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Forest
Service

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Draft Environmental Impact Statement

Ashley National Forest Plan Revision

Ashley National Forest Plan Revision
Environmental Impact Statement
Vernal, Utah

Lead Agency:	United States Department of Agriculture (USDA) Forest Service
Cooperating Agencies:	Daggett County, Utah Duchesne County, Utah Summit County, Utah Utah County, Utah Uintah County, Utah State of Utah Daggett Conservation District, Utah Uintah Conservation District, Utah State of Wyoming Sweetwater County, Wyoming Sweetwater Conservation District, Wyoming Uinta Conservation District, Wyoming Ute Indian Tribe
Responsible Official:	Susan Eickhoff, Forest Supervisor Ashley National Forest 355 North Vernal Avenue Vernal, Utah 84078 (435) 789-1181

Abstract: To comply with the National Forest Management Act and 2012 Planning Rule (36 Code of Federal Regulations 219), and address changes that have occurred during the past 30 years, the Forest Service proposes to revise the existing 1986 Ashley National Forest Plan. This draft environmental impact statement (DEIS) contains the analysis of impacts of four alternatives developed for programmatic management of the approximately 1.4 million acres administered by the Ashley National Forest staff. Alternative A (referred to as the current plan in this document) is the no-action alternative, which is the 1986 forest plan, as amended. Alternative B is the proposed forest plan, which was modified based on public and internal comments. This alternative addresses changes in conditions and demands since the 1986 forest plan was published; it meets objectives of Federal laws, regulations, and policies. Alternative C emphasizes preservation of the natural setting and the use of passive management to move toward desired conditions for vegetation and fire management. Alternative D focuses on accomplishing desired conditions by shared funding and cooperation with partners.

Comments: The publication of a notice of availability in the *Federal Register* for the DEIS, which was also announced and advertised in local and regional media, began a 90-day period wherein the public is invited to comment on the adequacy of the DEIS. This 90-day period also includes public meetings where the public can provide comments. The Forest Service then will review the comments and prepare responses to each. The Forest Service may modify the DEIS based on public comments. In any case, all comments and responses are incorporated into the final EIS. The Forest Service expects to make the final

EIS available in late 2021. It will be announced in the *Federal Register* and advertised in local and regional media.

The public can provide comments during the 90-day comment period in various ways, as follows:

- Attending a public meeting and providing written comments
- Submit electronic comments via the project website at https://www.fs.usda.gov/main/ashley/landmanagement/planning, which also includes the DEIS, information about public meetings, and other information, documents, and announcements about the National Environmental Policy Act process
- Writing to the Ashley National Forest at the following address:

    Forest Plan Revision Team Leader
    Forest Plan Revision DEIS Comments
    Ashley National Forest
    355 North Vernal Avenue
    Vernal, Utah 84078

Anyone requesting further information may email AshleyForestPlan@usda.gov, or call (435) 781-5118.

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Figures

(All additional figures are included in Appendix A.)

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Acronym or Abbreviation	Full Term
ATV	all-terrain vehicle
BLM	U.S. Department of the Interior, Bureau of Land Management
CCF	hundred cubic feet
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DEIS	draft environmental impact statement
EIS	environmental impact statement
EO	executive order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FGNRA	Flaming Gorge National Recreation Area
FLPMA	Federal Land Policy and Management Act
Forest Service	United States Department of Agriculture Forest Service
GIS	geographic information systems
HVRA	high-value resource area
IAP	Intermountain Adaption Partnership
IPaC	USFWS Information for Planning and Conservation
IRA	inventoried roadless areas
mcf	thousand cubic feet
MBF	thousand board feet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHD	National hydrology dataset
NHPA	National Historic Preservation Act
NRA	National Recreation Area
NRCS	Natural Resources Conservation Service
NRGA	National Recreation and Geologic Area
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWSRS	National Wild and Scenic Rivers System
OHV	off-highway vehicle
ORV	outstandingly remarkable value
PM	particulate matter
PM_{10}	particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter

RNA .... research natural area
ROS .... recreation opportunity spectrum
ROW .... right-of-way
SCC .... species of conservation concern
SIO .... scenic integrity objectives
SMS .... Scenery Management System

Tg .... teragram

UDWR .... Utah Division of Wildlife Resources
USC .... United States Code
USDA .... United States Department of Agriculture
USFWS .... United States Fish and Wildlife Service

VCC .... vegetation condition class
VCMQ .... vegetation classification, mapping, and quantitative inventory
VMS .... Visual Management System
VQO .... visual quality objective

WCF .... watershed condition framework

Summary

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Summary

Introduction

The National Forest Management Act of 1976 (Public Law 94-588) requires the preparation of an integrated land management plan by an interdisciplinary team for each unit of the National Forest System. The 2012 Planning Rule[1] (36 Code of Federal Regulations [CFR] 219.17(3)(b)(1)) guides the revision of land management plans to promote ecological, social, and economic sustainability of National Forest System lands and communities.

The Forest Service has prepared this draft environmental impact statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and state laws and regulations. This draft EIS discloses the broad potential effects of a proposed revision of the Ashley National Forest Land and Resource Management Plan (Forest Service 1986). This document describes, in general terms, the expected effects of management during the plan period; it does not predict the site-specific effects of future speculative actions each time the standards and guidelines are implemented at the project level. Those site-specific effects would be disclosed in subsequent NEPA reviews during the implementation of individual projects.

Additional documentation, including more detailed analyses of planning area resources, may be found in the planning record located at the Ashley National Forest supervisor's office.

Proposed Action

The Forest Service proposes to revise the Ashley National Forest Land and Resource Management Plan (Forest Service 1986), referred to as the "forest plan," to meet the legal requirements of the National Forest Management Act and the provisions of the 2012 Planning Rule. The proposed action is to create one unified forest plan for the Ashley National Forest; address gaps in current plan direction and changes in ecological, social, and economic conditions; and comply with the 2012 Planning Rule and other new laws, policy, regulation, and Forest Service direction adopted since 1986. The revised forest plan will describe the strategic intent of managing the Ashley National Forest for the next 10 to 15 years and will address the identified need to change the existing forest plan. The area affected by the proposal includes approximately 1.4 million acres of public land in northeastern Utah and southwestern Wyoming.

Purpose and Need

The purpose and need for revising the forest plan are to: 1) meet the legal requirements of the National Forest Management Act and the 2012 Planning Rule; 2) address the changed economic, social, and ecological conditions in the plan area that have occurred since the current forest plan was approved in 1986, and new focus topics described below; and 3) guide natural resource management activities on the Ashley National Forest for the next 10 to 15 years. The Forest Service developed the Ashley National Forest's needs for change from findings of the Assessment, public comments, and a series of collaborative

[1] The National Forest Management Act (NFMA) of 1976 requires every national forest or grassland managed by the Forest Service to develop and maintain an effective land management plan (also known as a forest plan). The process for the development and revision of plans, along with the required content of plans, is outlined in planning regulations, often referred to as the planning rule.

public workshops. The following five focus topics have been identified in the preliminary need to change the existing plan: 1) sustainable recreation, 2) economic resiliency, 3) managing traditional resources, 4) tribal and cultural resources, and 5) managing for resilient ecosystems and watersheds.

Engagement of State and Local Governments, Other Federal Agencies, and Indian Tribes

NEPA requires the Forest Service to coordinate planning with other Federal agencies that have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (see 40 CFR 1501.8). In addition, a State, tribal, or local agency of similar qualifications may become a cooperating agency by agreement with the lead agency. The following have been formally identified as cooperating agencies for this EIS:

- Daggett County, Utah
- Duchesne County, Utah
- Summit County, Utah
- Utah County, Utah
- Uintah County, Utah
- State of Utah, Public Lands Policy Coordinating Office
- Daggett Conservation District, Utah
- Uintah Conservation District, Utah
- State of Wyoming, Governor’s Policy Office
- Sweetwater County, Wyoming
- Sweetwater Conservation District, Wyoming
- Uinta Conservation District, Wyoming
- Ute Indian Tribe

The Forest Service collaborated with cooperating agencies throughout the planning process to consider ways the forest plan could contribute to common objectives, address impacts, resolve or reduce conflicts, and contribute to compatibility between the Forest Service and other agencies’ plans.

Public Engagement

The Forest Service publicly launched the forest plan revision process in 2016. A *Federal Register* notice of initiation to start the assessment phase of the process was published on July 22, 2016 (*Federal Register* Vol. 81 No. 141, p. 47749). The Forest Service hosted open house, public meetings during July and August 2016 in Utah and Wyoming to invite comments on the proposed list of species of conservation concern, the wilderness evaluation process, the wild and scenic rivers evaluation process, the areas of influence being considered for plan revision, and information and issues important to the assessment. The Forest Service held more open houses and public meetings in July 2017 to solicit comments on the draft assessment report. The Forest Service released wilderness inventory findings for review and comment at these meetings, and field trips related to the wilderness inventory were held in September and October 2017.

After releasing the final assessment report in October 2017, the Forest Service held four workshops in 2018 that further discussed topics the public had previously identified as priorities. The workshops initiated early discussion on the goals the attendees wanted to see in the draft forest plan. Throughout 2018 and part of 2019 the Forest Service worked on numerous drafts of a proposed forest plan that would be the basis of the environmental analysis.

The public scoping period for the EIS was initiated with the publication of the notice of intent in the *Federal Register* on September 10, 2019. A 60-day comment period was held from September 10 through November 8, 2019. The comment period provided the public with an opportunity to review: the need for change document, the proposed forest plan, the draft wild and scenic rivers eligibility report, and the draft wilderness evaluation report. Additionally, the Forest Service held five open house meetings in Utah and Wyoming in conjunction with the public comment period in the fall 2019 to begin scoping for the draft EIS on the forest plan revision.

Significant Issues

The Forest Service compiled all public concerns related to the proposed revision of the forest plan into issue statements, which were then categorized as significant or nonsignificant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action, that involved potentially significant effects, and that could be meaningfully and reasonably evaluated and addressed within the programmatic scope of the forest plan. Nonsignificant issues were identified as those that were not related to the decision to be made, were related to concerns outside the scope of analysis, were related to concerns that have been or will be addressed by a separate planning process, or involved implementation-level decisions. The Council on Environmental Quality NEPA regulations provide the following explanation for this delineation in section 1501.7: "Identify and eliminate from detailed study the issues which are not significant, or which have been covered by prior environmental review (§ 1506.3)."

The planning team identified five main categories of significant issues, which drove the subsequent development of alternatives: 1) sustainable recreation; 2) designated areas; 3) fire and fuels management; 4) vegetation management, timber harvest, and sustainable ecosystems; and 5) social and economic contributions.

Alternatives

The Forest Service developed the revised plan alternatives based on the Ashley National Forest assessment (Forest Service 2017); the need for change; desired conditions; implementation and monitoring of the current forest plan; public, agency, and tribal input; and issues derived from comments received during the public scoping period. Four alternatives for the draft forest plan are analyzed in this draft EIS: alternative A, the existing forest plan (as amended) and no-action alternative; alternative B, the draft proposed action, which was modified based on public and internal comments; alternative C, which emphasizes preservation of the natural setting and passive management to move toward desired conditions for vegetation and fire management; and alternative D, which focuses on accomplishing desired conditions by shared funding and cooperation with partners.

The alternatives represent a reasonable range of possible management options from which to choose, as required by NEPA (see 40 CFR 1505.14). All alternatives comply with law, regulation, and Forest Service policy. The Forest Service has not identified a preferred alternative(s) at this point; it plans to identify a preferred alternative in the final EIS after reviewing and considering the analysis presented in this document and comments received from the public.

Conclusions about the Effects of the Alternatives

The Forest Service recognizes that there may be implications or long-term environmental effects of managing the Ashley National Forest under any of the four alternatives. Consequences are based on predicted implementing activities and are meant to compare alternatives on a programmatic level, rather than provide exact measurements of effects. The Ashley National Forest's existing environment and the potential consequences to that environment from implementing the four alternatives are described in chapter 3.

The following assumptions are common to all resources in this draft EIS:

- No direct environmental effects will result from the administrative action of developing or revising the forest plan. Proposed actions will not be approved or otherwise authorized based on the content of the forest plan; however, they must be consistent with plan components, which include desired conditions, objectives, standards, guidelines, designation of management areas, suitability determinations, and monitoring requirements.
- Components of the forest plan reflect compliance with current Federal, state, and local laws and regulations, and U.S. Department of Agriculture and Forest Service policy.
- Plan decisions (desired conditions, objectives, standards, and guidelines) and other plan direction (management areas and monitoring) will guide future planning decisions or implementation of site-specific projects and activities.
- Funding levels will be similar to those of the past 5 years.
- Effects analyses are applicable for the expected life of the forest plan, which is estimated to be from 10 to 15 years. Other time frames may be specifically analyzed, depending on the resource and potential consequences.
- Visitation and use of National Forest System lands and facilities will increase during the life of the plan.
- The spatial extent for most resources is the decision area, as defined in chapter 1. Some resources may have different spatial extents, which will be defined in those resource sections.
- Monitoring identified in the monitoring chapter of the proposed plan will occur, and the land management plan will be amended, as needed, during the life of the plan. Monitoring will be used to measure the continued applicability of plan components and the need for future amendments.
- Individual proposed actions are not evaluated in this draft EIS nor are they defined by specific location, design, and extent. Rather, the effects described are generic and used to compare the relative effects of alternatives on a forestwide basis.
- There may be minor, but acceptable, discrepancies between the surveyed acres from the Ashley National Forest administrative boundary and the geographic information system layers used to define administrative or other area boundaries.

Chapter 1

Purpose of and Need for Action

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Chapter 1. Purpose of and Need for Action

Introduction

The National Forest Management Act of 1976 (Public Law 94-588) requires the preparation of an integrated land management plan by an interdisciplinary team for each unit of the National Forest System. The National Forest System land management planning rule (36 Code of Federal Regulations [CFR] 219; hereinafter referred to as the 2012 Planning Rule) is intended to create plans that guide integrated resource management in the plan area—in this case, the lands the Forest Service administers on the Ashley National Forest—within the context of the broader landscape. It takes an integrated and holistic approach that recognizes the interdependence of ecological processes with social, cultural, and economic systems.

The Forest Service has prepared this environmental impact statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and state laws and regulations. This draft EIS discloses the potential effects of a proposed revision of the Ashley National Forest Land and Resources Management Plan (Forest Service 1986). This document describes, in general terms, the expected effects of management during the plan period, but it does not predict the site-specific effects of future speculative actions each time the standards and guidelines are implemented at the project level. Those site-specific effects would be disclosed in subsequent NEPA reviews for proposed projects and activities.

The revised Ashley National Forest Land Management Plan (also known as the forest plan) will provide broad, strategic guidance that is consistent with other laws and regulations. Though it will provide strategic guidance, no decisions will be made regarding the regulation of public activities and access to Federal lands; the management of individual roads, trails, or areas associated with the Travel Management Rule (36 CFR 212); or permitted activities, such as grazing and use by outfitters and guides. These activities, projects, and site-specific management actions are managed through separate administrative and regulatory processes. Similarly, no decision regarding oil and gas leasing availability will be made, although plan components may be brought forward or developed in the future that will help guide oil and gas leasing availability decisions that may be necessary. Some actions (such as hunting regulations), although important, are outside Forest Service authority and cannot be included in the proposed action.

Additional documentation, including more detailed analyses of plan area resources, may be found in the planning record located at the Ashley National Forest supervisor's office.

Plan Area

The Ashley National Forest encompasses about 1.4 million acres in northeastern Utah and southwestern Wyoming. The national forest is located in three major areas: the northern and southern slopes of the Uinta Mountains, the Wyoming Basin, and the Tavaputs Plateau. Elevations range from 5,500 feet on the Green River below Little Hole near Dutch John, to 13,528 feet at the summit of Kings Peak (the highest point in Utah). About 70 percent of the Ashley National Forest falls within the Uinta Mountains. The Uintas are the largest east-west-trending mountain range in the lower 48 states. Together with the Tavaputs Plateau, the Uinta Mountains provide a unique ecological transition zone, connecting the northern and southern Rocky Mountains. Nationally designated areas include the High Uintas Wilderness, Ashley Karst National Recreation and Geologic Area, and the Flaming Gorge National Recreation Area.

The Ashley National Forest falls predominantly within four counties on the northern border of Utah and southern border of Wyoming: Daggett, Duchesne, and Uintah Counties in Utah, and Sweetwater County in Wyoming. Small portions of the Ashley National Forest also lie within Utah, Wasatch, and Summit Counties in Utah. Portions of the forest are within the original Uintah and Ouray Ute Indian Reservation, and the forest shares many miles of common boundary with the Ute Indian Tribe. In addition, Uinta County, Wyoming, is in close proximity to the Ashley National Forest (see figure 1-1). These communities and counties are connected in one way or another to the various ecosystem and economic benefits the Ashley National Forest provides.

The Ashley National Forest is generally considered a rural national forest with many traditional uses. Typical uses and activities include land- and water-based recreation (such as camping, hiking, boating, and all-terrain vehicle [ATV] riding), livestock grazing, commercial timber harvest, oil and gas production, hard rock mining, firewood gathering, hunting, fishing, viewing scenery and wildlife, and visiting historic and prehistoric sites. The Ute Indian Tribe has a unique interest in the Ashley National Forest and values the lands on the Ashley National Forest for many reasons including hunting and gathering, ceremonial and traditional uses, and ancestral connections. Portions of the Forest are within the original Uintah and Ouray Indian Reservation. Local Native American tribes value the lands on the Ashley National Forest for hunting and gathering, ceremonial and traditional uses, and ancestral connections.

Proposed Action

The Forest Service proposes to revise its 1986 Land and Resources Management Plan for Ashley National Forest, in compliance with the 2012 Planning Rule, to provide strategic, program-level guidance for management of the Ashley National Forest's resources and uses over the next 10 to 15 years. The proposed action is to create one unified forest plan for the Ashley National Forest; address gaps in current plan direction and changes in ecological, social, and economic conditions; and comply with the 2012 Planning Rule and other new laws, policy, regulation, and Forest Service direction adopted since 1986.

Specific details about the proposed action are provided in chapter 2.

Purpose of and Need for Action

The purpose for revising the current Ashley National Forest Plan is threefold: (1) the 1986 forest plan is over 30 years old and has been amended 24 times, (2) since the 1986 forest plan was approved in 1986, there have been changes in economic, social, and ecological conditions; new policies and priorities; and new information based on monitoring and scientific research, and (3) the Forest Service needs to address the focus topics identified in the need to change the existing plan (sustainable recreation, economic resiliency, managing traditional resources, tribal and cultural resources, and managing for resilient ecosystems and watersheds).

The need to change the forest plan has been organized into five focus topics to help ensure the purpose of and need to revise the forest plan are met. The focus topics are as follows:

1. There is a need for sustainable recreation. This includes balancing recreation use with ecological integrity, addressing population increases and aging populations, and addressing shifts in the types of preferred recreation.
2. There is a need for economic resiliency. This includes balancing local communities and economies with ecosystem services generated on the Ashley National Forest, such as municipal water, recreation, employment, and tourism.
3. There is a need to manage traditional resource uses. This includes conserving and encouraging traditional uses, such as mineral development, livestock grazing, timber and woodland products use, and fuelwood collection. There is a need to balance these uses with other multiple uses while transitioning from commodity-based goods to a focus on restoration, resiliency, and sustainability within emerging economic opportunities.
4. There is a need to manage cultural resources and improve tribal relationships and partnerships, to provide for subsistence and other cultural activities, including guidance to manage areas of tribal importance.
5. There is a need to manage for resilient ecosystems and watersheds. This includes protecting and restoring terrestrial and aquatic ecosystems and non-forest communities.

Decision Framework

The 2012 Planning Rule specifies eight primary decisions to be made in forest plans:

- Forestwide components to provide for integrated social, economic, and ecological sustainability; a diversity of plant and animal communities; ecosystem services; and multiple uses, and to manage timber as required under the National Forest Management Act of 1976 (NFMA). Components must be within the Forest Service’s authority and consistent with the inherent capability of the national forest (36 CFR 219.7 and 219.8–219.11).
- Identification of geographic area and management area-specific components (36 CFR 219.7(d)).
- Identification of suitability of areas for the appropriate integration of resource management and uses, including lands suited and not suited for timber production (36 CFR 219.7(c)(2)(vii) and 219.11).
- Identification of the maximum quantity of timber that may be removed from the national forest (36 CFR 219.7(c)(2)(ix) and 219.11(d)(6)).
- Identification of watersheds that are a priority for maintenance or restoration (36 CFR 219.7(f)(i)).
- Recommendations to Congress (if any) for lands suitable for inclusion in the National Wilderness Preservation System and rivers eligible for inclusion in the National Wild and Scenic Rivers System (NWSRS) (36 CFR 219.7(c)(2)(v) and (vi))
- Identification or recommendation (if any) of other designated areas (36 CFR 219.7(c)(2)(vii)).
- Identification of plan monitoring questions and indicators for the plan monitoring program (36 CFR 219.7(c)(2)(x) and 219.12).

The Forest Supervisor for the Ashley National Forest will make the final decision on the selected alternative for the revised forest plan. The Forest Supervisor will review the proposed action, the other alternatives, and the environmental consequences and decide which plan alternative best meets the desired conditions, multiple-use concept, diverse needs of the people, and sustainable management of the Ashley National Forest, as well as the requirements of the National Forest Management Act of 1976 and the Multiple-Use Sustained-Yield Act of 1960. The Forest Supervisor, who is the responsible official for the forest plan, will issue a draft record of decision, in accordance with agency decision-making procedures (40 CFR 1505.2) that will disclose and discuss:

- the decision (identifying the selected alternative) and reasons for the decision;
- how public comments and issues were considered in the decision; and
- how all alternatives were considered in reaching the decision, specifying which one is the environmentally preferable alternative (defined in 36 CFR 220.3).

As required by the planning rule (36 CFR 219.14(a)), the draft record of decision will also include:

- a statement of how the plan, plan amendment, or plan revision applies to approved projects and activities (36 CFR 219.14(a)(2) and 219.15)
- documentation of how the best available scientific information was used to inform planning, the plan components, and other plan content, including the plan monitoring program (36 CFR 219.3 and 219.14(a)(3))

The revised forest plan will provide integrated plan direction for managing the national forest for the next 10 to 15 years. However, even after approval of the plan, project-level environmental analyses and decisions will still need to be completed for specific proposals to implement the direction in the forest plan. Forest plans do not make budget decisions.

Direction Not Addressed in the Forest Plan

It is important to note that forest plans set broad direction; they do not include site-specific direction for where future projects will occur or how many permits will be issued. Forest plans provide a framework for integrated resource management and for guiding project and activity decision-making. Forest plans reflect the unit's expected distinctive roles and contributions to the local area, region, and Nation, and the roles for which the plan area is best suited, considering the agency's mission, the unit's unique capabilities, and the resources and management of other lands in the vicinity. Forest plans also do not affect treaty rights or other valid existing rights established by statute. Therefore, future forest plan direction will not include:

- Direction about Specific Roads and Trails: Determinations about which roads and trails will be opened or closed to specific types of motorized and nonmotorized uses are not addressed at the forest plan level. Travel management planning is a project-level decision that requires a site-specific analysis; however, the forest plan may provide context and guidance for future travel management decisions.
- Authorizations or Availability for Oil and Gas Leasing: Determinations of lands suitable or available for future oil and gas leasing, as well as stipulations for such leasing, are made through the leasing analysis process. The forest plan will not make leasing availability decisions, provide site-specific authorizations for oil and gas leases, or change existing lease stipulations.
- Designation of Wilderness or Wild and Scenic Rivers: The formal designation of wilderness and wild and scenic rivers will not occur during the plan revision because only Congress can perform these acts. The forest plan revision process can recommend areas for wilderness designation, or

recommend rivers or river segments to be eligible or suitable for wild and scenic river status. Such temporary classifications do not guarantee formal designation, but they do influence forest plan guidance of how to manage the recommended areas.

- Changes to Designated Roadless Areas: The boundaries of inventoried roadless areas defined by the 2001 Roadless Area Conservation Rule cannot be changed at the national forest level. The Roadless Rule can only be modified through a national rulemaking process or congressional action.
- Numbers and Types of Permits: Determining the number of livestock permitted to graze or the types and numbers of other types of permits is managed at the site-specific project level. However, the forest plan will establish desired conditions and other guidance with which permitted activities will need to be consistent.
- Changes to Existing Water Rights: The National Forest Management Act does not authorize bypass flow or water rights transfer requirements; rather, it directs the Forest Service to prepare management plans that provide for multiple uses and sustained yield of forest resources in accordance with the Multiple-Use Sustained-Yield Act of 1960. The act specifies that the national forests shall be managed for outdoor recreation, range, timber, watershed, and wildlife, fish, and aquatic species purposes, and contains no grant of authority for bypass flow requirements to the Forest Service. The National Forest Management Act does not contain any other specific directives governing Forest Service management of water resources. The forest plan will establish desired conditions and other guidance for watershed management; however, it will not address transfer of water rights.

Relationship to Other Entities

NEPA requires the Forest Service to coordinate planning with other Federal agencies that have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (see 40 CFR 1501.8). In addition, a State, tribal, or local agency of similar qualifications may become a cooperating agency by agreement with the lead agency. The following entities have been formally identified as cooperating agencies for this EIS:

- Daggett County, Utah
- Duchesne County, Utah
- Summit County, Utah
- Utah County, Utah
- Uintah County, Utah
- State of Utah, Public Lands Policy Coordinating Office
- Daggett Conservation District, Utah
- Uintah Conservation District, Utah
- State of Wyoming, Governor’s Policy Office
- Sweetwater County, Wyoming
- Sweetwater Conservation District, Wyoming
- Uinta Conservation District, Utah
- Ute Indian Tribe

The Forest Service collaborated with cooperating agencies throughout the planning process to consider ways the forest plan could contribute to common objectives, address impacts, resolve or reduce conflicts, and contribute to compatibility between the Forest Service and other agencies' plans. See Chapter 4, Consultation and Coordination, for additional details.

Public Involvement

The Forest Service began the forest plan revision process in 2016. A notice of initiation to start the assessment phase of the process was published in the *Federal Register* on July 22, 2016 (*Federal Register* Vol. 81 No. 141, 47749). Prior to the July 2016 notice, the Forest Service met with cooperating agencies to present the proposed revision process, discuss the public involvement plan, and solicit pertinent data and information to use for the assessment.

The Forest Service also hosted open house public meetings during July and August 2016 in Utah and Wyoming to invite comments on the proposed list of species of conservation concern (SCC), the wilderness evaluation process, the wild and scenic rivers evaluation process, the areas of influence being considered for plan revision, and information and issues important to the assessment. The Forest Service held more open houses and public meetings in July 2017 to solicit comment on the draft assessment report. The Forest Service released wilderness inventory findings for review and comment at these meetings, and field trips related to the wilderness inventory were held in September and October 2017.

After releasing the final assessment report in October 2017, the Forest Service held four "hot-topic" workshops in 2018, to delve deeper into the current science and social and economic demands facing national forest management. The topics were issues the public previously indicated were priorities. The "hot topic" workshops enlisted input from participants on goals and strategies the Forest Service might consider carrying into the early drafts of the proposed forest plan. Throughout 2018 and part of 2019 the Forest Service worked with the cooperating agencies to develop and refine numerous drafts of the proposed forest plan. This forest plan is this proposed action that would be the basis of the environmental analysis phase.

The public scoping period for the EIS was initiated with the publication of the notice of intent in the *Federal Register* on September 10, 2019. A 60-day comment period was held from September 10 through November 8, 2019. The comment period provided an opportunity for the public to review the preliminary need for change document, proposed direction in a proposal to revise the land management plan (proposed forest plan), the draft wild and scenic rivers eligibility report, and the draft wilderness evaluation report.

The Forest Service held five open house meetings in conjunction with the public comment period in the fall of 2019 to begin scoping for the draft EIS on the forest plan revision. Table 1-1 summarizes the meeting locations, dates, and number of attendees.

Table 1-1. Public Meeting Summary

Meeting Date	Meeting Location	Attendees
October 7, 2019	Green River, Wyoming	9
October 8, 2019	Vernal, Utah	20
October 9, 2019	Duchesne, Utah	17
October 10, 2019	Manila, Utah	10
October 11, 2019	Salt Lake City, Utah	4

Document Structure

This EIS discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

- *Chapter 1. Purpose of and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This chapter also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2. Alternatives, Including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. The Forest Service developed these alternatives based on significant issues raised by the public and other agencies. Chapter 2 presents a summary of the alternatives in comparative form, providing the decisionmaker a clear basis for choice among options. This information is supplemented by a matrix of the plan components which vary by alternative, provided in appendix B. This discussion also includes mitigation measures.
- *Chapter 3. Affected Environment and Environmental Consequences*: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This chapter summarizes the information used to compare alternatives contains the detailed basis used to measure the potential environmental consequences of each alternative.
- *Chapter 4. Consultation and Coordination:* This chapter provides a list of preparers and agencies consulted during the development of the EIS.
- *Glossary, References, and Index:* The glossary provides a list of terms and definitions used in the EIS. The references section provides citations to literature sources used in the document. The index provides page numbers for specific terms.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the EIS. The entirety of the forest plan (alternative B), is provided as appendix E.

Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record located at the Ashley National Forest supervisor's office in Vernal, Utah.

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Chapter 2

Alternatives, Including the Proposed Action

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Chapter 2. Alternatives, Including the Proposed Action

Introduction

This chapter describes and compares the alternatives the responsible official considered for the forest plan. It includes a discussion of how the alternatives were developed, the issues raised, descriptions and comparisons of the alternatives, and alternatives that were not considered in detail. Numbers, such as acres, miles, and volumes, are approximate due to the use of geographic information systems data and rounding. Except for designated areas, acres displayed are rounded to the nearest 100.

Development of Alternatives

As discussed in chapter 1, this forest plan revision effort is based on the requirements of the 2012 Planning Rule, findings of the forest assessment, changes in conditions and demands since the 1986 forest plan, and public concerns. A list of significant issues was identified from the public involvement period, and some of these issues drove the development of alternatives. Some components, such as the Wild and Scenic River eligibility study and the wilderness inventory and evaluation, are addressed in the revision because they are required by planning regulations (such as 36 CFR 219.17(3)(b)(1)).

The Council on Environmental Quality regulations, with respect to the National Environmental Policy Act (NEPA) procedures and specifically to the aspect related to alternatives development (36 CFR 40 1502.14), are fundamental to the process. This DEIS was developed and written consistent with Council on Environmental Quality NEPA direction that existed at the outset of the notice of intent in September, 2019. The relevant section of the CFR reads as follows:

> Based on the information and analysis presented in the sections on the affected environment (1502.15) and the environmental consequences (1502.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public. In this section agencies shall:
>
> a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.
> b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.
> c) Include reasonable alternatives not within the jurisdiction of the lead agency.
> d) Include the alternative of no action (which represents the current plan).
> e) Identify the agency’s preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.
> f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

All reasonable alternatives to the proposed action must meet the purpose of and need for change and address one or more of the significant issues. Not all possible alternatives were carried into detailed study because the list of options would have been prohibitively large. Instead, the responsible official identified those alternatives that met the criteria and created a reasonable range of outputs, direction, costs, management requirements, and effects from which to choose.

Revised plan alternatives represent a range of possible management options. Information presented here and in chapter 3 provides the basis from which to evaluate the comparative merits of the alternatives. Each alternative emphasizes specific land and resource uses and deemphasizes other uses in response to the significant issues.

Alternative A (referred to as the current plan in this document) is the no-action alternative, which reflects the 1986 forest plan, as amended to date, and accounts for current laws, regulations, and terms and conditions from biological opinions. Alternative B is based on the Forest Service's response to public comment and internal review on the Proposal to Revise the Land Management Plan, provided for scoping, and a subsequent draft of the proposed plan. Development of alternatives C and D was driven by issues identified during scoping.

The Forest Service has not identified a preferred alternative(s) at this point; it plans to identify a preferred alternative in the final environmental impact statement after reviewing and considering the analysis presented in this document and comments received by the public.

Significant Issues

Issues serve to highlight effects or unintended consequences that may occur from the proposed action or alternatives, giving opportunities during the analysis to reduce adverse effects and to compare trade-offs for the decision maker and public to understand. The Forest Service's planning team categorized the issues identified during scoping and identified those considered to be significant. Significant issues were defined as those directly or indirectly caused by implementing the proposed action, that involved potentially significant effects, and that could be meaningfully and reasonably evaluated and addressed within the programmatic scope of the forest plan.

The planning team identified five main categories of significant issues that drove the subsequent development of alternatives:

Sustainable Recreation

Recreation-related comments represented the topic with the highest level of interest during the public scoping period. Commenters provided input on the allowable uses, size, and locations of backcountry management areas. In addition, suggestions were provided on the use of recreation emphasis areas as a way for the forest plan to provide management in specific areas where many different recreation uses are concentrated. Additionally, some commenters stated that the Forest Service should provide opportunities for nonmotorized recreation and manage portions of the Ashley National Forest as closed to off-highway vehicle use, while others requested additional opportunities for motorized recreation. Based on this input, a range of alternatives was developed for the size and use of backcountry management areas, general recreation areas, and destination recreation areas. Finally, scenic integrity objectives (SIOs) were developed and modified, as appropriate, to provide for the scenic character, which is a component of sustainable recreation in the 2012 Planning Rule. A range of alternatives was developed for SIOs based on resource integration for ecological, social, and economic sustainability and multiple uses.

Designated Areas

Comments included suggestions for designated areas, including recommended wilderness. Some commenters stated that the Forest Service should analyze an alternative that manages all the wilderness inventory areas being proposed as recommended wilderness areas. Other commenters stated that an alternative should be included that analyzes none of the wilderness quality areas being proposed as recommended wilderness areas. The Forest Service has included a range of alternatives related to recommended wilderness to address these concerns. This includes the continuation of no recommended wilderness under alternative A and the inclusion of all areas meeting the requirements for wilderness under the wilderness inventory and determined to be suitable for wilderness recommendation under the wilderness review under alternative C.

Fire and Fuels Management

Some commenters stated that management in the forest plan should focus on protecting communities, infrastructure, and natural resources from hazardous fuels conditions. Issues brought up the need to identify high-risk areas for wildfire and employ a variety of methods to treat fire; for instance, alternative D allows more motorized access for fuels treatment. In response, the Forest Service developed plan components at the forestwide level to support fuels management. Due to potential trade-offs in fuels management and desired conditions for other resources, a range of fuels management direction was provided across alternatives.

Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Concerns brought forward in public scoping included concerns related to management of forage as well as forested vegetation and timber harvest. In addition, some commenters provided recommendations to increase timber production to achieve desired vegetation conditions and to stimulate local economies. The Forest Service also received comments on specific wildlife concerns, including management of bighorn sheep. Additional concerns brought forward were related to sustainable ecosystems for wildlife, including management of soil and water resources.

Social and Economic Contributions

Social and economic ties to the local and regional economy were a concern brought forward in public scoping across resources and resource uses. Recreation, and the importance of recreation opportunities on the Ashley National Forest, were a primary concern for local communities. Other resources of note with social and economic importance included livestock grazing and management of forested resources for community wildfire protection and for timber resources. While plan components specifically related to socioeconomics are intentionally broad in nature and do not vary by alternative, the Forest Service included variation in management related to recreation management areas and allowed uses to address these concerns.

Alternatives

The range of alternatives developed and presented is based on an evaluation of the information gathered from public and internal comments and the purpose and need. While all alternatives provide a wide range of ecosystem services and multiple uses, some give greater emphasis to selected resources based on the theme of the alternative and the response to the focus topics identified in the need to change.

The Forest Service developed the revised plan alternatives based on the Ashley National Forest assessment (US Forest Service 2017a); the need for change; desired conditions; implementation and monitoring of the current forest plans; public, agency, and tribal input; and comments received during the public scoping period. The alternatives represent a range of possible management options from which to choose. Each alternative emphasizes specific land and resource uses and deemphasizes other uses in response to the revision topics. Some components may vary between alternatives to address the issues identified during scoping; the description of the alternatives provides specific details. Plan direction for desired conditions, goals, standards, and guidelines typically remains constant for all revised plan alternatives, with the exceptions noted.

In addition to the no-action alternative (A) (often referred to as the current plan in this document) and the proposed action (B), which was modified based on public and internal comments, two additional alternatives (C and D) were developed based on the identified issues. The alternatives span the range of forest management practices and uses of available resources. The general theme and intent of each alternative is summarized below, in relationship to the issues that drove alternatives.

The Forest Service has provided a full suite of plan components for alternative B in the forest plan (appendix E). A limited number of plan components and acres assigned to management areas vary by alternative. A summary of key changes in alternatives is included in the narrative below and in the tables provided in the "Comparison of Alternatives" section of this chapter.

Elements Common to All Alternatives

All alternatives adhere to the principles of multiple use and the sustained yield of goods and services required by 36 CFR 219.1(b). All alternatives are designed to:

- Comply with laws, regulation, and policy
- Provide integrated plan components, including desired conditions, objectives, standards, guidelines, suitability of uses, and monitoring. Desired conditions are common across all alternatives, based on needs for change identified in the assessment of forest resource condition and trends. Desired conditions are described in detail in alternative B (appendix E).
- Conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land
- Maintain air quality that meets or exceeds applicable Federal, State, and local standards and regulations
- Use a common list of species of conservation concern (SCC). The SCC were selected based on regional guidance and recommendations from forest and State agency specialists
- Provide appropriate habitat to support species' viability and critical habitat for threatened and endangered species across the planning area ecological conditions to contribute to the recovery of, or restore critical habitat for, federally listed threatened and endangered species or to conserve federally listed proposed and candidate species
- Provide protection for riparian areas
- Recognize the value of traditional and cultural uses and their relationship to the Ashley National Forest
- Protect cultural resources

All alternatives will provide management direction in keeping with language in legislative direction for the designated High Uinta Wilderness Area (276,175 acres on the Ashley National Forest). Inventoried roadless areas (approximately 637,700 acres on the Ashley National Forest) will be managed in accordance with relevant regulations. In addition, management direction provides for two river segments previously determined to be suitable for inclusion in the National Wild and Scenic River system. Other designated areas include the Ashley Karst National Recreation and Geologic Area and Flaming Gorge National Recreation Area (FGRNA). Separate management plans will be prepared for both areas; the

FGNRA is currently managed following the direction in appendix A of the 1986 forest plan. Two segments of national scenic byways would have the same management across all alternatives.

Supplemental management approaches included in the forest plan (see appendix B, attachment B) would be applicable under all alternatives. These management approaches describes potential management approaches, strategies, and coordination activities that may take place at the project or activity level to help maintain existing conditions or to achieve the desired conditions described in the plan.

Elements Common to Alternatives B, C, and D

The following are the same under all action alternatives:

- Plan direction is consistent with the 2012 Planning Rule and associated directives; it emphasizes adaptive management and considers the best available scientific information.
- Plan direction meets the purpose of and need for change and addresses one or more significant issue(s).
- Plan components provide for the ecological conditions to maintain a viable population of each species of conservation concern (SCC) within the plan area. The Regional Forester identified the SCC, based on the Forest Supervisor's recommendation; consideration of public and State agency comment; and Forest Service evaluations, using regional and national guidance. No SCC are identified under Alternative A.

In addition, each action alternative identifies designated areas, management areas, and associated plan direction that applies to these areas, in accordance with the 2012 Planning Rule (36 CFR 219.19 and 26 CFR 219.7(d)). These are described in further detail below.

Designated Areas

Designated areas are areas or features identified and managed to maintain the unique special character or purpose. Some categories of designated areas may be designated only by statute; some categories may be established administratively in the land management planning process or by other administrative processes of the Federal executive branch. Table 2-1 lists the designated areas common to alternatives B, C, and D and designation information. For additional information, see "Designated Areas" in chapter 3.

Table 2-1. Designated Areas Common to Alternatives B, C, and D

Designated Area Name[1]	Statute or Administratively Designated	Designation Authority
Flaming Gorge National Recreation Area[2]	Statutorily designated	Congressionally designated in 1968 by enactment of Public Law 90-540, Act to establish the Flaming Gorge National Recreation Area in the States of Utah and Wyoming,
High Uintas Wilderness[2]	Statutorily designated	Congressionally designated in 1984 by enactment of Public Law 98-428, Utah Wilderness Act of 1984
Ashley Karst National Recreation Area[2]	Statutorily designated	Congressionally designated in 2019 under the John D. Dingell, Jr. Conservation, Management, and Recreation Act

Designated Area Name[1]	Statute or Administratively Designated	Designation Authority
Sheep Creek Canyon Geologic Area[2]	Administratively designated	Designated by the Forest Service Intermountain Region in 1962
River segments identified as suitable for inclusion in the National Wild and Scenic Rivers System[2]	Administratively designated	Recommended for inclusion in the National Wild and Scenic Rivers System under the 2008 Wild and Scenic River Suitability Study for National Forest System Lands in Utah
Flaming Gorge-Uintas Scenic Byway and Dinosaur Diamond Scenic Byway[2]	Administratively designated	Designated by the Federal Highway Administration in 1998 and 2002, respectively
637,700 acres of inventoried roadless areas[2]	Administratively designated	Designated under the 2001 Roadless Area Conservation Rule (36 CFR 294)
Research natural areas[2]	Administratively designated	Individual areas designated by the Forest Service Intermountain Region between 1987 and 1996

[1]Alternatives B and C designated recommended wilderness areas. Recommended wilderness areas are administrative designations made by the responsible official. Wilderness designation is a statutory designation made by Congress. There are no wilderness designations under any alternative.
[2]These designated areas are also identified in alternative A; however, not all designated areas include plan direction under alternative A.

Management Areas

Management areas describe how plan components apply to specific parcels of National Forest System lands, with locations shown on maps. Every plan must have management areas, geographic areas, or both (36 CFR 219.7(d)). Management areas depict lands with integrated packages of compatible resource direction, and they may overlap with other management areas. Alternatives B, C, and D identify two types of management areas: historic and recreation management areas.

Historic management areas are specific areas or features on the Ashley National Forest that have been given a designation to maintain the unique character, purpose, or management emphasis. These include:

- Swett Ranch
- Ute Mountain Fire Lookout Tower
- Historic ranger stations
- Carter Military Road

Recreation management areas are locations on the Ashley National Forest where similar types and levels of recreation occur. Non-wilderness lands are divided into three distinct recreation management areas:

- Backcountry management areas
- General recreation areas
- Destination recreation areas

While the suitability of certain uses and spatial distribution of these recreation management areas change between alternatives, the overall intent and themes remain consistent across alternatives B, C, and D, as described below:

Backcountry management areas: These areas provide large, undeveloped landscapes suited for dispersed recreation use. The public should expect to see natural landscapes with few amenities, limited management, lower visitor uses and density levels, and a limited Forest Service presence. Wheeled motorized travel is suitable, consistent within the desired recreation opportunity spectrum settings as assigned and on designated roads, trails, and areas, except under alternative C. Mechanized travel (i.e., mountain bikes) is permitted on existing roads and trails.

General recreation areas: These management areas are where the concept of multiple use is most evident. They are the working landscape where dispersed and developed recreation, fuelwood gathering, vegetation management, livestock grazing, electrical transmission infrastructure, communication sites, and oil and gas production may occur. The public should expect to see a variety of ecosystem-conservation management activities and some lands modified to meet multiple-use objectives. A broad spectrum of landscapes, activities, and uses are included, ranging from relatively unaltered lands to areas of active management for purposes of meeting a variety of social, economic, and ecological objectives. Small pockets of concentrated use may exist, but these do not dominate the landscape. In summer, dispersed recreation, camping outside a developed campground, off-highway vehicle riding, and motorized water recreation are the most popular uses.

Destination recreation areas: The destination recreation areas provide the most intensive recreation development on the Ashley National Forest. The public should expect areas of high-density recreation with high use levels. In winter, portions of these areas provide facilities for winter uses, such as ice fishing and cross-country skiing. Recreationists are attracted to these settings because of the variety of opportunities. Motorized access and support facilities (roads, parking lots, water access and boating support services, campgrounds, resorts, and marinas) are emphasized.

Alternative A—No Action (Current Plan)

Alternative A, the no-action alternative, reflects current management practices under the 1986 forest plan, as amended and implemented, and provides the basis for comparing alternatives with current management and levels of output. The Council on Environmental Quality regulations (40 CFR 1502.14(d)) require that a “no action” alternative be analyzed in every EIS. This does not mean that nothing would occur under alternative A. The current forest plan would continue to guide management of the national forest, and ongoing work or work previously planned and approved would occur under that guidance. This alternative would not recommend any new management areas; no changes would occur to the plan in response to issues raised, and it would not adjust management in response to the requirements of the 2012 Planning Rule. A summary of current management is included below for the identified significant issues.

Sustainable Recreation

Management is provided based on an assumption of moderate to heavy levels of dispersed recreation projected for the Ashley National Forest. A variety of recreation opportunity spectrum (ROS) classes provides activities from roaded natural to primitive setting (see appendix A, figure 2-4). Management Area G, Undeveloped Dispersed Recreation, includes approximately 80,000 acres in four areas: Fish Creek, Uinta River, Lakeshore Basin, and Weyman Park.

Under alternative A, scenic resources are managed in accordance with the Visual Management System (USDA Forest Service 1974) where visual quality objectives are specified by management area. Visual quality objectives define degrees of change or contrast from the surrounding natural landscape. These existing inventoried visual quality objectives are preservation, retention, partial retention, modification, and maximum modification. In some management areas, the direction to meet visual quality objectives is included as standards. In other areas, it is stated as a value to be considered, but it should be reduced as needed to meet wildlife or other management area priorities and emphases. See appendix A, figure 2-8 for the spatial distribution of scenic integrity objectives under alternative A.

Designated Areas

Under alternative A, special management areas include the Sheep Creek Geologic Area and research natural areas (Ashley Gorge, Gates of Birch Creek, Lance Canyon, Pollen Lake, Sims Peak Potholes, Timber-Cow Ridge, and Uinta Shale Creek). See appendix A, figure 2-20. Two river segments in the Green River (6 miles) and Uinta River (42 miles) would be managed as suitable for inclusion in the National Wild and Scenic Rivers System (appendix A, figure 2-23).

Fire and Fuels Management

Under alternative A, fire and fuels management follows the direction in the 2001 Utah Fire Amendment to the 1986 forest plan. This plan provides forestwide direction for returning fire to the ecosystem, hazardous fuels reduction, and maintaining historical fire regimes.

The Forest Service uses wildfire decision support tools for strategic decisions on wildfires that assist land managers with fire prediction and estimating threats to values from that fire. This plan does not incorporate the latest policy and terminology changes since the amendment. Nor does it incorporate new fire-predicting and planning tools now available for determining high-risk areas, prioritizing those areas, and predicting benefits from treatments.

Vegetation Management, Timber Harvest, and Sustainable Ecosystems

A total of 11,000 acres of vegetation management was set as an objective in lodgepole pine habitat to encourage natural regeneration. The allowable sale quantity is set at 21 million board feet for the planning period based on 528,000 acres designated as suitable for timber production. This volume includes fuelwood and other products being harvested from the timber base. Due to policy changes, including the 2001 Roadless Rule, objectives set in the current plan are no longer achievable. Lands suitable for timber production are based on the 1986 plan, as amended, with current regulation and policy. For livestock grazing, forage utilization and stubble height under alternative A would be determined based on site-specific conditions to meet land health standards and based on individual AMPs and permit terms and conditions.

Alternative A includes goals, objectives, and standards for managing wildlife and habitat, including some directed at individual species, groups of species, and habitat conditions. Management emphasis is on actively managing habitat while minimizing harm from other resource activities, with special consideration to threatened, endangered, and high-interest species. However, alternative A does not specifically manage for SCC.

Social and Economic Contributions

Alternative A is focused on a commodity-based approach and emphasizes economic output associated with forest resources. The economic importance of recreation is not emphasized, and contributions from ecosystem services are not specifically addressed. Plan objectives reflect a mix of resource enhancement; timber and wood products volume; hazardous fuels treatment; road, trail, and facility maintenance; and new recreation facilities.

Alternative B

Alternative B is based on the Proposal to Revise the Land Management Plan that was published with the notice of intent in the *Federal Register* on September 10, 2019, with modifications in response to scoping comments, cooperating agency input, and internal Forest Service review. This alternative was developed to address the need for change and significant issues. Alternative B, including all plan content, is included as appendix E.

Features of alternative B in relationship to the significant issues identified above include:

Sustainable Recreation

Under alternative B, the focus of recreation management would be on providing infrastructure to support recreation, while taking into account other resource values. In addition, management would provide for a variety of developed and dispersed recreation and tourism opportunities to support a diverse set of users and local communities. Three recreation management areas would be established to support different recreation opportunities: destination recreation areas emphasizing developed recreation experiences in high-use areas, with motorized access and support facilities; backcountry recreation areas focused on dispersed recreation outside wilderness areas with limited infrastructure; and general recreation areas that allow for a range of recreational uses, including motorized and nonmotorized use, along with other forest uses (see appendix A, figure 2-1 for details).

Unlike alternative A, alternative B utilizes the Scenery Management System to determine the relative value, stability, resiliency, and importance of scenic values. The Scenery Management System also integrates an increased understanding of cultural landscapes and focuses on which desired scenic character attributes are to be maintained or enhanced. A range of SIOs are identified under alternative B, including very high, high, moderate, and low with an emphasis on a natural-appearing scenic character. The Scenery Management System recognizes natural disturbance processes, such as fire, insects, and disease, as part of the natural landscape that is dynamic and important in maintaining healthy, sustainable, and scenic landscapes (see appendix A, figure 2-9 for details).

Designated Areas

Alternative B would add additional designated areas to protect special resources. This alternative would include management of two recommended wilderness areas (see appendix A, figure 2-21). All existing special areas and research natural areas would remain. In addition, existing suitable streams would continue to be managed for inclusion in the National Wild and Scenic Rivers System (appendix A, figure 2-24).

Fire and Fuels Management

Under alternative B, fire management strives to balance the natural role of fire while minimizing the negative impacts on watershed health, wildlife habitat, highly valued resources and assets (HVRAs), and air quality. Based on the historical disturbance regimes, wildland fire and other vegetation treatments would be used to improve or maintain desired vegetation conditions during the life of the plan. Use of natural ignitions for resource objectives would be encouraged, where conditions permit, on at least 10 percent of the ignitions over 10 years. Specific management is proposed for HVRAs to protect these values and to provide flexibility to manage changing resources over the life of the plan.

Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Alternative B would promote vegetation management for resource objectives. Treatments (such as timber harvest, planned ignitions, thinning, and planting) would be permitted and estimated on 1,500 acres of the

Ashley National Forest annually (1,200 acres in the second decade). In this alternative, acres would be identified as suitable or not suitable for timber production based on compatibility with the desired conditions and objectives, as well as legal and technical reasons. Additional areas would be identified as suitable for harvest outside timber production areas. In these areas, treatments to meet other resource objectives may contribute to total harvest.

Under alternative B, forage for livestock grazing would have specific utilization levels included in management (50 percent) as well as 4-inch stubble height guidelines to provide criteria to help meet desired conditions for terrestrial vegetation.

Management under alternative B would also support the maintenance and improvement of resilient ecosystems and watersheds to support wildlife diversity; it would provide ecological conditions to maintain a viable population of each SCC within the plan area and common and abundant species. A complementary ecosystem and species-specific approach (known as a coarse-filter/fine-filter approach) would be used to contribute to the diversity of plant and animal communities and the long-term persistence of native species. The coarse-filter plan components are designed to maintain or restore ecological conditions for ecosystem integrity and biological diversity on the Ashley National Forest. Fine-filter plan components are designed to provide for additional, specific habitat needs for native animal species when those needs are not met through the coarse-filter plan components.

Specifically for bighorn sheep, management has been included to limit authorization of new permitted domestic sheep or goat allotments unless separation from domestic sheep and goats can be demonstrated, or research indicates that the potential for pathogen transfer would be limited. In addition, alternative B includes plan direction for sheep or goat grazing permits to be voluntarily waived without preference, including potential allotment closures, timing adjustments, conversion to cattle and horse allotments, utilization as a cattle and horse forage reserve, or other options that provide separation or pathogen transfer mitigation. See appendix E for details.

Social and Economic Contributions

Under alternative B, the forest plan emphasizes a sustainable level of goods and services, such as wilderness, fish and wildlife, recreation opportunities and access, timber, energy resources, livestock forage, and infrastructure, as determined by resource-specific desired conditions. These goods and services would help support local and regional populations. The goal would be the support of ecosystem services associated with forest products, as well as those that contribute to the quality of life and sense of place for both present and future generations, including the support of aquatic and terrestrial ecosystems, clean air and water, aesthetic values, cultural heritage values, and recreation opportunities.

Alternative C

Alternative C emphasizes preservation of the natural setting and the use of passive management (i.e. reliance on natural processes for changes to vegetation structure) to move toward desired conditions for vegetation and fire management. Specific plan components for alternative C are found in tables 2-1 and 2-2, and in appendix B. Maps showing the alternatives are found in appendix A. Features of alternative C in relationship to the significant issues identified above include:

Sustainable Recreation

Under this alternative, the emphasis for recreation would be on backcountry recreation and recreation classes emphasizing a quiet experience. Compared with alternative A, motorized recreation would be reduced due to restrictions on use in backcountry recreation areas, and increased acres within the backcountry classification (appendix A, figure 2-2). Conflicts from other land uses with recreation would be reduced under this alternative because timber production and grazing would not be permitted in destination recreation areas. Under this alternative, additional areas would be managed for high or very high SIOs, with a more natural and natural-appearing scenic character in keeping with the ROS and management area direction (see appendix A, figure 2-10 for locations of SIOs).

Designated Areas

Alternative C would include the most acres managed for wilderness characteristics as recommended wilderness areas (appendix A, figure 2-22). It also would bring forward four additional segments as suitable for inclusion in the National Wild and Scenic Rivers System (appendix A, figure 2-23). An additional research natural area, Gilbert Bench, would also be added, as compared with the no-action alternative.

Fire and Fuels Management

Alternative C would focus fuels management on the use of natural processes, including the use of wildland fire to move toward desired fire regimes. Under this alternative, the fewest acres are proposed for active vegetation management (i.e. using the manipulation of vegetation through silvicultural and forest management practices to meet objectives). Outside of HVRAs, suppression would be emphasized to protect human health and safety or property.

Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Under alternative C, vegetation management is focused on the use of natural processes. Compared with alternative B, areas suitable for timber harvest and total volume harvested would be reduced. This is due to additional designated areas with limitations on timber harvest, limiting vegetation management in inventoried roadless areas, and fewer vegetation management projects that can contribute to timber yields, compared with other alternatives. This management would emphasize habitat connectivity.

Alternative C would emphasize maintenance or improvement of wildlife habitat through the same coarse-filter/fine-filter approach as under alternative B, but though greater use of natural unplanned ignitions. Guidelines for soil and water would include additional restrictions on resources uses to limit impacts. Forage for livestock would be limited to a level of 40 percent utilization and a stubble height of 4 inches. For bighorn sheep, this alternative would include additional and more stringent plan direction for separation from domestic sheep. New domestic sheep or goat allotments would not be permitted unless separation from wild bighorn sheep is demonstrated. In addition, when domestic sheet or goat grazing permits are voluntarily waived without preference, and if the allotment does not provide separation from bighorn sheet, the allotments would be closed to provide separation between domestic sheep and goats and bighorn sheep.

Social and Economic Contributions

Under alternative C, as under all alternatives, social and economic contributions from the Ashley National Forest would be retained. Under alternative C, management would support visitors who value a natural visual setting and nonmotorized recreation experiences. In addition, an increased emphasis on habitat connectivity would support ecosystem services associated with this value, including habitat for hunting, fishing, and wildlife viewing. Increased restrictions on resources uses, such as timber, would support ecosystem services associated with clean water, including municipal water supplies.

Alternative D

This alternative includes the fewest restrictions on resource use. The focus under this alternative is accomplishing desired conditions by shared funding and cooperation with partners. Specific plan components for alternative D are found in tables 2-1 and 2-2, and in appendix B. Maps showing the alternatives are found in appendix A. Features of alternative D in relationship to the significant issues identified above include:

Sustainable Recreation

Alternative D would emphasize increased motorized forest access and developed recreation opportunities. Motorized use would be permitted in backcountry recreation areas, and objectives across management areas would emphasize increased roads, trails, and recreation infrastructure. Under alternative D, more areas would be included in moderate or low SIOs with a slightly altered scenic character, following the emphasis for a more developed recreation setting (see appendix A, figure 2-11).

Designated Areas

Alternative D would not promote the recommendation of new designated areas; however, all existing designated areas under alternative A would remain. There would be no recommended wilderness areas. Existing suitable streams would continue to be managed for inclusion in the National Wild and Scenic Rivers System, but no additional segments would be added.

Fire and Fuels Management

Alternative D encourages use of a full range of fire suppression strategies and tactics. In addition, all fuels treatments would be designed to support the protection of developed resources and to decrease fire behavior. Within HVRAs, use of wildland fire to support other management objectives would not be permitted, maximizing protection of resources in these areas.

Under alternative D, more acres would be treated through mechanical and prescribed fire fuels treatments, focusing on assets and not on natural resource protection. Through collaboration with partners, the Forest Service would seek to achieve the higher-end levels of anticipated vegetation treatment per year to minimize risks from uncharacteristic wildfire for local communities. If there is conflict between the need to mitigate hazardous fuels to protect critical values, particularly human improvements, and other natural resource concerns, alternative D would favor protecting those critical values.

Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Alternative D would have the fewest restrictions on timber harvest, with the most acres suitable for timber production and the greatest harvest volume. In addition, this alternative would encourage harvesting in areas not suitable for production to accomplish other resource objectives, resulting in an increased harvest. Vegetation management under alternative D would support the highest level of treatment per acre over the life of the plan. For livestock grazing, forage utilization and stubble height under alternative D would be determined based on site-specific conditions to meet desired conditions, as under alternative A.

Under alternative D, management for wildlife would emphasize support for wildlife habitat while limiting the impacts on other land uses. Plan components for soil and water would provide fewer limitations on use compared with other action alternatives. No additional restrictions would be in place for managing bighorn sheep.

Social and Economic Contributions

Alternative D would emphasize active management of resources and promote partnerships to achieve higher-end targets of vegetation management and timber harvest. Active suppression of wildfire and fuels treatment in HVRAs would also emphasize the protection of developed resources for local communities and minimize distribution of historical uses in the forest, including timber and livestock grazing. This would support ecosystem services associated with these provisioning services. In addition, alternative D would emphasize accessibility of the forest, promoting increased motorized use. Support for ecosystem services associated with undeveloped recreation settings, naturalness, and passive management of resources would not be emphasized under this alternative. Since this alternative is dependent on partnering to develop new recreation and timber opportunities, if partnership funding is not available, recreation and timber objectives may not be achieved.

Alternatives Considered but Not Given Detailed Study

The Council on Environmental Quality requires Federal agencies to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14(a)). Public comments received during scoping provided suggestions for alternative methods for achieving the purpose of and need for action. Some of these alternatives were outside the scope of the purpose of and need for action, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary harm. These alternatives, and the subsequent agency rationale as to why they were not given further detailed study, are described below.

Travel Management Decisions Alternative

Commenters requested an alternative that provides travel management decisions, including an assessment and inventory of roads, route designations, and over-snow vehicle use for winter recreation. Determinations related to the designation of roads, trails, and areas for motor vehicle use (36 CFR 212(b)) and over-snow vehicle use (36 CFR 212(c)) are site-specific decisions and are not addressed at the forest plan level. Travel management planning occurs outside of the forest plan revision process; however, the forest plan may provide context and guidance for future travel management decisions. For this reason, an alternative that evaluates travel management decisions was considered but not evaluated in detail.

Leasing Availability Decisions Alternative

Commenters requested changes to fluid mineral leasing stipulations, including no surface occupancy stipulations for the Flaming Gorge National Recreation Area, inventoried roadless areas, and occupied sage-grouse habitat within priority habitat management areas. This alternative was considered but not evaluated in detail because leasing availability decisions are not within the scope of the need for change. Leasing availability decisions were evaluated in the 1997 Western Uintas Basin Oil and Gas Leasing EIS.

Tribal Geographic Area Alternative

Commenters requested an alternative that identifies separate management for the portion of the Ashley National Forest that is within the original boundary of the Uintah and Ouray Ute Indian Reservation as a way to recognize the tribe’s treaty rights to this area. This alternative was considered but not evaluated in detail; this is because it is not appropriate for the Forest Service, in the context of forest plan revision, to draw conclusions about the legal status of the land within the original reservation boundary that is now a part of the Ashley National Forest.

Increasing Amount of Forested Areas

Commenters requested that the Forest Service analyze an alternative that emphasizes the need to increase forestation of non-forested areas. This alternative was considered but not evaluated in detail because it is not within the scope of the plan revision; it does not meet the need for change.

Comparison of Alternatives

This section provides a summary comparison of alternatives. Plan components and management direction have been fully developed for alternative B (the forest plan), as shown in appendix E. Table 2-2 and table 2-3 summarize the differences in management direction for resource areas that can be compared quantitatively or qualitatively by alternative. Information in table 2-2 and table 2-3 demonstrates the variation in alternatives, but it does not provide the full text for alternatives C or D. Rather, for convenience the tables simply show differences in the alternatives compared with alternative B. The full text of alternative B, with plan components and specific management direction, is included in appendix E. Alternatives that have been proposed during public scoping are summarized in table 2-2 and table 2-3. For convenience, we recommend comparing the text of alternative B (appendix E) with the proposed alternative language in table 2-2 and table 2-3.

Appendix A, Figures, provides figures demonstrating management that varies by geographic location, including ROS classes, SIO, and management areas. Table 2-2 provides a summary of variation by alternative for forestwide management; table 2-3 compares the differences in acres of designated management areas associated with significant issues by alternative.

Appendix B, Plan Components by Alternative, includes the full text for plan components that vary by alternative. Plan components and management direction for all resources are fully developed in alternative B (the forest plan). Plan components that are not shown as varying in appendix B would be carried forward in all action alternatives. The Forest Service determined it was easier to see differences in this format rather than providing four full alternatives with minor changes between the alternatives.

Appendix E, forest plan, includes the full text for the plan components of alternative B as well as other plan content. This document is the core document upon which other alternatives can be compared and shows the proposed organization and layout of the final forest plan. Changes to the text would be made as alternatives are selected and alternate language in appendix B is added.

Table 2-2. Summary of Plan Content Responding to Forestwide Issues By Alternative

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Sustainable Recreation				
ROS Primitive (acres)	276,400	286,700	313,000	276,400
ROS Semiprimitive Nonmotorized (acres)	369,600	351,900	333,400	368,500
ROS Semiprimitive Motorized (acres)	282,700	289,000	282,400	280,700
ROS Roaded Natural (acres)	437,100	438,200	437,000	415,900
ROS Rural (acres)	10,600	10,600	10,600	34,900
SIO Very High	243,200	283,900	323,600	273,600
SIO High	457,700	436,100	686,300	240,000
SIO Moderate	304,400	423,600	320,400	596,100
SIO Low	351,000	232,600	45,900	266,500
SIO Very Low	15,000	0	0	0
Fire and Fuels Management				
Acres proposed for fuels treatment to improve or maintain desired vegetation conditions (acres per year)	No comparable plan components	6,600 to 32,000 acres per year	Same as alternative B	10,000 to 40,000 acres per year
Manage natural, unplanned ignitions to meet resource objectives across the entire forest (average percentage over 10-year period)	No comparable plan components	At least 10 percent of the ignitions	At least 20 percent of the ignitions	At least 5 percent of the ignitions
Annual vegetation treatment around HVRAs during the first 5 years of the plan (acres)	No comparable plan components	1,000 to 3,000 acres	No comparable plan components	5,000 to 10,000 acres

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Vegetation Management, Timber Harvest, and Sustainable Ecosystems				
Livestock Grazing				
Livestock forage utilization and stubble height guidelines	Utilization and stubble height based on land health standards	50 percent utilization for livestock and 4-inch stubble height guidelines with exceptions where a different height will meet desired conditions	40 percent utilization for livestock and 4-inch stubble height guidelines	Utilization and stubble height based on desired conditions
Permitted head months (HMs)[1]	76,922	76,922	76,812	76,922
Permitted grazing (acres)[1]	919,700	919,700	906,700	919,700
Forest Product Harvest				
Annual forested vegetation treatment to maintain or move toward achieving desired conditions for forested ecosystems (acres)	Regeneration harvests in this decade and the last decade were projected to be an average of 4,000 acres a year; other vegetation treatments not identified	1,500 acres per year (1,200 acres in the second decade of the plan)	1,000 acres per year (800 acres in the second decade of the plan)	1,600 acres per year (1,300 acres in the second decade of the plan)
Acres suitable for timber production	528,000[2]	109,800	80,500	114,300
Acres suitable for timber harvest	No areas identified for timber harvest under alternative A	189,400	93,700	189,400
Average annual timber sale quantity (100 cubic feet [CCF]/1,000 board feet [MBF])	Allowable sale quantity is 21,000 MBF (annual basis)	3,806 to 3,833 CCF (1,145 to 1,158 MBF)	2,822 to 2,842 CCF (795 to 805 MBF)	3,956 to 3,983 CCF (1,190 to 1,204 MBF)
Average annual wood sale quantity (CCF)	N/A (allowable sale quantity for the planning period is 21 million board feet [MMBF])	3,806 to 3,833 CCF (1,145 to 1,158 MBF)	2,822 to 2,842 CCF (795 to 805 MBF)	3,956 to 3,983 CCF (1,190 to 1,204 MBF)

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Wildlife				
Bighorn sheep	Sheep allotments that remain unutilized for a period of 5 years may be considered for conversion to another class of livestock or closed.	For domestic sheep or goat grazing allotments that are voluntarily waived without preference and do not provide separation from bighorn sheep, separation would be provided by means consistent with the most current state big horn sheep management plan, adjusting the time and date of use; conversion to cattle and horse allotments; use as a cattle or horse forage reserve; or potential closure of all or a portion of the allotment to domestic sheep and goats. New domestic sheep or goat allotments would not be authorized unless separation from bighorn sheep can be demonstrated, or research demonstrates the risk of pathogen can be avoided or is no longer an issue (excludes pack goats or existing domestic sheep/goat grazing permits waived with preference).	Domestic sheep or goat grazing allotments that are voluntarily waived without preference and do not provide separation from bighorn sheep would be closed to provide separation of domestic and bighorn sheep. New domestic sheep or goat allotments would not be authorized unless separation from bighorn sheep can be demonstrated. This does not apply to the use of pack goats for recreational use, or existing domestic sheep allotments waived with preference. When opportunities arise, domestic sheep and goat allotments that overlap a bighorn sheep core herd home range would be closed.	For domestic sheep or goat grazing allotments that are voluntarily waived without preference and do not provide separation from bighorn sheep, the authorized use of the allotment should provide separation of domestic sheep and goats from bighorn sheep, or mitigate the threat of pathogen transfer from domestic sheep and goats to bighorn sheep.

[1] Excludes allotments administered by the Bureau of Land Management

[2] Current plan direction for acres suitable for timber production does not account for roadless area restrictions.

Table 2-3. Summary of Plan Content by Alternative for Management Areas and Areas Administratively Recommended for Designation

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Backcountry Management Areas				
Backcountry management areas size (acres)	No equivalent backcountry management area under alternative A	404,200	739,700	299,000
Timber harvest in backcountry management areas	No equivalent backcountry management area under alternative A	Permitted	Not permitted	Permitted
Mechanized use	No equivalent backcountry management area under alternative A	Permitted	Limited to existing trails	Permitted
Motorized use	No equivalent backcountry management area under alternative A	Permitted	Not permitted	Permitted
Destination Recreation Areas				
Destination recreation areas size (acres)	No equivalent destination recreation area under alternative A	29,000	23,200	34,200
Acres suitable for timber production in destination recreation areas	No equivalent destination recreation area under alternative A	2,900	900	3,200
Grazing (permitted acres) in destination recreation areas	No equivalent destination recreation area under alternative A	Permitted (13,000 acres currently have active allotments)	Not permitted	Permitted (13,000 acres currently have active allotments)
General Recreation Area				
General recreation area size (acres)	No equivalent general recreation area under alternative A	670,000	340,100	769,800
Recommended Wilderness Areas				
Recommended wilderness areas size (acres)	0	10,300	50,200	0

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Recommended wilderness areas (number)	0	2	4	0
Research Natural Areas				
Research natural areas size (acres)	7,700 acres	Same as alternative A	9,100	Same as alternative A
Research natural areas (number)	7	Same as alternative A	8	Same as alternative A
Wild and Scenic Rivers				
Wild and Scenic Rivers–suitable (miles)	Green River (6 miles) Uinta River (42 miles)	Same as alternative A	Green River (6 miles) Uinta River (42 miles) Dowd Creek (3.1 miles) Honslinger Creek (2.3 miles) Spring Creek 2 (6.8 miles) North Skull Creek (1.8 miles)	Same as alternative A

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Chapter 3

Affected Environment and Environmental Consequences

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Chapter 3. Affected Environment and Environmental Consequences

Introduction

This chapter describes the existing environment of the Ashley National Forest and the potential consequences to that environment from implementing the range of alternatives described in chapter 2. Land management plans do not authorize or mandate any site-specific projects or activities, including ground-disturbing activities; however, there may be socioeconomic implications, or long-term environmental consequences, of managing the Ashley National Forest under this programmatic framework. Those environmental consequences are described in this chapter. Consequences are based on predicted implementing activities and are meant to compare alternatives on a programmatic level, rather than provide exact measurements of effects; therefore, this document does not predict what would happen each time plan components are implemented.

Analysis Methodology

Best Available Scientific Information

The 2012 Planning Rule requires the responsible official to use the best available scientific information to inform the development of the proposed plan, including plan components, the monitoring program, and plan decisions. The analysis in this chapter relies on peer-reviewed and technical literature, existing geospatial data, modeling tools and approaches, local information, workshop outputs, and information received during public participation periods. Data sources were screened for accuracy, reliability, and relevancy.

Assumptions Common to All Resources

The following assumptions are common to all resources in this analysis:

- No direct environmental effects will result from the administrative action of developing or revising the forest plan. Projects, activities, and authorizations will not be approved or otherwise authorized based on the content of the forest plan; however, they must be consistent with plan components, which include desired conditions, objectives, standards, guidelines, and suitability determinations.
- Components of the forest plan and individual projects and activities reflect compliance with current Federal, State, and local laws and regulations, and United States Department of Agriculture (USDA) and Forest Service policy.
- Plan decisions (desired conditions, objectives, standards, and guidelines) and other plan direction (management areas and monitoring) will guide future planning decisions or implementation of site-specific projects and activities.
- Funding levels will be similar to those of the past 5 years.
- Effects analyses are applicable for the expected life of the forest plan, which is estimated to be approximately 15 years. Other time frames may be specifically analyzed, depending on the resource and potential consequences.
- Visitation and use of forest lands and facilities will increase during the life of the plan.

- The spatial extent for most resources is the decision area, as defined in chapter 1. Resources may have different spatial extents, which will be defined in those resource sections.
- Monitoring in the proposed plan's "Chapter 4. Plan Monitoring Program" (appendix E) for progress toward or maintenance of desired conditions and objectives will occur for the life of the plan. The plan will be amended or management activities will be adjusted, as needed.
- Individual proposed actions are not evaluated in this draft environmental impact statement (DEIS) nor are they defined by specific location, design, and extent. Rather, the effects described are generic and are used to compare the relative effects of alternatives on a forest-wide basis.
- There may be minor discrepancies between the surveyed acres from the Ashley National Forest administrative boundary and the GIS layers used to define administrative or other area boundaries.

Ecological Sustainability and Diversity of Plant and Animal Communities

Air Quality

Introduction

Air quality is a critical resource protecting ecosystem health, as well as human health and the enjoyment of clear visibility in the forest. Air pollutants, either by themselves or after chemical transformations in the lower atmosphere, can cause negative impacts on ecosystems, including changes in soil and water chemistry from nitrogen and acid deposition, damage to sensitive vegetation due to chronic and elevated ozone exposure, and increased visibility impairment in scenic areas. High concentrations of pollutants can also have adverse effects on people who visit, recreate, or work on the forest.

The Forest Service is committed to monitoring and protecting air quality on National Forest System lands. Air quality is dependent on the type and amount of pollutants emitted into the atmosphere, ground topography, and prevailing weather conditions. Sources of air pollution on the Ashley National Forest include timber and mining operations, prescribed fire, road dust, transportation, and other combustion engine sources. When they occur, wildfires are also a large source of emissions. A small portion of the forest also contains emission sources related to oil and gas development. Air pollution sources outside of the Ashley National Forest affecting the national forest include agricultural sources such as dairies and feedlots, fertilizer application, crop burning, and emissions from industrial sources and urban areas. Air quality also is affected by long-distance source emissions transmitted via continental airflow patterns (Forest Service 2017b).

Regulatory Framework

Clean Air Act of 1970 (42 USC 7401 et seq.), as amended—This act provides the framework for protecting air quality at the national, state, and local level. The act designates the US Environmental Protection Agency (EPA) as the chief regulatory body of air resources in the United States, but it allows some states to have management authority to implement their own air quality legislation, monitoring, and control measures. In Utah, air pollution is regulated by the Department of Environmental Quality's Division of Air Quality. In Wyoming, air pollution is regulated by the Department of Environmental Quality's Air Quality Division. Regulatory oversight of the Clean Air Act resides with the EPA and the States of Utah and Wyoming.

National Ambient Air Quality Standards (NAAQS). Under the authority of the Clean Air Act, the EPA has set time-averaged NAAQS for six criteria air pollutants considered to be harmful to human health and welfare: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter (particulate matter less than 10 microns in diameter [PM_{10}] and particulate matter less than 2.5 microns in diameter [$PM_{2.5}$]). The NAAQS consist of primary and secondary standards, with the former providing requirements for public health—particularly sensitive populations such as asthmatics, children, and the elderly—and the latter incorporating public welfare provisions, such as the protection of visibility, wildlife, crops, vegetation, and buildings. The Utah Department of Environmental Quality, Division of Air Quality and the Wyoming Department of Environmental Quality, Air Quality Division are responsible for ensuring compliance with the NAAQS within their respective states.

Clean Air Act Conformity. The general conformity provisions of the Clean Air Act (section 176(c)) prohibit Federal agencies from taking action within a nonattainment or maintenance area that causes or contributes to a new or existing violation of the standards or delays the attainment of a standard. National Forest System lands that fall within nonattainment or maintenance areas are subject to these requirements. The Ashley National Forest has a 70-acre portion of land within the Unita Basin 8-hour ozone nonattainment area and a 3,900-acre portion within the Utah County PM_{10} maintenance area. General conformity regulations must be met by the Ashley National Forest for any Forest Service actions, including those actions permitted or funded within these areas. This means every Forest Service action that produces air pollutants in the nonattainment or maintenance area must be evaluated for its effect on that area.

Prevention of Significant Deterioration (PSD). The Clean Air Act amendment of 1977 created the prevention of significant deterioration permitting program to preserve the clean air usually found in pristine areas. Its purpose is to prevent violations of the NAAQS and to protect air quality and visibility in pristine areas. The amendment designated national parks larger than 6,000 acres and national wilderness areas larger than 5,000 acres established before 1977 as mandatory class I areas that would be afforded additional protections from air quality impairment. Areas not designated as class I are classified as class II. For class II areas, greater incremental increases in ambient pollutant concentrations are allowed as a result of controlled growth. There are no class I areas on or near the Ashley National Forest. The High Uintas Wilderness is a class II wilderness area managed by the Forest Service. It lies partly within the Ashley National Forest and partly within the Uinta-Wasatch-Cache National Forest.

Wilderness Act and National Forest Management Act, including the 2012 Planning Rule—The Wilderness Act requires management to ensure that wilderness character is preserved in all wilderness areas regardless of whether they are class I or class II areas. Air quality has been chosen by the Forest Service as a mandatory measure of wilderness character for which certain aspects of air quality are indicators. The National Forest Management Act (NFMA) states that national forests are ecosystems whose management requires an awareness and consideration of the interrelationships of environmental factors, including air quality, within such ecosystems. The 2012 Planning Rule required the Forest Service to assess sensitive air quality areas and emissions affecting these areas, and to use critical loads of air pollutant deposition as a way to track ecological conditions and trends of resources that are affected by air quality. Forest plans must include plan components to maintain or restore air quality.

Smoke Management Programs—In compliance with EPA direction, the States of Utah and Wyoming have implemented smoke management programs intended to prevent deterioration of air quality and exceedances of the NAAQS and to minimize smoke impacts on forest visitors and nearby communities from prescribed burning. Prescribed burning on the Ashley National Forest is subject to the regulations of the States of Utah and Wyoming; the Forest Service coordinates with the States and complies with their regulations. These regulations determine the conditions under which burning can occur, to be protective of air quality and visibility in an airshed.[1] Smoke management agencies coordinate and, if necessary, limit prescribed burn activities within an airshed to minimize smoke-related impacts on human health and visibility in that airshed.

Analysis Area

Air quality is affected by emission sources and pollutants, weather patterns, terrain, and prevailing winds. Primary and secondary pollutants are formed through chemical reactions in the atmosphere from precursor pollutants. The region of influence for a pollutant depends on the rate of emissions from a source, the elevation of the source, the type of pollutants, and the meteorological conditions that determine dispersion and dilution during transport from the emissions source. The region of influence for air pollutants ranges from very close to the source to hundreds of miles away.

The analysis area for the evaluation of effects on air quality from forest plan alternatives includes the airsheds in which the Ashley National Forest is located. The Utah portion of the Ashley National Forest is in Utah smoke management airsheds 7 and 9. Airshed 7 encompasses the north slope of the Uinta Mountains and Ashley National Forest, down to the Utah-Wyoming state line. Airshed 9 encompasses the south slope of the Uinta Mountains and Ashley National Forest, as well as the South Unit of the Ashley National Forest in the Tavaputs Plateau. This airshed is roughly equivalent to the Uintah Basin. The basin is a geologic depression bounded by the Wasatch Range on the west, the Uinta Mountains on the north, uplifted areas in northwestern Colorado on the east, and a broad east-west strip of higher plateau that rises sharply to the south, of which the Tavaputs Plateau is a part. The State of Wyoming does not have predefined smoke management airsheds (Forest Service 2017b).

Because air flows freely across boundaries, and pollutant sources include local and long-distance sources covering vast landscapes, the analysis discusses air quality across the entire Ashley National Forest. The temporal scope of the analysis is the anticipated life of the plan.

Description of Affected Environment

Air Quality Conditions

The Clean Air Act requires each state to identify areas that have ambient air quality in violation of the NAAQS using monitoring data collected through State monitoring networks. Areas that violate air quality standards are designated as nonattainment areas for the relevant criteria air pollutants. Areas that comply with air quality standards are designated as attainment areas for the relevant criteria air pollutants. Areas that have been redesignated from nonattainment to attainment are considered maintenance areas. Areas of uncertain status due to insufficient monitoring data are generally designated as unclassifiable, but they are treated as attainment areas for regulatory purposes.

Most of the Ashley National Forest is in attainment or unclassifiable for the NAAQS (EPA 2020a). In 2018, the EPA designated portions of the Uinta Basin in marginal nonattainment status for elevated levels of wintertime ozone; a 70-acre portion the Ashley National Forest north of Vernal is at the northwest extreme of this nonattainment area boundary. In addition, approximately 3,900 acres of the forest, in Utah County, are in a PM_{10} maintenance area.

[1] The states of Utah and Wyoming have designated airsheds for smoke management purposes.

While air quality on the Ashley National Forest is good, it can be affected by upwind areas of the forest with poorer air quality conditions. Portions of Utah's Wasatch Front metropolitan area, approximately 40 miles west of the Ashley National Forest, are in nonattainment for ozone, sulfur dioxide, PM_{10}, and the 24-hour $PM_{2.5}$ NAAQS; portions of the Logan/Cache Valley area, approximately 70 miles northwest of the Ashley National Forest, are nonattainment for the 24-hour $PM_{2.5}$ NAAQS. There is an ozone nonattainment area approximately 30 miles north of the FGNRA in Wyoming (EPA 2020b).

The Forest Service Rocky Mountain Research Station conducted ozone monitoring at one site on the Ashley National Forest. This site was part of an ozone study of remote, non-urban mountain areas in national forests in Colorado and northeastern Utah (Musselman and Korfmacher 2014). This site was located at Dutch John heliport near Flaming Gorge and was operated between 2010 and 2014. The results of the study indicated that ozone rarely exceeded 100 parts per billion or dropped below 30 parts per billion (the NAAQS is 70 parts per billion). Daily changes in concentration indicated that mixing of nitrogen oxides, volatile organic compounds, and ozone favor stable ozone concentrations. High ozone concentrations in the spring and at night suggest stratospheric intrusion may be contributing to ambient ozone. The highest nighttime concentrations occurred at the highest elevations, while daytime concentrations were not correlated with elevation.

A more recent study of ozone and ozone precursor concentration data at 38 sites in the Uintah Basin showed a decline in ozone concentrations over the past decade, with ozone and nitrogen oxide concentrations trending downward at the rates of about 3 and 0.3 parts per billion per year, respectively. The study attributed the decline to weakening global demand for oil and natural gas and more stringent pollution regulations and controls, both of which have occurred over the previous decade (Mansfield and Lyman 2020).

Sources of Air Pollution Emissions

Emission inventories provide an overview of the magnitude of air pollution and help to inform areas that may be impacting air quality on the Ashley National Forest. These inventories include point, area, and mobile sources, as well as estimated emissions from natural events like wildfire. Therefore, air emissions information provides an overview of the magnitude of air pollution and is important in understanding air quality on the Ashley National Forest. Emissions inventories are created by quantifying the amount of pollution that comes from point sources (power plants and factories) and area sources (emissions from automobiles in a city or oil and gas development). Emissions can also originate from natural events like a wildfire. Some of the sources originate within the plan area, though most sources of air pollutants originate outside the plan area (Forest Service 2017b).

The major sources of carbon monoxide, nitrogen oxides, sulfur dioxide, PM_{10}, $PM_{2.5}$, and volatile organic compounds are the Wasatch Front metropolitan area, the Wyoming Interstate 80 (I-80) utility corridor, and the Uintah Basin (Forest Service 2017b). Ammonia emissions typically come from both tailpipes and agricultural sources. Emissions for counties in and around the plan area were examined for the last four EPA national emissions inventory cycles (2008, 2011, 2014, and 2017). As shown in table 3-1, below, there was a general decline in most criteria pollutant emissions over this time period, with some exceptions for individual counties. Counties in bold contain portions of the Ashley National Forest, while text in italics indicates a change only between the 2014 and 2017 inventory cycles.

Table 3-1. Changes in Criteria Pollutant Emission Levels, 2008–2017

County	Change in Emissions						
	Carbon Monoxide	**Volatile Organic Compounds**	**Nitrogen Oxides**	**PM_{10}**	**$PM_{2.5}$**	**Sulfur Dioxide**	**Ammonia**
Cache, Utah	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease
Carbon, Utah	Decrease	*Decrease*	Decrease	Decrease	Decrease	*Decrease*	Variable
Daggett, Utah	Decrease	Decrease	Stable	Decrease	Decrease	Decrease	Decrease
Davis, Utah	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease
Duchesne, Utah	*Decrease*	*Decrease*	Increase	Stable	Stable	*Decrease*	Increase
Uinta, Wyoming	Decrease	Decrease	Decrease	Decrease	Decrease	Variable	Variable
Uintah, Utah	*Decrease*	Increase	Increase	Decrease	Decrease	*Decrease*	Increase
Utah, Utah	Variable	Decrease	Decrease	Variable	Variable	Decrease	Variable
Salt Lake, Utah	Decrease	Decrease	Decrease	Decrease	Decrease	Stable	Decrease
Summit, Utah	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease
Sweetwater, Wyoming	Decrease	*Decrease*	Decrease	Variable	Decrease	Decrease	Decrease
Wasatch, Utah	*Decrease*	Decrease	Stable	Decrease	Decrease	*Decrease*	Decrease

Source: EPA 2020d

Continued growth in the Wasatch Front metropolitan area and continued energy development in the Uintah Basin and southwest Wyoming will continue to affect air quality and air quality-related values, such as visibility and deposition, on the Ashley National Forest.

Visibility

There are no Interagency Monitoring of Protected Visual Environments visibility monitoring sites near the Ashley National Forest. The Forest Service operated a visibility camera on Lake Mountain from 1987 through 2000 and 2010 through 2015. Visibility can be affected by regional haze, plume blight, and episodic events such as wildfires.

Deposition and Critical Loads

Emissions of sulfur dioxide, nitrogen oxides, and other pollutants such as ammonia can lead to atmospheric deposition of sulfuric acids, nitric acids, and other pollutants into national forest ecosystems. In sensitive ecosystems, acid compounds can acidify soil and surface waters, affecting nutrient cycling and ecosystem services. Deposition has been monitored at the East McKee National Trends Network site as part of the National Atmospheric Deposition Program since 2017. The Forest Service began operating the East McKee monitoring site on the eastern side of the Ashley National Forest in 2017, but the site has not operated long enough to provide deposition trends.

Critical loads describe the thresholds of air pollution deposition below which harmful effects on sensitive resources in an ecosystem are not expected to occur. Critical loads are based on scientific information about expected ecosystem responses to a given level of atmospheric deposition. Nationally, critical loads for nitrogen and sulfur have been developed for many resources. Nitrogen critical loads for the Ashley National Forest have been evaluated for surface water acidification and eutrophication[2], tree species

[2] excessive levels of nutrients in a lake or other body of water, frequently due to runoff from the land, which causes a dense growth of plant life and death of animal life from lack of oxygen

growth and decadal survival, and lichen species richness and forage lichen abundance. Although the magnitude and extent of exceedances are still being investigated, initial results indicate that both surface water critical loads and the lichen critical loads may be exceeded in much of the Ashley National Forest.

Recent analysis (McMurray et al. *In prep.*) of deposition critical loads on the forest have shown areas where nitrogen deposition is high enough to exceed one or more critical loads. Current nitrogen deposition rates indicate an increased risk for surface water acidification for 60 percent of the monitored lakes and an increased risk for early stages of eutrophication in surface waters across 60 percent of the forest. Deposition rates exceed critical loads across portions of the forest for tree species sensitive to increases in nitrogen. It is estimated that current deposition rates represent a greater than 1 percent decline in survival over 10 years for 93 percent of the timber stands where Douglas fir is dominant or co-dominant, and 6 percent of the timber stands where quaking aspen is dominant or co-dominant.

Critical loads are developed based on modeling potential effects and monitoring responses. The surface water eutrophication critical loads were developed with local data, while tree critical loads were developed from nationwide datasets. Because of this, tree critical loads have more uncertainty. It should also be noted that exceedance of critical loads are a snapshot in time (2019) and do not indicate trends either upward or downward without more years of analysis (McMurray et al. *In prep.*).

Long-term water quality monitoring of high-elevation lakes in the Uinta Mountains has not shown a significant trend toward acidification, but sediment surveys of some lakes reflect increases in lake productivity occurring since the mid-twentieth century (Hundey et al. 2014).

Another potential concern is deposition of dust from off-forest sources and its effects on high-elevation lakes, water yield, and timing of flows. Research in the Wasatch Range of Utah and the San Juan Mountains in Colorado indicates windblown dust can accelerate snowmelt and alter the timing of spring runoff (Skiles 2018). A 2018 study in the Wasatch Mountains concluded that a dust event “accelerated snowmelt by approximately 25%.” In the San Juan Mountains, studies have shown that high dust concentrations “advance melt by 3–7 weeks” (Skiles 2018). Metals and other elements can be carried long distances in the dust, with a potential to influence aquatic organisms.

Specific to the Uinta Mountains alpine zone, dust accumulation rates are similar to values reported for the Wind River Range of Wyoming but less than values for southwestern Colorado. This suggests a south-to-north decrease in regional dust flux (Munroe 2014). Grain analysis suggests the dust has an exotic origin and is not from local geology. There is a recording of an anthropogenic change in dust composition in the Uinta Mountains, linked to settlement of surrounding lowland basins (Reynolds et al. 2010; Munroe et al. 2015). Hundey et al. (2016) reported an increase in nitrate deposition in the Uinta Mountain lake sediments since the mid-twentieth century; the majority of nitrate is linked to distant agricultural activity and agricultural regions rather than industrial emissions.

Wildfire and Prescribed Fire Smoke

Wildfire smoke, particularly from large fires, affects air quality on the Ashley National Forest on a seasonal basis. Emissions from wildland fire (wildfire and prescribed fire) can contribute to elevated ambient concentrations of air pollutants, potentially affecting human health and safety. Careful use of prescribed fire during periods when smoke is less likely to affect communities can be a useful tool to prevent the greater impacts from large wildfires. Wildfire impacts are increasingly difficult to manage on national forests due to excessive fuel loads, a history of fire exclusion, an increased urban interface, and climate change (drought and increasing temperatures). Prescribed fire and fuels treatment projects include mastication (chipping), thinning, broadcast burns (area burns designed to reduce fuels in a contiguous area over a landscape), and pile burns (discrete piles of slash from timber harvest or thinning from fuels treatment projects, or both). These treatment techniques are designed to reduce the size, frequency, and intensity of wildfires and improve fire control, increase predictability of fire effects, and allow for smoke emissions management.

Sensitive Air Quality Areas

There are no class I areas in or near the plan area. The High Uintas Wilderness is a Forest Service-managed class II wilderness area and is in Utah smoke management airsheds 7 and 9. All non-wilderness areas of the Ashley National Forest and FGNRA are designated class II. Wilderness air quality values and sensitive receptors have been identified for the High Uintas Wilderness area (table 3-2).

Table 3-2. High Uintas Wilderness Air Quality Values and Sensitive Receptors

Wilderness Air Quality Values	Sensitive Receptor
Water	Acid-neutralizing capacity values of high-altitude lakes Macroinvertebrate and other organisms
Fauna	None
Flora	Conifers, other ozone sensitive species (for example, *Populus tremuloides*), and lichen
Soils	None
Scenic Vistas	None

Source: Nick et al. 2012

Summary

A small portion, approximately 70 acres, of the Ashley National Forest falls within the Uinta Basin 8-hour ozone nonattainment area and is sensitive to ozone precursor emissions for general conformity. An additional portion, approximately 3,900 acres, of the southern unit falls within the Utah County PM_{10} maintenance area and therefore requires general conformity evaluation for particulate matter emissions.

Visitors to the Ashley National Forest and FGNRA generally experience air quality above the NAAQS, except during smoke events. However, critical load modeling suggests current levels of nitrate deposition in western portions of the forest could be at levels that represent an increased risk for eutrophication/acidification of high-elevation lakes inherently sensitive to changes in nutrient inputs. The area is minimally developed, has limited local emissions sources, and has predominantly very robust air dispersion. The Ashley National Forest is in conformance with each of the NAAQS, except for 70 acres that fall within the northwest boundary of the Uintah Basin marginal ozone nonattainment area.

Wildfire emissions, depending on the year, can be a large source of pollution within and around the Ashley National Forest. Management cannot control the emissions except indirectly, through fire suppression and fuels management. Prescribed fire emissions in the area occur during the spring and late fall. Smoke is managed during prescribed burns following Utah and Wyoming State regulations. Air quality impacts from other resource management activities, such as dust from logging roads and recreational use of National Forest System roads, are generally small and inconsequential. The impacts are not a concern at the forest planning level.

The greatest threat to Ashley National Forest air quality is anthropogenic sources on lands of other ownership. Urban, industrial, and agricultural air pollution, from both upwind and surrounding source areas, have a potentially persistent impact because many of these emissions occur year-round. Permitted sources are managed by air quality regulatory agencies in Utah and Wyoming, and other upwind states. Although the Ashley National Forest does not have any class I areas to which PSD permitting would apply, the Forest Service does collaborate with the states of Wyoming and Utah on PSD permitting for areas that may affect other class I areas. With large sources, this analysis and consultation may indirectly benefit air quality on the Ashley National Forest.

Currently, areas directly contiguous to most of the Ashley National Forest are in attainment of all the NAAQS. A marginal designation is the least stringent classification for a nonattainment area and does not require the State to submit a formal State implementation plan to the EPA; however, Utah has been implementing measures to reduce ozone concentrations, including enacting measures to reduce the emissions of volatile organic compounds and nitrogen oxides in the Uinta Basin marginal ozone nonattainment area from oil and gas operations in the Uinta Basin (Utah DEQ 2020).

The small portion of the Ashley National Forest in Utah County is within the maintenance area for PM_{10}. Utah Department of Environmental Quality has a maintenance plan for Utah County outlining strategies and controls that have been successful in maintaining air quality below the PM_{10} NAAQS (Utah Department of Environmental Quality 2019). The county was redesignated by the EPA to maintenance status on March 27, 2020 (85 *Federal Register* 10989). As described previously, there also are a number of nonattainment and maintenance areas along the Wasatch Front, upwind of the Ashley National Forest. Measures are in place, including through state implementation plans, to reduce emissions in these areas.

Environmental Consequences for Air Quality

Methodology and Analysis Process

The potential impacts on air quality from management direction given in the no-action alternative (alternative A) are compared with those under the action alternatives (alternatives B, C, and D). There are several activities on the Ashley National Forest that are sources of air pollutant emissions and have the potential to affect air quality and air quality-related values, such as visibility. Of these activities, prescribed fire and naturally ignited fires managed to meet resource objectives are the forest management actions with the greatest potential to affect air quality. Data are not available to quantify smoke emissions, particularly those resulting from naturally ignited fires managed to meet resource objectives; therefore, the effects from management actions are discussed qualitatively based on the level of proposed fuels treatments and proposed prescribed fire treatments under each alternative and the anticipated outcome of these treatments. Effects are assessed for the short term (within 10 years) and the long term (greater than 10 years).

Sources of ambient pollution, other than prescribed fire and wildfire managed to meet resource objectives, produce emissions on the Ashley National Forest that will not vary greatly by alternative; they are not a significant source of air pollutants, as described under the affected environment. Therefore, these are described but not discussed in detail.

Analysis Assumptions

- Air quality will continue to meet or exceed State and Federal ambient air quality standards in attainment areas.
- In the small portion of the forest within the Uinta Basin ozone nonattainment area, ambient ozone concentrations will move toward attainment.
- It is unknown exactly when, where, or how much wildfire will occur, but the trend of increasing large wildfires and associated high smoke emissions is expected to continue (Hurteau et al. 2014).
- The amount of emissions released from the combustion of vegetation depends on the type of vegetation, density of vegetation, and completeness of combustion.

- The Forest Service would practice smoke management actively with all prescribed fires and naturally ignited fires managed to meet resource objectives. This would include smoke prediction modeling, smoke monitoring, and close coordination with smoke management agencies.

Indicators

- Changes in emissions of PM_{10} and $PM_{2.5}$ from wildland fire based on acres treated using prescribed fire or the percentage of natural, unplanned ignitions to meet resource objectives (short term) and expected outcomes (long term)
- Changes in emissions of other criteria pollutants from forest management actions and forest uses

Environmental Consequences for Air Quality Common to All Alternatives

Effects from Air Resources Management

Under all alternatives, the Forest Service would maintain air quality that meets or exceeds applicable Federal, State, and local standards and regulations by meeting its legal obligations to comply with the Clean Air Act and the Utah and Wyoming State Smoke Management Programs. Alternative A provides guidance to "[Comply] with applicable air and water quality standards including but not limited to the Clean Air Act" (Forest Service 1986). Alternatives B, C, and D also have direction for the Forest Service to meet these legal obligations.

Effects from Recreation and Social and Economic Contributions

Under all alternatives, vehicles and equipment used on the Ashley National Forest for administrative uses, recreational uses, and forest uses, such as livestock grazing, timber production, mining, and oil and gas development, would produce fuel combustion-related emissions of criteria pollutants regulated by the NAAQS. The Forest Service does not anticipate these emissions to increase substantially over current conditions or vary substantially across alternatives. Given that air quality on most of the Ashley National Forest is in compliance with the NAAQS and that these emissions are intermittent and dispersed, exhaust-related emissions would not have a substantial impact on air quality on the Ashley National Forest. Emissions in the 70-acre portion of the Ashley National Forest that lies in the northwest boundary of the Uintah Basin marginal ozone nonattainment area would be similar to those that currently occur.

Under all alternatives, mining and oil and gas development would occur to some degree over the life of the plan. Operation of these developments would be an ongoing source of criteria pollutants regulated by the NAAQS until they were decommissioned. Under all alternatives, such new uses would be subject to review and permitting, with recommendations for use of best management practices (all alternatives) and best available control technology to reduce emissions (action alternatives). Such review would include a consideration of effects, including changes in visibility, on the High Uintas Wilderness class II area under all alternatives.

Under all alternatives, motorized use of roads and trails and other surface-disturbing activities would produce fugitive dust, primarily in the form of PM_{10}. The amount of dust generated depends on the property of the soils, including the silt content and moisture levels, weather conditions at the time of use, vehicle speeds, vehicle weights, and the amount of use. While finer particles ($PM_{2.5}$) can remain airborne for long periods and travel hundreds of miles, larger particles (PM_{10}) produce more localized and temporary impacts because they do not remain airborne as long as fine particles (EPA 2015a). Like combustion-related emissions, fugitive dust emissions are not anticipated to increase substantially over current conditions or vary substantially among alternatives. In addition, dust abatement is required for surface-disturbing projects to minimize fugitive dust; all alternatives contain objectives for reducing the potential for soil erosion that can lead to fugitive dust conditions. As such, the Forest Service does not anticipate uses that generate fugitive dust to have a substantial effect on air quality or affect visibility in the High Uintas Wilderness class II area, where such uses are limited.

Effects from Fire and Fuels Management and Vegetation Management

Under all alternatives, vegetation and fuels treatments would be used to reduce tree density and the quantity of surface fuels and to remove insect-affected trees, which, in turn, lowers the risk of severe wildfire. Operation of chainsaws, chippers, and heavy equipment needed to perform the treatments releases exhaust-related criteria pollutants and particulates to the air. Burning the larger branches, twigs, and other woody debris generates smoke-related $PM_{2.5}$ and PM_{10}. While the amount of vegetation and fuels treatments varies across alternatives in terms of acres treated, the emissions from individual treatments would be temporary and intermittent.

Smoke produced from prescribed fire treatments and naturally ignited fires managed to meet resource objectives would be a large source of temporary emissions under all alternatives. Although several criteria air pollutants can be found in smoke, particulate matter is typically of most concern from a health and visibility standpoint. It is the primary pollutant resulting from the combustion of fuels during wildland fire (NWCG 2018). Studies indicate that about 90 percent of smoke particles emitted during wildland fires are PM_{10} and about 90 percent of the PM_{10} are $PM_{2.5}$ (NWCG 2018). $PM_{2.5}$ poses the greatest risk to human health because the small size of the particles can cause respiratory and heart problems, particularly in sensitive populations (EPA 2020b). The larger particles in PM_{10} are of less concern to human health, but they can be a localized source of reduced visibility. Carbon monoxide released during fire is generally a localized health concern that is more likely to affect the health and safety of fire personnel. Combustion also releases nitrogen oxides, which are chemical precursors to the formation of ozone.

Under all alternatives, the Forest Service would use prescribed fire and naturally ignited fire to meet resource objectives; these would be managed according to standards and guidelines set forth under each alternative. Under all alternatives, the Forest Service would comply with the Utah and Wyoming Smoke Management Programs for prescribed fire and for naturally ignited fire managed to meet resource objectives, including the use of emission reduction and dispersion techniques to reduce adverse impacts on air quality. Emissions reduction techniques provide the Forest Service with tools to manage smoke levels and reduce the potential for exceeding the NAAQS and affecting visibility in the High Uintas Wilderness class II area during managed fire events. Emission reduction techniques are contained in both the Utah and Wyoming Smoke Management Plans (Utah Division of Air Quality 1999; Wyoming DEQ Air Quality Division 2004).

The potential for wildland fires may increase over the life of the plan due to a predicted increase in drought and higher temperatures, with adverse effects on air quality and visibility in the plan area, including in the High Uinta Wilderness class II area. Smoke from wildland fires may travel large distances, impairing local and regional visibility and degrading air quality far from its point of origin, depending on topography and meteorological conditions, such as wind speed and direction. In the case of uncharacteristically large wildfires, ambient concentrations of criteria pollutants may increase beyond the NAAQS, both locally and in distant locations. Vegetation and fuels management treatments under each alternative would offset this trend to varying degrees by moving forest cover types toward more desired conditions, resulting in more resistant and resilient forest vegetation communities. Increasing resistance to insects and pathogens and resilience to disturbance, such as fire and climate variability, would indirectly reduce impacts on air quality and visibility from wildfire.

Environmental Consequences for Air Quality—Alternative A

Under alternative A, there would be no change to current management. The current forest plan does not contain explicit quantitative objectives for landscape-scale fuels treatments, prescribed fire, or managed natural ignitions, though these activities do occur. Impacts on air quality and visibility from these activities would be as described under "Environmental Consequences for Air Resources Common to All Alternatives."

Over the long term, impacts on air quality and visibility from wildfires would continue. With no objectives to move forest vegetation communities toward desired conditions at a landscape level, an increase in the likelihood for more frequent, severe, and intense wildfires would continue. This would result in increased emissions of PM_{10} and $PM_{2.5}$ over the long term, with the subsequent impacts on air quality described under "Environmental Consequences for Air Resources Common to All Alternatives" and potential increases in episodes of visibility impairment in the High Uinta Wilderness class II area.

Environmental Consequences for Air Quality Common to Alternatives B, C, and D

Alternatives B, C, and D would provide forestwide management of vegetation communities toward desired conditions, including a more natural disturbance regime, and provide objectives for vegetation and fuels treatments, including prescribed burning and managing naturally ignited fires to meet resource objectives. This would focus treatments on reducing adverse effects from uncharacteristic wildfire, thereby reducing fire-related impacts on air quality and visibility over the long term compared with Alternative A, which has no similar objectives.

Environmental Consequences for Air Quality—Alternative B

Under alternative B, prescribed burning in areas suitable for timber harvest would occur on up to 893 acres annually; additional acres may be burned for fuel mitigation purposes or for achievement of other resource objectives. In addition, the Forest Service would manage naturally ignited fires on at least 10 percent of the ignitions every 10 years. Because more fire-related treatments may occur, short-term increases in PM_{10} and $PM_{2.5}$ from vegetation and fuels management may be greater than under alternative A, which does not specify an objective for these treatments. However, complying with the Utah and Wyoming Smoke Management Programs for prescribed fire and for naturally ignited fire managed to meet resource objectives would minimize these impacts and avoid visibility impairment in the High Uinta Wilderness class II area.

Alternative B would annually treat 1,500 acres in the first decade and 1,200 acres in the second decade in areas suitable for timber harvest; alternative B would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on 6,600 to 32,000 acres per year during the life of the plan. Over the long term, these treatments would move forest vegetation communities toward desired conditions more than under alternative A, which has no such objectives for treatments at the landscape scale (see also "Terrestrial Vegetation"). This would have an indirect impact on air quality by lengthening the fire return interval, reducing available fuels during the fire season, restoring natural burn patterns, and reducing acres burned, thereby reducing wildfire-related PM_{10} and $PM_{2.5}$ emissions. Compared with alternative A, it also would reduce periodic episodes of visibility impairment from wildfire in the High Uinta Wilderness class II area over the long term.

Environmental Consequences for Air Quality—Alternative C

Under alternative C, prescribed burning would occur on up to 746 acres annually in areas suitable for timber harvest; additional prescribed burning may occur to meet other resource objectives. In addition, the Forest Service would manage naturally ignited fires on at least 20 percent of the ignitions every 10 years.

Short-term impacts would be similar to those described for alternative B, with the potential for increased PM_{10} and $PM_{2.5}$ emissions, compared with alternative B, if more acres were burned related to naturally ignited fires. As described for alternative B, complying with the Utah and Wyoming Smoke Management Programs would minimize air quality impacts and avoid visibility impairment in the High Uinta Wilderness class II area.

Alternative C would annually treat 1,000 acres in the first decade and 800 acres in the second decade of vegetation management in areas suitable for timber harvest. It would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on 6,600 to 32,000 acres per year (same as alternative B) during the life of the plan. Alternative C may be less effective in moving vegetation toward desired conditions and improving ecosystem resilience at large scales compared with alternative B. This is because it emphasizes passive vegetation management rather than active, increased vegetation treatments. However, it would move forest vegetation communities toward desired conditions more than alternative A, with the same indirect impacts on air quality; these indirect impacts would be reducing wildfire-related PM_{10} and $PM_{2.5}$ emissions and reducing periodic episodes of visibility impairment from wildfire in the High Uinta Wilderness class II area over the long term.

Environmental Consequences for Air Quality—Alternative D

Under alternative D, prescribed burning would occur on up to 884 acres annually in areas suitable for timber harvest; additional prescribed burning may occur to meet other resource objectives. In addition, the Forest Service would manage naturally ignited fires on at least 5 percent of the ignitions every 10 years. Short-term impacts would be similar to those described for alternative B, with similar numbers of acres treated with prescribed fire and naturally ignited fires managed for resource objectives. As described for alternative B, complying with the Utah and Wyoming Smoke Management Programs would minimize air quality impacts and avoid visibility impairment in the High Uinta Wilderness class II area.

Alternative D would annually treat 1,600 acres in the first decade and 1,300 acres in the second decade of vegetation management in areas suitable for timber harvest. Alternative D would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on 10,000 to 40,000 acres per year during the life of the plan. The increased acres of treatment proposed under alternative D would have long-term impacts similar to those described under alternative B—reductions in wildfire-related PM_{10} and $PM_{2.5}$ emissions and fewer periodic episodes of visibility impairment from wildfire in the High Uinta Wilderness class II area, compared with alternative A.

Long-term impacts would be a decreased risk of emissions from wildfires compared with alternative A, but an increased risk compared with alternative B, which has more flexibility to meet resource objectives using naturally ignited fire for resource benefits (see “Fire and Fuels”).

Cumulative Environmental Consequences for Air Quality

The cumulative effects analysis area is the same as described under “Analysis Area.” The time frame for assessing cumulative effects on air quality is 10 years. Prescribed fires would continue to be applied under the direction of the Federal, State, or local land management agencies after consideration of such variables as weather, type and condition of fuels, duration, and acreage to be treated. Prescribed fires authorized by both the Utah Department of Environmental Quality and the Wyoming Department of Environmental Quality are based partly on the potential for cumulative effects from smoke with other activities planned during the same time; therefore, the potential for significant cumulative effects from planned ignitions is largely avoided or, in some cases, mitigated by adhering to the smoke management program in the State implementation plan. Likewise, air emissions from industrial sources are regulated under permits by the State and local environmental agencies. Therefore, if new significant sources of this kind are proposed, regulators would review the increment of pollutants, and mitigation and monitoring would be required to ensure continued attainment of the NAAQS on the Ashley National Forest.

While the vast majority of the Ashley National Forest is in attainment of the NAAQS, climatic conditions, such as drought and wind, can cause dust and particulate emissions associated with fire to vary significantly in extent over time. While wildfires are not considered in the assessment of attainment of the NAAQS because they are not planned actions, they could contribute to cumulative effects on air quality and visibility in the Forest Service-managed High Uintas Wilderness class II area.

In addition to emissions from wildfire and prescribed burning on the Ashley National Forest, other emissions on the national forest would affect air quality. Air quality would also be affected by surrounding and upwind regional area sources, including, but not limited to, wildfire and prescribed burning, agricultural sources, industrial emissions, mining and oil and gas development sources, residential and municipal sources, construction equipment, vehicles, road dust, gravel pit dust, campground wood fires, and smoke from non-national forest wildland fires. Potential future sources of emissions that could affect the Ashley National Forest are continued growth in the Wasatch Front metropolitan area and continued energy development in the Uintah Basin and southwest Wyoming. Long-distance regional sources can occur from the western United States and even Canada and Asia.

Soils

Introduction

Soils are a living, dynamic resource that support physical, chemical, and biological activities of ecosystems. The diversity of soil types on the Ashley National Forest reflect the varied landscapes and soil-forming factors. Soils are formed from the interactions over time between parent materials, climate, organisms, topography, and vegetation communities. The physical, chemical, and biological properties of soils differ with soil characteristics and are always changing, but all soils provide many ecosystem services, including storing and cycling nutrients, providing long-term carbon storage, purifying air and water, storing and regulating water flow, and providing support for plants and human structures (Natural Resources Conservation Service [NRCS] 2001c).

Additional information about soils is available in the Ashley National Forest Assessment, Air, Soil, Water and Watershed Resources Report (Bevenger 2017, pp. 6–8 and 48–71) and the Ecosystem Diversity Evaluation Report (Forest Service 2009a). Information from these sources is used within the discussion of the affected environment.

Regulatory Framework

National Forest Management Act of 1976—Emphasizes the maintenance of productivity and the need to protect and improve soil and water resources and avoid permanent impairment of the productive capability of the land.

Public Rangelands Improvement Act of 1978—Directs that range condition and productivity be improved to protect watershed function, soil, water, and fish habitat.

Forest Service Manual, Intermountain Region (Region 4) Ogden, Utah: FSM 2500 Watershed and Air Management Chapter 2550 Soil Management Supplement 2500-2011-1—Provides direction on maintenance and measurement of soil quality, definitions for detrimental soil disturbances and soil quality, and references to be used for technical direction.

USDA Forest Service FS-990a National Best Management Practices for Water Quality Management on National Forest System Lands: Volume 1—National Core BMP Technical Guide—Provides best management practices for forest uses by the public and forest projects carried out by Forest Service personnel in order to protect the quality of soils and water.

Forest Service Handbook 2509.22 Soil and Water Conservation Practices Handbook—Provides site-specific soil and water conservation practices for use on National Forest System lands in Region 1 and Region 4 to comply with the Clean Water Act.

Additional contributors to the regulatory framework are described in Ashley National Forest Assessment, Air, Soil, and Watershed Resources Report (Bevenger 2017) and are incorporated by reference. The report contains descriptions of how acts, executive orders (EOs), memorandums of understanding, and agency manuals and handbooks influence the management of soil resources on National Forest System lands.

Analysis Areas

The area of analysis for soil resources is National Forest System lands in the Ashley National Forest.

Description of Affected Environment

The Ashley National Forest lies within three distinct geographic areas: the Tavaputs Plateau, the FGNRA, and the Uinta Mountain range. The diversity of ecosystems in these areas reflects different climate conditions due to varied topography and elevation range. Soil moisture and temperature regime ranges from aridic (dry) and mesic (warm) at lower elevations, to udic (humid) and cryic (very cold) at the highest elevations.

The forest is mapped in an integrated lands system inventory that focuses on large areas of similar geomorphology, geology, vegetation communities, and response to disturbances and management. Soils are described in relation to the ecosystem characteristics and processes of formation but are not described using soil taxonomy. The lands system inventory maps the forest within 166 landtypes that are aggregated into 24 landtype associations (Forest Service 2009a; Bevenger 2017). See figure 3-1.

Soil quality is used in this analysis to describe the capacity of soil to sustain plant and animal activity and productivity, to regulate water and solute flow, to store and cycle nutrients and carbon, to provide physical support, and to filter, buffer, and degrade organic and inorganic materials (NRCS 2015). Soil quality is influenced by both natural soil formation and human use and management.

Soil productivity is one aspect of soil quality. Productivity is the ability to support vegetation, and it depends on many soil physical, chemical, and biological properties. Two main soil properties that determine vegetation productivity are the amount of nutrients and water the soils contain and can release to plants (NRCS 2001c). Nutrient exchange and the available water capacity of soils in turn depend on several factors, including soil depth, texture, pH, and soil organic matter (NRCS 2001a). Soil organic matter and clay are key to nutrient exchange and the type and strength of soil structure.

Soil Erosion and Slope

One of the greatest threats to soil quality is soil erosion. Although erosion is a natural and continual process, accelerated soil loss often occurs after ground disturbance when effective ground cover is reduced, when soil is displaced, or when soils have increased runoff due to compaction (NRCS 2001d). Background natural rates of soil erosion in forest stands are generally low and under 0.5 tons per acre annually, but accelerated erosion from disturbance can increase that rate more than 100-fold (Miller

2014). Soil is considered a nonrenewable resource due to its slow formation and because once it is moved off-site, it cannot be replaced (Lowery et al. 1999).

Erosion affects the soil's physical, biological, and chemical properties. These changes stem from the degradation of soil structure and loss of the soil organic matter and clay fractions that are key sites for nutrient exchange. Erosion also reduces soil porosity and water holding capacity. The changes to soil microbial populations and productivity can alter what plant communities can be supported (Lowery et al. 1999).

Soil erosion hazard is the potential for accelerated erosion to occur and depends on soil properties and site factors. Studies indicate that site factors, including vegetation and the degree of disturbance, have a greater impact on the amount of runoff and soil erosion than the soil's physical and chemical properties (Elliot 2013).

Overall, the main cause of accelerated erosion on forests of the Rocky Mountains is wildfires, and secondarily the network of roads and trails (Elliot 2013). Accelerated erosion can also be caused by timber management activities, prescribed fire, livestock grazing, mining, oil and gas development, and recreation impacts.

Wildfire can accelerate slope erosion, which reflects the degree of burn severity (change to the ecosystem). The burn severity results from a group of factors, including fuels, slope gradient, aspect, winds, and other variables. Post-fire erosion stems from the loss in the vegetation canopy and root support, the loss of surface cover, and the degradation of soil organic matter and structure. Even low-severity fires often result in water repellent soil surfaces, further preventing infiltration and adding to runoff and erosion rates (Elliot 2013).

System roads, logging roads, skid trails, and recreation trails are chronic sources of erosion. Their use creates a compacted base with loose soil material on the surface and sides that can easily erode. Paved roads and compacted dirt roads and trails prevent water infiltration, resulting in runoff and water that channelizes in ruts and ditches.

Soil factors that determine erodibility include soil texture, rock content, the organic content and the related strength and type of structure, and factors of infiltration rate, soil moisture, and the tendency to develop surface seal or physical crusts.

Site factors that determine the soil erosion hazard include the slope gradient and shape, surface roughness, and length of the slope. In addition, the type of vegetation, topography, and the amount of ground cover provided by coarse woody debris, litter, duff, and biological crusts are important. The climate, including the intensity and duration of storms, may become increasingly important due to trends from climate change (Forest Service 2017r).

Slope gradient is one of the most important factors that determine soil erosion by water. The erosion potential increases along with increasing slope, up to a threshold of a slope gradient of approximately 86 percent or 41 degrees (Liu et al. 2001).

A general view of the soil erosion hazard is derived from the factor of slope and using slope intervals. The slope breaks below are derived from regional soil interpretations where slope was a factor in potential impacts from fire, timber harvest, and off-highway vehicle (OHV) use. Table 3-3 lists the approximate land area on the Ashley National Forest within main slope intervals.

Table 3-3. Acres of Percent Slopes Ranges in the Plan Area

Percent Slope	Acres	Percentage of National Forest in Plan Area
0–10	533,600	38.7
10–25	399,400	29.0
25–40	272,700	19.8
40–60	149,000	10.8
>60	22,900	1.7

Source: Forest Service GIS 2020

Mass wasting is also a source of soil loss, but it is difficult to quantify. Numerous slumps, debris flows, and landslides have been documented on the forest. These sites often occur on similar geologic formations and combinations of rock materials with contrasting permeabilities that promote slope saturation and failure, including shales, lacustrine formations, and glacial till deposits. Other factors involved in slope failures include slope gradient, the presence of seeps, groundwater pressure, bedding angles, the type of surface vegetation, and disturbance from fire or storms (Forest Service 2017q).

Sensitive Areas and Compaction

Soil disturbance is defined in the Intermountain Region as any activity that alters existing physical, chemical, and/or biological properties of the soil. Most soil disturbance is short lived and unavoidable as a result of forest management activities and public uses of the forest, but other disturbances can persist or even be irreversible. Soil disturbance is described in soil management direction in terms of thresholds where it becomes detrimental to the goal of maintaining soil quality (Forest Service 2011a). The main forms of soil disturbance are compaction, puddling, displacement, and severe burning. Erosion is also a disturbance that often occurs secondarily as result of changes to the soil surface.

Soil compaction is caused by the forces of weight and vibration on the soil, resulting in the loss of porosity with a corresponding increase in bulk density. Soil texture is the primary factor in determining soil compaction. Soils with mixed particle sizes can easily compact, including loam, sandy loam, and sandy clay loam texture classes, due to the ability for smaller particles to be forced between the larger sand grains (NRCS 2001a). The second-most determining factor in soil compaction is the soil moisture content. Soils that are moist to wet are vulnerable to particle movement. Dry soils compact to a lesser extent; saturated soils do not compact because the pores are filled with water (Greacen 1980).

Common sources of compaction are from the use of vehicles, recreation equipment, and machinery used in timber management and construction. High levels of compaction can occur under both tires or tracks when equipment makes turns and also from repeated passes of equipment. Soil that has been compacted has altered or absent structure; this restricts water infiltration and plant roots. The depth-to-compaction is often 12 inches but can extend to 24 inches in a soil profile. Various studies have shown that once compacted, forest soils often take several decades to return to undisturbed levels of bulk density (Page-Dumroese 2006).

The forest has areas where soils are prone to compaction because they have moist to wet soil conditions. These include areas of springs and seeps, wetlands, and areas with seasonally high water tables. Springs and seeps are areas of freshwater discharge at the ground surface, and both are widely distributed across the Ashley National Forest, with an increased presence at higher elevations. Seeps are common in the Trout Slope and Alpine Moraine landtype associations, and both seeps and springs are abundant where the Uinta Bollie landtype borders Alpine Moraine landtype areas (Forest Service 2009a).

Wetlands on the Ashley National Forest include those with hydric soils, and fens with organic soils. The Colorado Natural Heritage Program at Colorado State University mapped the fen wetlands on the forest in 2017. This mapping indicates there are 8,614 potential fens on the Ashley National Forest, with a concentration at higher elevations between 9,000 and 12,000 feet (Smith and Lemly 2017). Fens represent some of the most unique and fragile areas on the Ashley National Forest and are important sites for water quality, water retention, carbon storage, and biodiversity. The organic materials that form fens accumulated over hundreds to thousands of years.

Puddled soil has little to no infiltration due to a surface seal or crust. Puddling can occur from compaction and is common in ruts made from equipment. The puddled area can cause water to channel and can alter the local groundwater hydrology or wetland function by preventing water infiltration.

Soil displacement is the removal of soil material from one place to another, which can be small areas adjacent to wheels or where logs were dragged, to large areas of slopes (Napper et al. 2009). Soil that is displaced has an altered structure and often a mixing of horizons. The displaced soil is loosened and more susceptible to erosion.

Soil burn severity is divided into three classes depending on the post-fire conditions of the vegetation, ground cover and litter, the depth and color of ash, remaining roots in the surface soil, and the soil structure and water repellency (Parsons et al. 2010). Severely burned soil has many alterations to the soil's physical, chemical, and biological properties, including altered structure, available nutrients and organic matter content, infiltration, pH, and composition of the microbial and invertebrate communities (Certini 2005). Severely burned soils have a damaged or destroyed structure from the combustion of the soil organic fraction and the destruction of soil pores. Roots are charred or absent, and the soil may be sterilized from the heat. The soil surface commonly is left with a layer of ash and underlying char, and the soils are often strongly water repellant.

Generally, severely burned soils are considered more likely to result from wildfires than from controlled prescribed fire. However, wildfires can move swiftly through an area with limited impacts on the forest floor or soils. Soils can be severely burned by high-severity or low-severity ground fires with small flames. Even fire that smolders with no flames, particularly if the overlying duff and the soils are dry, can sterilize soils due to the duration of the burn time (Neary 2019).

Environmental Consequences for Soils

Methodology and Analysis Process

The analysis focuses on the general impacts from proposed alternatives over the plan area, instead of identifying site-specific impacts on soil. This section addresses the issue topics identified during scoping and subsequent alternatives development.

Potential effects of decisions and management actions were identified by reviewing the best available science and using qualitative and quantitative data related to impact indicators. Acres were used to best reflect the scale and magnitude of these effects. A GIS dataset and overlays of resources and resource uses were used to quantify effects, when available. The analysis is mostly qualitative.

Analysis Assumptions

- As slope increases, the potential for erosion increases and the risk of soil instability following disturbance increases, particularly if cover, structure, or permeability has been altered (NRCS 2001d).

- Mass wasting can result from heavy precipitation saturating unstable geologic formations, including shales.
- Surface-disturbing activities, including vegetation and fuels management projects, timber harvests, recreation, and mining, have greater impacts where soils have higher erodibility (Auerswald 2008).
- Biological soil crusts are present on a variety of soil types across the Ashley National Forest. They protect soils from wind and wind erosion by providing cover and reducing runoff. Once disturbed, recovery of biological crusts can take decades or longer to reestablish (Belnap et al. 2001).
- Soils on National Forest System lands will be managed to maintain productivity and soil physical, chemical, and biological properties by implementing best management practices, such as watershed improvement and site-specific mitigation measures that prevent and reduce surface disturbance, including compaction and erosion (Forest Service 2012a).
- Restoration activities will be consistent with soil resource capabilities.

Indicators

Impacts on soils are analyzed using the following indicators:

- Soil erosion hazard
- Soil disturbance

Indicators selected to compare alternatives focus on potential management differences resulting in accelerated soil erosion throughout the forest, and where detrimental disturbance in the form of compaction could affect sensitive soils.

Environmental Consequences for Soils Common to All Alternatives

Management activities with ground-based mechanical equipment would be avoided on slopes greater than 40 percent in all alternatives, with the flexibility of exceptions using new methods and mitigations that protect soils in alternatives B and D. There are approximately 171,900 acres of these slopes on the Ashley National Forest.

Effects from Recreation

Both nonmotorized and motorized recreation on designated trails would continue to result in soil compaction and displacement. Compaction is a main source of detrimental soil disturbance that can persist for decades or longer, depending on the depth and degree of impacts. Impacts from compaction are damage to plant roots, changes in soil moisture, temperature and microbial activity, and degraded productivity. The reduction in soil pores and water infiltration can add to surface runoff and erosion rates (NRCS 2001a). During periods of saturation, soils are very prone to compaction. Impacts on these soils can alter and lower the water table or subsurface water movement, alter plant productivity, and increase rates of soil erosion due to lessened infiltration and permeability (NRCS 2001a).

The road and trail network on national forests is a continual source of soil erosion and sedimentation (Miller 2014). The road base itself has no to low infiltration, resulting in precipitation becoming concentrated runoff (Elliot 2013). Side ditches along roads and ruts in dirt roads further channelize water and remove the surface soil. Erosion off roads and trails is similar and depends on many factors, including their length and gradient, topography, soil properties, use and maintenance, and conditions of adjacent cut slopes.

Soils on roads and trails with moderate to steep 25 to 40 percent and 40 to 60 percent slopes would be at the highest risk because the downward movement of soil particles due to water is greater on higher slope gradients (Liu et al. 2001).

The surface soil that is lost to erosion is the most vital portion of the soil, with the highest content of soil organic matter, biological activity, nutrients, and soil microorganisms. Loss of surface soil also degrades soil quality by altering soil structure and water infiltration, and, by these changes, reduces soil water holding capacity and productivity (NRCS 2001d). Dispersed and developed camping would continue to compact soils and decrease soil aggregate stability, and the result would be soil loss. Impacts on soils are greatest when camping is dispersed in new areas rather than repeat uses of an already disturbed area (Marion et al. 2018). This is because more soils would be exposed to impacts across the Ashley National Forest. Sensitive soils would be avoided in developed recreation areas and near trails, but these areas would still be exposed to dispersed recreation and off-road motorized use.

Effects from Fire and Fuels Management

Fuel reduction treatments can benefit soils and watersheds by reducing the risk of uncharacteristic wildfires. Mechanical thinning and prescribed fire would have similar impacts on soils under all the alternatives, with the overall risk of soil erosion. The reduction in both plant canopy and litter additions to the soil surface exposes soil to more erosion, and increased bare soil can accelerate erosion levels (Auerswald 2008). In addition, loss of vegetation canopy cover and surface organic materials can alter snowpack accumulation, soil moisture retention, and soil temperature (Zhou et al. 2008; Genxu et al. 2009). Where organic litter and duff surfaces are combusted by fire or reduced by thinning, soils have a net loss in nutrients and carbon, affecting their microbial populations that cycle nutrients.

Mechanical treatments also affect soil by detrimental disturbances of displacement and compaction. Compaction can be reduced by using skid-based equipment and timing impacts when soils are dry, frozen, or snow covered (Forest Service 2012a). Sensitive soil areas can be identified and protected during project implementation with designated buffer zones.

The impacts from prescribed fire on soils depend on both the heat of the fire and the burn duration. The convergence of many site factors determines the fire effects, including slope, aspect, climate, burn conditions, soil texture and rock content, and depth of organic materials (Elliot 2013). Hydrophobic surface soils can exist naturally, particularly under ponderosa pine stands. Most fires can result in at least temporary development of hydrophobic soil surfaces, adding to the risk of post-fire soil erosion (Lal 2015). The combustion of organic materials within the soil matrix reduces or destroys soil structure, leaving soils less permeable and resistant to erosion. Severely burned soils change structure and color and are sterilized.

Effects from Designated Areas

All the alternatives would manage the designated High Uintas Wilderness Area, Ashley Karst National Recreation and Geologic Area (NRGA), Sheep Creek Canyon Geologic Area, seven RNAs, 637,700 acres of inventoried roadless areas (IRAs), and two suitable wild and scenic river segments. Soil quality in these areas can be expected to be maintained or altered depending on the management of recreation and livestock grazing impacts. These activities could disturb the soil surface, especially on steep slopes, or could occur in areas sensitive to soil compaction.

Effects from Timber Harvest

The main impact of timber harvest on soil resources is soil compaction, with subsequent accelerated soil erosion due to the increase in surface runoff. Timber harvest treatments have similar impacts as discussed under mechanical fuel treatments. The potential for soil displacement, compaction, and accelerated soil erosion is linked to the slope gradient and the degree of surface disturbance (Grigal 2000). Compaction can be reduced by using skid-based equipment and timing impacts when soils are dry, frozen, or snow covered. Sensitive soil areas can be identified and protected during project implementation with designated buffer zones.

Soils on moderate to steep slopes would be more susceptible to soil erosion. All alternatives would include a guideline that restricts timber harvesting on steep slopes, which would decrease the potential for soil erosion and displacement on steep slopes.

Effects from Livestock Grazing Management

Impacts from livestock grazing on the forest are usually concentrated in relative microsites, including areas of trailing; at water crossing points, water sources, holding corrals, and bedding sites; and around salt blocks. These sites have impacts of soil displacement, loss of vegetation, and soil compaction. Impacts on soils can also add to surface erosion due to the increase in bare soil and soil compaction. These impacts decrease the soil condition. Over the life of the plan, livestock grazing management that results in improvements to land health conditions would maintain the soil condition; however, if an area is overgrazed, the soil condition could decrease, and soil erosion could occur.

Effects from Energy and Minerals

Under all alternatives, the FGNRA has the potential to open to future energy or mineral leasing. Any development would be required to not involve surface disturbance within the FGNRA that affects resource values and require measures such as long-distance directional drilling or mine shaft construction. Any potential energy or mineral development within the FGNRA would avoid or minimize impacts on soil resources. In other areas of the Ashley National Forest, the impacts from energy and mineral development depend on the site-specific location and the amount of ground disturbance involved. The development of leases and associated construction generally result in soil compaction, displacement, a mixing of soil horizons, and the loss of vital surface soil. Erosion may be accelerated and the general soil quality may be reduced from damage to the soil structure, infiltration, and loss of vegetation. Soil disturbance brings the risk of an influx of weeds and invasive species that further degrade the vegetation community and soils. For example, the South Unit oil lease has allowed halogeton to enter and establish from equipment and high traffic use.

Environmental Consequences for Soils—Alternative A

Effects from Recreation

Alternative A includes different recreation opportunity spectrum classes, from roaded natural to primitive settings, to encourage diversity of recreation uses. Alternative A also has 80,000 acres of dispersed recreation, which includes Fish Creek, Uinta River above U-Bar Ranch, Lakeshore Basin, and Weyman Park. This would continue to result in impacts, as described under “Environmental Consequences for Soils Common to All Alternatives.” Off-road motorized use and dispersed camping are common in the FGNRA and areas of the Vernal and Duchesne-Roosevelt Ranger Districts, resulting in impacts of soil compaction, displacement, and accelerated erosion.

Effects from Fire and Fuels Management

Alternative A does not incorporate the newest fire management tools but emphasizes fire suppression and hazardous fuel reduction to maintain historical fire regimes. Fire suppression would limit the potential for severely burned soils, the development of soil hydrophobicity, and post-fire soil erosion in the short term.

Continued use of fire suppression over the life of the plan could result in a buildup of hazardous fuels that increases the potential for high-severity fires (Barrett 2020). This would increase the potential for burning on soils and their susceptibility to erosion over the life of the plan.

Alternative A would emphasize timber harvest rather than prescribed fire for the reduction of hazardous fuels. For this reason, alternative A does not include a range of treatment acreages for prescribed fire. Impacts on soils from mechanical thinning and prescribed fire would be the same as those described under “Environmental Consequences for Soils Common to All Alternatives.”

Effects from Designated Areas

Impacts would be the same as those described under “Environmental Consequences for Soils Common to All Alternatives.”

Effects from Timber Harvest

Alternative A would limit timber harvest management on slopes greater than 40 percent. Impacts on soils from timber harvesting would be the same as those described under “Environmental Consequences for Soils Common to All Alternatives.”

Effects from Livestock Grazing Management

There are no forest wide specific forage utilization or stubble height guidelines under alternative A, guidelines are determined at the allotment level. Current range conditions for sensitive soils and soils on moderate to steep slopes in allotment areas would continue under alternative A. The soil condition may be altered in areas where rangeland conditions are deteriorating, as described under “Environmental Consequences for Soils Common to All Alternatives.” The desired condition for livestock grazing management under alternative A is to optimize forage to the extent that it is cost effective and is balanced with other resources. This desired condition is being met in rangeland areas, except where soil conditions are deteriorating.

Effects from Energy and Minerals

Impacts would be the same as described under “Environmental Consequences for Soils Common to All Alternatives.”

Environmental Consequences for Soils—Alternative B

Effects from Recreation

Alternative B would provide three recreation management areas with different management emphases. One would include high-use destination recreation with motorized access and active allotments for grazing. Another area would be strictly backcountry recreation, with dispersed recreation outside wilderness areas and limited infrastructure; however, motorized use and timber harvesting would be allowed in backcountry areas under alternative B. The third would be a general recreation area with a range of motorized to nonmotorized uses, similar to the recreation opportunity spectrum classes under alternative A. Management in backcountry recreation areas (11,300 acres of potential wetlands) and general recreation areas (22,900 acres of potential wetlands) would have greater impacts on soils, compared with 4,800 acres of potential wetlands in the destination recreation area.

For all of these areas, motorized, destination, and dispersed recreation would compact soils and increase erosion susceptibility, as described under “Environmental Consequences for Soils Common to All Alternatives.” Alternative B would provide more areas for recreation, and therefore more surface disturbance, than alternative A. This increases the potential for compaction and displacement of sensitive soils and erosion of soils on moderate to steep slopes, in comparison with alternative A.

Effects from Fire and Fuels Management

Impacts on soils from mechanical thinning would be as described under alternative A, except alternative B would treat fewer acres and in doing so would limit the magnitude of soil disturbance. Impacts on soils from prescribed fire would be similar to those described under "Environmental Consequences for Soils Common to All Alternatives"; however, alternative B would include a guideline for post treatment to leave various sizes of coarse woody debris (minimum of 3 inches in diameter) distributed over 40 percent or more of the plan area, where available. This would increase soil stability and reduce the potential for erosion after treatments, compared with alternative A.

Under alternative B, high intensity fires may still occur because it would also use wildland fire to achieve desired vegetative objectives. This would increase the potential for soil burning and soil loss. Alternative B would include a guideline for vegetation management that uses ground-based equipment to limit soil disturbance to no more than 15 percent of the area from completed cumulative management activities. This would also apply to timber management. If disturbance exceeds this threshold, the guideline encourages that mitigation measures be put in place to avoid further soil disturbance and to maintain soil quality.

Effects from Designated Areas

Under alternative B, two areas covering 10,300 acres would be managed as wilderness with 230 acres identified as potential wetlands. The wilderness designation and the alternative B guideline to locate new or relocate existing trails to resilient areas provide protection for soil resources, including sensitive hydric and organic soils in wetlands. Compared with alternative A, this reduces the potential for soil compaction and accelerated erosion.

Effects from Timber Harvest

Alternative B would allow timber harvest, thinning, planned ignitions, and planting on 1,500 acres annually and would provide fewer acres suitable for timber production, compared with alternative A. More acres would be suitable for timber harvesting (189,400 acres); however, alternative A would provide more acres overall for timber activities. This means compaction and soil erosion would be reduced under alternative B, compared with alternative A. Timber management would be limited on slopes greater than 40 percent; in areas suitable for timber production, this would include approximately 29,000 acres (Forest Service GIS 2020).

To prevent soil erosion and recreational use of temporary roads and skid trails, alternative B would include a guideline to establish post-project reclamation on a minimum of 60 percent effective ground cover. This ground cover would include materials that provide soil stability, such as wood, slash, litter, surface rock, and understory vegetation.

In areas suitable for timber production, wetlands and fens would not be affected, because there are no wetlands or fens in suitable areas (Forest Service GIS 2020); however, there are approximately nine springs in these areas and high concentrations of seeps and high water table areas (Forest Service GIS 2020), as evidenced by overlapping landtypes described under "Description of Affected Environment." Soils in these areas would be vulnerable to soil compaction, displacement, and erosion if affected by timber harvest equipment. Alternative B would include guideline direction to use design features and mitigations to prevent impacts on soils.

Effects from Livestock Grazing Management

Alternative B would provide specific utilization and stubble height guidelines that could be increased or decreased depending on the soil condition and other rangeland conditions to meet desired conditions. Compared with alternative A, these guidelines would better maintain rangeland conditions, including soil condition, as described under “Environmental Consequences for Soils Common to All Alternatives.”

Effects from Energy and Minerals

Impacts would be the same as described under “Environmental Consequences for Soils Common to All Alternatives.” Alternative B would include a guideline for new energy or mineral operations to not authorize ground-disturbing activities in riparian zones. This would maintain sensitive soils in those areas from compaction and displacement, compared with alternative A.

Environmental Consequences for Soils—Alternative C

Plan components under alternative C would be the same as those described under alternative B.

Effects from Recreation

Under alternative C, the Forest Service would manage three recreation management areas, similar to alternative B. Impacts from management would be greatest on soils in backcountry recreation areas (with 15,800 acres of potential wetlands) and general recreation management areas (with 18,600 acres of potential wetlands), compared with 4,600 acres of potential wetlands in the destination recreation management area. Similar to alternative B, it would increase access to the forest and the potential for soil compaction and soil erosion, compared with alternative A.

Alternative C would limit motorized vehicle use in backcountry areas, which would reduce soil compaction and soil erosion susceptibility from motorized vehicles. Timber production and grazing would not be allowed in destination recreation areas, so compaction on sensitive soils and potential erosion on moderate to steep slopes would be reduced, compared with alternative A.

Effects from Fire and Fuels Management

Management of fire, both prescribed and natural fire, and fuels under alternative C and the resulting impacts on soils would be similar to alternative B, except with an increased use of wildland fire to meet resource objectives. When using wildfires for resource objectives, there is always the potential for part of the burned area to have high-intensity fires, resulting in some soil loss. This would increase soil erosion susceptibility and soil loss over the life of the plan, compared with alternative A.

Effects from Designated Areas

Alternative C provides the most acres managed as recommended wilderness (50,200 acres), compared with alternative A. It would provide an additional RNA and four segments of wild and scenic rivers. Within the recommended wilderness areas and the proposed RNA, there would be 2,600 acres of potential wetlands (including fens), where sensitive hydric and organic soils occur. Similar to alternative B, this would increase opportunities to maintain soils sensitive to soil compaction, compared with alternative A. This would indirectly reduce erosion rates, providing the most benefit for soils on moderate to steep slopes.

Effects from Timber Harvest

Timber harvest under alternative C would be reduced, compared with alternative A. Sensitive soils in wetlands and fens would not be affected because they do not occur in suitable areas. Eight springs within the suitable timber production area would need design features to avoid compaction of sensitive soil areas

(Forest Service GIS 2020). Overall, timber suitability and timber yields would be reduced compared with alternative A.

Similar to alternative B, timber management would be limited on slopes greater than 40 percent. Under alternative C, this includes approximately 22,400 acres in areas suitable for timber production (Forest Service GIS 2020). Limiting timber harvest and vegetation management in these areas could increase hazardous fuels and the potential for high-severity wildfires (Barrett 2020). The potential for fires that would result in severely burned soils and post-fire soil erosion would increase over time. This would likely outweigh the short-term beneficial impacts of reduced surface disturbance and soil erosion.

Effects from Livestock Grazing Management

Alternative C would lower utilization, compared with alternative A; not allow for modifications, as compared with alternative B, and likely ensure rangeland desired conditions are maintained. This could reduce grazing in some areas where utilization consistently exceeds 50 percent and stubble height exceeds 4 inches. Overall, alternative C would reduce impacts on the soil condition, including soil compaction and displacement, vegetation cover loss, surface runoff, and soil erosion, in concentrated use areas.

Effects from Energy and Minerals

Impacts would be the same as those described under alternative B.

Environmental Consequences for Soils—Alternative D

Plan components under alternative D would be the same as those described under alternative B.

Effects from Recreation

Alternative D would provide the most acres for infrastructure development and motorized use on roads and trails in backcountry areas. Similar to alternative B, grazing would be permitted in destination recreation areas. These areas are currently permitted for grazing under alternative A but not as destination recreation areas. Alternative D would also include three recreation management areas, as would alternatives B and C. Impacts on soils would be greatest in backcountry recreation management areas (with 9,000 acres of potential wetlands) and general recreation management areas (with 25,100 of potential wetlands), compared with the destination recreation management area, which would include 4,900 acres of potential wetlands.

Compared with alternative A, these additional areas designated for recreation would increase forest access for recreation vehicles, including off-road uses, and developed and dispersed recreation. This would result in impacts as described under "Environmental Consequences for Soils Common to All Alternatives." In turn, soil compaction on sensitive soils and soil erosion susceptibility would increase, especially on moderate to steep slopes, compared with alternative A.

Effects from Fire and Fuels Management

Under alternative D, all fuel management tools would be emphasized and available for use. In the short term, mechanical thinning and prescribed fire would result in soil displacement, compaction, and burned soil and add to soil erosion rates, especially on steeper slopes. Impacts from these treatments would be greater than they would be under alternative A because the Forest Service would treat more acres under alternative D. These fuel management tools would decrease hazardous fuel loads and result in lower-severity fires, compared with alternative A. Further, these tools would have the potential to reduce impacts of severely burned soil and soil erosion over the life of the plan.

Effects from Designated Areas

No new designated areas are proposed under alternative D, so impacts on soils in designated areas would be the same as described under alternative A.

Effects from Timber Harvest

Alternative D would allow timber harvest, thinning, planned ignitions, and planting on 1,600 acres annually. Similar to alternative B, more acres (189,400 acres) would be suitable for timber harvesting than under alternative A. Alternative D would provide 114,300 acres suitable for timber production, but this would be less than under alternative A. Timber harvest would also be allowed in unsuitable areas under alternative D, which would increase soil compaction and soil erosion susceptibility in those areas, compared with alternative A. There would be approximately 1,500 acres of potential wetlands in areas suitable for timber production (Forest Service GIS 2020).

Similar to alternative B, areas suitable for timber harvesting would include areas of concentrated seeps, soils with high water tables, and potential wetlands where soils are more sensitive to compaction and erosion. Timber management would be limited on slopes greater than 40 percent. Similar to alternative B, soils in these areas would be vulnerable to soil compaction and soil displacement from vehicles used to access timber, but these impacts would be avoided or mitigated under the proposed guideline, as described under alternative B.

Effects from Livestock Grazing Management

Similar to alternative A, alternative D would not include specific utilization or stubble height guidelines. Impacts on soils under alternative D would be the same as those described under alternative A.

Effects from Energy and Minerals

Impacts would be the same as those described under alternative B.

Cumulative Environmental Consequences for Soils

The cumulative environmental consequences analysis area for soils is National Forest System lands on the Ashley National Forest. Cumulative impacts would last for the life of the plan but could last decades more if soil is lost.

Fuels reduction and vegetation management projects would promote vegetative diversity and resiliency to wildfire disturbance. Examples of such projects are as follows:

- West Northwest D1 Wildlife Habitat Improvement Project Categorical Exclusion (CE) and Little Pond Forest Restoration Project EA
- Greater Cart Creek Restoration Project in the Vernal Ranger District
- Ashley National Forest Aspen Restoration Project CE
- Forest-wide hazard tree removal

In turn, wildfire intensity would decrease and so would the potential for soil burning. In combination with the vegetation management proposed in the revised plan, especially for alternatives B and D, this would have an additive cumulative effect of indirectly improving soil quality over the life of the plan; however, these projects would also increase treatment areas across the forest and would cumulatively affect soils by increasing the potential for soil erosion. For tree removal especially, alternative A would result in the greatest potential for soil erosion, in conjunction with these reasonably foreseeable vegetative management projects. This is because it would provide the greatest acreage for areas suitable to timber production.

Recreation projects, such as the Badlands Trail Project—Part 2, CE, Big Brush Creek—Outlaw All-terrain Vehicle (ATV) Trail Reroute Project CE, and the Highline ATV Trail Reroute Project CE, would reroute and reconstruct trails to improve resource conditions. These trails would result in short-term soil disturbance during construction, but they would help prevent future soil compaction and erosion by providing designated routes and reducing off-trail motorized use. The Ashley Karst National Recreation and Geologic Area Management Plan will limit construction of new motorized access within the designated area. Soil resources may benefit from reduced impacts of road and trail construction, but recreation use may increase and result in areas of soil disturbance, including compaction, displacement, and accelerated erosion.

Water resource projects, such as the Sowers Creek Restoration CE, Round Park Hardened Stream Crossing Project CE, and Moose Pond Water Diversion and Moose Pond Dredging projects in the Flaming Gorge District, would use heavy equipment to create water diversions, construct control structures, and remove sediment. These projects could result in soil disturbance within the project footprints, including soil displacement, compaction, and erosion.

Alternative D would result in the most disturbance to sensitive soils due to vegetation management and recreation. In conjunction with these reasonably foreseeable water resources projects, sensitive soils would be most vulnerable to compaction and erosion susceptibility under alternative D.

Future infrastructure projects would cause soil displacement and compaction, and create a potential for accelerated soil erosion and establishment of invasive species. Examples of these projects are as follows:

- Wyoming Pipeline Corridor Initiative Project
- Strata Fiber Optic Cable Line buried along Highways 191 and 44
- Soda Pacific Water Pipeline in the Flaming Gorge District
- Removal of Indian Canyon Guard Station in the South Unit and removal of Stockmore Administrative Site in the Roosevelt and Duchesne Ranger Districts

In addition to these projects, natural occurrences such as wildfires would result in additive cumulative soil loss in conjunction with vegetation treatments, recreation uses, timber harvesting, and livestock grazing. Wildfires typically result in larger areas of severely burned soil that result in higher levels of hydrophobicity and post-fire soil erosion. Wildfire also can create hydrophobic soil surfaces that worsen post-fire erosion rates. Wildfires will continue to be a threat to soils under all the action alternatives, but alternative D would provide the most fuel treatment tools and the greatest potential to reduce high-severity wildfires.

Watersheds and Aquatic and Riparian Ecosystems

Introduction

The Ashley National Forest is in the Green River drainage, a major tributary to the Colorado River. The drainage begins at the Continental Divide, in the Wind River Range in northwest Wyoming, and joins the Colorado River in Canyonlands National Park in south-central Utah. The drainage is comprised of the upper and lower Green River basin, being divided by the Uinta Mountains, where much of the Ashley National Forest is located. The FGNRA is on the north side of the Uinta Mountains and in the southern end of the upper Green River basin. The south unit of the national forest is in the Tavaputs Plateau. The Uintah Basin, generally, is between the Uinta Mountains and the Tavaputs Plateau (Forest Service 2017b).

The Ashley National Forest includes three distinct areas that differ in ecology, geology, and hydrology: the Uinta Mountains and FGNRA in the north unit and the Tavaputs Plateau in the south unit of the Ashley National Forest.

Regulatory Framework

Organic Administration Act of 1897—States that one aspect of the mission of the national forests is to "provide favorable conditions of water flow."

Clean Water Act of 1948, as amended—The principal law that addresses pollution in the nation's streams, lakes, and estuaries. Originally enacted in 1948, it has been revised by amendments in 1972 (Public Law 92-500) that gave the act its current form and spelled out ambitious programs for water quality improvements that are now being put in place by industries and cities. Congress refined these amendments in 1977 (Public Law 95-217) and 1981 (Public Law 97-117). The 1987 amendments added the following language:

- Section 319, under which states are required to develop and implement programs to control nonpoint sources of pollution and rainfall runoff from farm and urban areas and construction, forestry, and mining sites.
- Section 303(d), which requires states to identify pollutant-impaired water segments and develop total maximum daily loads that set the maximum amount of pollution that a waterbody can receive without violating water quality standards. States must also develop a water-quality classification of streams and lakes, to show support of beneficial uses, and establish anti-degradation policies that protect water quality and stream conditions in systems where existing conditions exceed standards.

Federal Water Pollution Control Act, as amended—Provides direction to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Sections 303, 319, and 404 apply to forest management. Section 208 of the 1972 amendment specifically mandates identification and control of nonpoint source pollution from silviculture. There are five required elements, as follows:

- Compliance with State and other Federal pollution control rules
- No degradation of instream water quality needed to support designated uses
- Control of nonpoint source water pollution using conservation or "best management practices"
- Federal agency leadership in controlling nonpoint source pollution from managed lands
- Rigorous criteria for controlling the discharge of pollutants into the nation's waters

Safe Drinking Water Act of 1977 and amendments—In 1996, the Safe Drinking Water Act was amended with requirements to identify "source water protection areas" and to assess their susceptibility to contamination. This provides states with more resources and authority to enact the Safe Drinking Water Act. This amendment directs the states to identify source water protection areas for public water supplies that serve at least 25 people, or 15 connections, at least 60 days a year. In terms of relative size and scope, while an individual national forest unit may have four designated municipal watersheds, there may be over 100 source water protection areas that intersect with National Forest System lands managed by that unit.

Source water protection areas have been established to protect public water systems from contamination. "Public" in public water system refers to the people drinking the water, not to the ownership of the system (www.epa.gov/sourcewaterprotection). These systems can be dependent on any type of water source, including streams, lakes, reservoirs, springs, wells, or infiltration galleries, and include systems used either year-round or only seasonally.

State governments were given the option to accept primacy or responsibility for delineating and developing assessments for these source water protection areas. Utah has accepted this responsibility and maintains the most up-to-date information regarding the source water protection delineations, assessments, and management requirements or goals; however, Wyoming has not accepted this responsibility and currently maintains a voluntary program for source water protection.

Municipal Watersheds—36 CFR 251.9: authorizes the chief of the Forest Service to enter into agreements with municipalities to restrict the use of National Forest System lands from which water is derived to protect the municipal water supplies (Forest Service Manual 2542).

Executive Order 11988 (May 24, 1977)—Directs Federal agencies take action on Federal lands to avoid, to the extent possible, the adverse short-term and long-term impacts associated with the occupancy and modification of floodplains. Agencies are required to avoid the direct or indirect support of development on floodplains whenever there are reasonable alternatives and to evaluate the potential effects of any proposed action on floodplains.

Executive Order 11990 (May 24, 1977), as amended—Requires Federal agencies exercising statutory authority and leadership over Federal lands to avoid, to the extent possible, the adverse short-term and long-term impacts associated with the destruction or modification of wetlands. Where practicable, direct or indirect support of new construction in wetlands must be avoided. Federal agencies are required to preserve and enhance the natural and beneficial values of wetlands.

Executive Order 12962 (June 7, 1995)—Acknowledges the recreational value of aquatic biota by stating the objectives "to improve the quantity, function, sustainable productivity, and distribution of United States aquatic resources for increased recreational fishing opportunities" by "(h) evaluating the effects of federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order."

Utah Water Quality Act (June 1, 2014)—Develops surface water quality standards for the State of Utah and requires all discharges to adhere to those standards.

Utah Groundwater Quality Protection (January 1, 2020)—Develops groundwater quality standards for the State of Utah, defines groundwater class protection levels, and institutes a permit system for groundwater discharges.

Analysis Areas

The analysis area for watersheds, riparian management zones, and aquatic species includes all lands within the boundary of the Ashley National Forest. The temporal scope of the analysis is the anticipated life of the plan. The cumulative analysis area includes the 147 subwatersheds that overlap the Ashley National Forest but it also extends beyond its boundaries.

Description of Affected Environment

Watershed Condition

Watershed condition is the state of the physical and biological processes in a watershed; these processes affect soil condition and hydrologic function, which in turn support ecosystems. Watershed condition can be represented by a continuum from naturally pristine to degraded. The watershed condition framework (WCF), an analysis method developed by the Forest Service, classifies the state of all subwatersheds on the Ashley National Forest (Forest Service 2011b, 2011c). The WCF characterized the health and conditions of watershed at the 6th-level hydrologic unit code scale, using a comprehensive set of 4 process categories, 12 indicators, and 24 attributes. The initial or baseline characterization was completed in 2011. Only watersheds that have 5 percent or more National Forest System lands were rated. For the Ashley National Forest, 107 of the 147 6th-level watersheds were characterized (figure 3-3, Watershed Condition Ratings).

Watersheds are classified as being in one of the following condition categories:

- Class 1 (properly functioning)—Watersheds exhibit high geomorphic, hydrologic, and biotic integrity[3], relative to their natural potential condition, and they are functioning properly.
- Class 2 (functioning at risk)—Watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity, relative to their natural potential condition, and they are functioning, but at risk.
- Class 3 (impaired function)—Watersheds exhibit low geomorphic, hydrologic, and biotic integrity, relative to their natural potential condition, and their function is impaired.

Overall, 57 of the 107 watersheds (53 percent) are functioning properly. Another 50 watersheds (47 percent) are functioning at risk. No watersheds have impaired function (table 3-4, figure 3-3). The distribution of overall scores indicate that 70 percent of the watersheds scored near the break between properly functioning and functioning at-risk watershed condition. Changing one or more attributes could shift the classification one way or another, indicating opportunities to improve watershed condition, but also degrade watersheds through mismanagement (Forest Service 2017b).

The twelve indicators used to classify subwatersheds are in four process categories: aquatic physical, aquatic biological, terrestrial physical, and terrestrial biological. Most of the 107 watersheds are functioning properly, relative to the indicators, except for the terrestrial physical indicator where most watersheds are functioning at risk. The terrestrial physical process category has 22 watersheds with impaired function, due to high open road density, lack of road and trail maintenance, and proximity of roads and trails to water (table 3-4; Forest Service 2017b).

Beyond simply assessing watershed condition, the WCF is used to identify priority watersheds, which are areas where land management decisions should emphasize maintaining or improving watershed conditions. The Forest Service designated the Swift Creek and Cart Creek watersheds as priority

[3] Geomorphic functionality or integrity can be defined in terms of attributes such as slope stability, soil erosion, channel morphology, and other upslope, riparian, and aquatic habitat characteristics. Hydrologic functionality or integrity relates primarily to flow, sediment, and water-quality attributes. Biological functionality or integrity is defined by the characteristics that influence the diversity and abundance of aquatic species, terrestrial vegetation, and soil productivity (Forest Service 2011b).

Table 3-4. Watershed Condition Framework Ratings for the Ashley National Forest

Watershed Condition Rating	Overall Watershed Condition		Watershed Condition Process Categories			
	Number of Watersheds	Percentage of Watersheds	Aquatic Physical (Number of Watersheds)	Aquatic Biological (Number of Watersheds)	Terrestrial Physical (Number of Watersheds)	Terrestrial Biological (Number of Watersheds)
Functioning properly	57	53	72	67	7	105
Functioning at risk	50	47	35	39	78	2
Impaired function	0	0	0	1	22	0

Source: Forest Service 2017b

watersheds in 2012, with essential projects identified to improve watershed conditions. Work has been completed in the Swift Creek watershed. The proposed plan would include three priority watersheds—Cart Creek, Wolf Creek, and Whiterocks River—where restoration work is currently focused (figure 3-4).

Watershed Vulnerability

For the Ashley National Forest, watershed vulnerability to climate change is considered moderate to high. Increases are anticipated for drought, heat, flooding, greater evaporation, snowpack loss, and earlier snowmelt that would shift runoff timing, reduce streamflow, and increase the severity and intensity of wildfires. Ashley National Forest watersheds are considered highly sensitive to these projected changes (Forest Service 2018a). Vulnerability would be moderate to very high to drought, heat, wildfire, and floods, with decreasing sensitivity as elevation increases (Forest Service 2017c).

The capacity for the Ashley National Forest watersheds to adapt to climate change is moderate, with most inherently resilient because they are in good functioning condition at present (table 3-4). Watersheds functioning at risk are more vulnerable to climate change effects. This is due to the impaired function of terrestrial physical processes, including high road densities and poor road and trail conditions (Forest Service 2017c).

Surface Water Resources

Surface water features on the Ashley National Forest are streams, reservoirs, lakes, wetlands, stock ponds, and springs (figure 3-5). These features provide habitat for diverse communities of vegetation, wildlife, and fish. They also provide water for such downstream uses as crop irrigation, domestic livestock, municipal and domestic water supplies, and commercial and industrial uses.

Surface Water Features

Stream characteristics and flow pattern vary between the three geographic areas of the Ashley National Forest. Streams draining the Uinta Mountains typically occupy either U-shaped glaciated valleys or narrow, stream-carved canyons. Streams in the lower elevations of the FGNRA originate from Pleistocene glaciation, erosive sedimentary substrates, and a series of east-west trending faults. The Tavaputs Plateau is dissected by numerous stream channels, most of which are intermittent or ephemeral, on highly erosive substrates. The streams originate in steep, narrow canyons at the head of the plateau and transition to low gradient alluvial floodplains at lower elevations (Forest Service 2017c).

Overall, the Ashley National Forest contains 1,100 miles of perennial streams, 2,100 miles of intermittent streams, and an undetermined number of miles of ephemeral streams (table 3-5; figure 3-5).

Table 3-5. Streams, Waterbodies, Seeps, and Springs on the Ashley National Forest

Waterbodies	Total
Perennial streams (miles)	1,100
Intermittent streams (miles)	2,100
Lakes and reservoirs (acres)	55,400
Swamps and marshes (acres)	4,400
Seeps and springs (count)	474

Sources: Forest Service GIS 2020; National Hydrography Dataset (NHD) GIS 2020

There are thousands of waterbodies that total 55,400 acres on the Ashley National Forest (table 3-5; figure 3-5). At higher elevations in the Uinta Mountains, these include a glacial lake, potholes, kettle ponds, and beaver ponds. Wider valley bottoms include ponds created by depressions, reservoirs, and stock ponds.

High elevation waterbodies receive input from streams, seepage, and groundwater upwelling. Potholes and pools show high variation in surface water conditions based on annual climate fluctuations. Ephemeral pools, ponds, and potholes collect runoff in meadows and fluctuate year to year in depth (Forest Service 2018a).

Stream dynamics are driven predominantly by snowmelt for most of the Ashley National Forest, but they vary with the precipitation patterns. Runoff from persistent snow beds and groundwater discharge from springs and talus slopes maintain perennial stream baseflows. Peak flows of perennial and intermittent streams typically occur after heavy snowmelt runoff, but they can also result from rain and snow or summer thunderstorms. Annual snowmelt flows increase in late March to early April, peak in late May to early June, and return to baseflow levels in August. Due to the annual variation in precipitation and temperature, there is a high amount of variability in annual stream flows. Flow in the Tavaputs Plateau is different from the Uinta Mountains or FGNRA due to the drier conditions. In some years, there can be no surface flow in the stream channels late in the year, and flow patterns are characterized more by peak flows after large thunderstorms than after snowmelt (Forest Service 2017b).

The streams across the Ashley National Forest transport water and sediment from the surrounding watershed. Increases or decreases in either the amount of water or sediment can affect stream dynamics, resulting in stream widening or down-cutting and affecting stream and riparian area health. Stream channels on the Ashley National Forest are connected to adjacent floodplains, which vary by stream and valley type from tens of feet to hundreds of feet. The connectivity between the stream channel and floodplain is very important for regulating water quality and how water is distributed over time. Connected stream and riparian systems dissipate flood energy and recharge alluvial aquifers. Human occupancy and use along stream channels or in the floodplain have the potential to change water availability and sediment transport.

Disturbance Processes

In some locations of the Ashley National Forest, channel, floodplain, and sediment dynamics have been altered since European settlement. Human-made stressors on stream dynamics and hydrology include dams and diversions, herbivory from livestock and wild ungulates, fire suppression, roads, and motorized recreation.

Dams and diversions can alter the hydrology patterns for mountain streams on the Ashley National Forest. Changing flow patterns from dam releases can displace riparian areas, which can change the active stream channels and floodplains downstream. Canals and diversions dewater portions of the perennial channels they intercept and move water to other locations, altering the flow pattern of the natural channel. Roads and other disturbed sites could increase sedimentation to stream channels, lowering pool frequency and increasing fine sediment concentrations. Changes in vegetation groundcover in a floodplain from uncharacteristically intense wildfire, overgrazing, or poor management can affect peak flows or sediment loads to adjacent streams; this can result in channel widening or downcutting (Forest Service 2017d).

Climate change is considered an additional stressor. Potential changes in the pattern and timing of precipitation and temperature can augment existing stressors. Warming temperatures, prolonged drought, and extreme weather can affect channel, floodplain, and sediment dynamics. This would come about by increasing water stress on riparian and upland vegetation, increasing wildfire intensity and frequency, and increasing peak flow and sediment impacts on area streams (Forest Service 2017d).

Water Quality

The primary source of pollution on National Forest System lands are nonpoint source pollutants. These are derived from diffuse overland sources, in contrast to point sources of pollutants, which discharge from identifiable outlets, such as pipes, ditches, agricultural fields, or industrial or sewage treatment facilities.

Activities generating nonpoint source pollutants on the Ashley National Forest are oil and gas development, livestock grazing, road construction, timber and fuelwood harvesting, recreation, and ground disturbance from OHVs. Natural and unknown sources of pollutants may also contribute to nonpoint source pollution on the Ashley National Forest.

Utah and Wyoming assess water quality in their streams and waterbodies. Figure 3-6 includes perennial streams in the plan area that are listed as impaired under the Clean Water Act, section 303(d) list. Specific impairments are from aluminum, arsenic, boron, dissolved oxygen, pH, selenium, total dissolved solids, and zinc. There were 676 miles of perennial streams on the Ashley National Forest listed as impaired by the State of Utah pending EPA designation (EPA GIS 2020). This represents 61 percent of all perennial streams on the Ashley National Forest. Harmful algal blooms have been observed periodically in the upper reaches of Flaming Gorge Reservoir on or near the plan area.

The EPA's partial approval of the 2016–2018 Integrated Report for the State of Utah extended to all waterbodies on the lists, with the exception of waters in Indian Country, as defined in 18 USC 1151 (EPA 2015b). With the partial approval of the integrated report, the EPA maintains that state water quality standards do not apply to waterbodies within Indian Country (EPA 2015b). The area includes a portion of the Ashley National Forest encompassing the Duchesne-Roosevelt Ranger District and portions of the Vernal Ranger District within the Whiterocks River drainage that is within the original treaty boundary of the Uintah and Ouray Ute Indian Reservation (Indian Country).

Under the Clean Water Act, Indian tribes may apply to the EPA to be treated as states for the purpose of setting water quality standards and administering other Clean Water Act programs on their reservations. The Uintah and Ouray Ute Indian Reservation is one of the reservations that to date has not applied for treatment as state status for setting water quality standards (EPA 2016).

Regardless of the water quality standards that apply to the plan area, the Forest Service is obligated to meet water pollution control requirements of the Clean Water Act to the same extent as any nongovernmental entity (33 USC 1323(a)).

Groundwater

The Ashley National Forest contains unique groundwater resources that are very important to local ecosystems and downstream users, such as farmers and communities. At least 474 seeps and springs are on the Ashley National Forest (table 3-5; figure 3-5); some of them are very large along the northern and southern boundaries of the Uinta Mountains (NHD GIS 2020). These springs are associated with carbonate rocks, where streams at higher elevations lose water into the rock formations through karst features, such as sinking and losing streams, caves, sinkholes, and springs. Water then resurfaces at large springs at lower elevations (Forest Service 2017b).

Groundwater supports many wetlands, springs, and seeps across the Ashley National Forest. A portion of these are groundwater-dependent ecosystems, which include communities of plants, animals, and other organisms that are unique on the Ashley National Forest. The “Riparian and Wetland Areas” section below includes a discussion of these communities in greater detail.

Most spring developments on the Ashley National Forest are pipeline and trough systems to improve livestock distribution on grazing allotments. Other spring developments include domestic and drinking water systems for homes, campgrounds, recreation facilities, and larger systems for public drinking water use. Groundwater-dependent ecosystems were surveyed for impacts and most did not show signs of dewatering or flow alternation, beyond the natural range of variability. Those found to be outside the natural range of variation were typically observed at developed springs, where other surface water sources were not common (Forest Service 2017b).

Water Uses

The Ashley National Forest generates approximately 1.0 million acre-feet of water annually to streamflow and contributes a large, but unmeasured, quantity of water to multiple groundwater aquifers. A portion of this water is used by wildlife, livestock, recreationists, and administrators across the Ashley National Forest; however, most of the water flows downstream and off the Ashley National Forest. A small portion of the water is used by private landowners inside the Ashley National Forest administrative boundary.

There are 3,313 inventoried water sources on the Ashley National Forest. During the 1970s and 1980s, the Ashley National Forest began a process to file claims on many of these uses with the State of Utah. The process however was never completed.

Presently, there are 32 dams on the Ashley National Forest, one of which was decommissioned in 2017. There are 14 pipelines that traverse parts of the Ashley National Forest, three of which are used for electricity generation. There are 30 irrigation pipelines and canals used for off-forest irrigation. Some of the water development infrastructure mentioned here is associated with the Central Utah Project and Flaming Gorge Dam (Forest Service 2018a).

Municipal Watersheds and Source Water Protection Areas

Public water systems are defined under the Safe Drinking Water Act as entities that provide “water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year” (EPA 2017). (“Public” in public water systems refers to the people drinking the water, not to the ownership of the system.)

Source water protection areas are established to protect public water systems from contamination, in accordance with the 1996 amendments to the Safe Drinking Water Act. The Utah Department of Environmental Quality Division of Drinking Water’s source water protection program provides guidance and approval of source water protection areas in Utah. Wyoming is the only state in the country where public water system operators are not required to complete source water assessments; however, the State encourages water system operators to participate in voluntary assessments.

Source water protection areas in Utah are divided into source water protection zones according to the watersheds that provide water to the public water system intakes. Several municipalities extend their protection areas onto the Ashley National Forest, including the following municipalities in Utah: City of Green River, Duchesne, Whiterocks, Tridell, Vernal, Manila, and Dutch John. Management of these watersheds focuses on maintaining and improving the quality, in the long term, of surface water in the public water system. In addition, the Forest Service has designated the Ashley Karst National Recreation and Geographic Area with the purpose to conserve and protect the karst systems that provide drinking water and irrigation to Uintah County. The management plan includes forest plan components to protect the water quality of these headwater karsts.

Water Rights

With regard to water uses and development, Forest Service Manual 2541.02 directs national forests and grasslands to obtain water needed for the National Forest System, in accordance with legal authority and with due consideration for the needs of other water users. This objective includes securing water rights for waters not reserved, in accordance with state laws, for water needed on acquired lands and securing rights on reserved lands, if the reservation doctrine or other Federal law does not apply to the uses involved (Forest Service Manual 2451.22).

The Ashley National Forest has water rights in both Utah and Wyoming. In Utah there are 1,590 perfected water rights: 1,401 for stock water, 129 for domestic use, 41 for irrigation use, and 19 for miscellaneous uses. The Ashley National Forest also possesses three subbasin claims, with plans to file for additional claims. The Ashley National Forest holds three subbasin claims; it plans to adjust stock water rights into a similar format to better meet current and future livestock watering needs. In Wyoming there are 12 domestic, miscellaneous, and stock watering rights associated with the FGNRA (Forest Service 2017b).

Riparian and Wetland Areas

In general, riparian areas are lands where land meets a river or stream; wetlands are lands that are saturated with water all year or for varying periods during the year. Hydrologic processes that affect riparian and wetland areas are volume and timing of stream flows, extent of area inundated by surface water, fluctuations in depth to groundwater, evapotranspiration, and fluvial influences, such as sediment deposit.

On the Ashley National Forest, intermittent and perennial streams have surface flows and groundwater connections adequate to support riparian vegetation. Ephemeral streams and human-made (anthropomorphic) channels with sporadic surface flows and little to no connection with the water table do not typically support riparian vegetation. Wetlands on the Ashley National Forest form in areas fed by surface water or groundwater: lakes, ponds, fens, and wet meadows (see the "Terrestrial Vegetation" section for more information on fens). Reservoirs and stock ponds also support wetlands at lower elevations on the Ashley National Forest.

Although riparian and wetland areas occupy only a small percentage of the Ashley National Forest, they provide important habitat for many terrestrial and aquatic species, including connectivity of habitat from headwaters to downstream areas. Riparian areas cover approximately 33,200 acres, or 2.4 percent of the Ashley National Forest (table 3-6; figure 3-5), while wetland areas next to lakes, ponds, and other waterbodies cover approximately 22,700 acres, or 1.6 percent of the Ashley National Forest (table 3-7; figure 3-7).

Table 3-6. Riparian and Wetland Vegetation Types

Vegetation Type	Acres
Riparian, unclassified	1,100
Herbaceous-dominated	14,300
Shrub-dominated	11,000
Tree-dominated	6,800
Total	**33,200**

Source: Forest Service GIS 2020

Table 3-7. Emergent Wetlands from the National Wetlands Inventory

Wetland Type	Acres
Freshwater emergent wetland	18,600
Freshwater forested/shrub wetland	4,100
Total	**22,700**

Source: Forest Service GIS 2020

The Uinta Mountains include most of the perennial and intermittent streams on the Ashley National Forest, along with a wide variety of waterbodies, including glacial lakes, potholes, kettle ponds, and beaver ponds. The variety of surface water features, along with high precipitation, especially snow, support a wide range of riparian and wetland vegetation communities. Wet meadows, fens, and willow fields surround most waterbodies, forming expansive aquatic, riparian, and wetland ecosystems. These wet meadows can be herbaceous-dominated or willow-dominated, depending on soil conditions (Forest Service 2018a).

Herbaceous-dominated ecosystems are typically dominated by a mix of grasses, such as water sedge (*Carex aquatilis*), Nebraska sedge (*C. nebrascensis*), beaked sedge (*C. utriculata*), tufted hairgrass (*Deschampsia cespitosa*), and wiregrass (*Juncus arcticus*) that occur across the elevations of the mountain range. The plane-leaf willow (*Salix planifolia*)/water sedge community is common along high-elevation streams and meadows. At lower elevations, deciduous trees are more common and include narrowleaf cottonwood (*Populus angustifolia*), box elder (*Acer negundo*), and bigtooth maple (*Acer grandidentatum*). These riparian woodlands also contain coniferous trees, and willows are also distributed across all elevations (Forest Service 2018a).

The FGNRA includes surface water features that support a wide range of riparian and wetland vegetation communities. Most vegetation is dominated by herbaceous species, especially the in northern areas of the FGNRA, with high acreage of irrigation-influenced riparian and wetland areas. Woody species are narrowleaf and Fremont cottonwood (*Populus fremontii*), willows, boxelder, and chokecherry (*Prunus virginiana*), with sparse cover of conifers, such as ponderosa pine (*Pinus ponderosa*) and blue spruce (*Picea pungens*). Invasive species are common along the lower sections of streams entering the Flaming Gorge Reservoir (Forest Service 2018a).

The Tavaputs Plateau receives less precipitation than the other two geographic areas and is comprised primarily of ephemeral streams (those that flow only during part of the year). Accordingly, riparian and wetland vegetation communities are small and largely limited to streams with perennial reaches. Upper reaches of these streams include Booth's willow (*Salix boothii*), aspen (*Populus tremuloides*), and some narrowleaf cottonwood, while lower reaches are characterized by wiregrass, sedges, and other grasses. Shrubs and trees are scattered through the lower reaches: cottonwood, boxelder, coyote willow (*S. exigua*), and graybark willow (*S. eriocephala*). Irrigation also influences the riparian and wetland areas at the lower elevations (Forest Service 2018a).

General Fens

The Ashley National Forest contains a rich resource of fen wetlands, covering up to 13,869 acres across its jurisdiction. While that represents only 1 percent of the entire landscape, these fen wetlands are an irreplaceable resource. Fens are defined as groundwater-fed, peat-accumulating wetlands with organic soils that typically support sedges and low stature shrubs. They are important for maintaining groundwater and sequestering carbon (Smith and Lemly 2017).

In 2017 fen mapping for the Ashley National Forest was completed by the Colorado Natural Heritage Program (Smith and Lemly 2017). In total, 8,614 potential fens were mapped throughout the Ashley National Forest, 4,019 of which were most likely fens. Potential fens were identified by analyzing digital aerial photography and topographic maps, and fen confidence levels were assigned: 5 (likely fen), 3 (possible fen), and 1 (low confidence fen). Potential fen acreage by confidence level is summarized in table 3-8, and all potential fens on the Ashley National Forest are illustrated in figure 3-8. See Fen Mapping for the Ashley National Forest (Smith and Lemly 2017) for comprehensive fen analysis and descriptions.

Table 3-8. Potential fen counts and acreage, by confidence levels.

Confidence	Count	Acres	Average Size (Acres)
5 (likely fen)	4,019	9,000	2.24
3 (possible fen)	2,765	3,000	1.06
1 (low confidence fen)	1,830	1,900	1.06
Total	**8,614**	**13,900**	**1.61**

Source: Smith and Lemly 2017

Climate-related risks that lead to drying conditions are a likely stressor for all fens. The Intermountain Region’s climate vulnerability assessment indicates that mid- to high elevation fens have both a moderate to high sensitivity and vulnerability ratings and a low to moderate adaptive capacity rating regarding climate-related risks (Forest Service 2018b). Those species that rely on cold and wet conditions and that are limited in size and distribution would be at risk with a warmer and drier climate. Species that inhabit mid-elevation fens may have the ability to move upslope to adaptable habitat as the climate becomes warmer. Plant community composition would be affected by increased water stress, opening niches for more drought-tolerant species.

Riparian Management Zones

Riparian management zones are where riparian-dependent resources receive primary emphasis and management is subject to specific standards and guidelines. Riparian areas provide important habitat for amphibians, neotropical migrant birds and small mammals, and they are migration corridors for terrestrial and aquatic species. These areas consist of riparian and upland vegetation next to streams, wetlands, and other waterbodies and help maintain the integrity of aquatic ecosystems by the following actions (Naiman et al. 1992):

- Influencing the delivery of coarse sediment, organic matter, and woody debris to streams
- Providing root strength for channel stability
- Shading the stream
- Protecting water quality. Fish and other aquatic life benefit greatly from riparian area protection due to these functions

Upland vegetation in riparian management zones, in combination with the riparian vegetation, create zones that provide important terrestrial and aquatic wildlife habitat and connectivity. Most wildlife use riparian management zones and aquatic habitats for at least some of their daily or seasonal needs. Due to their widespread distribution and linear or clustered pattern, riparian management zones provide extensive and important habitat connectivity areas for numerous species of wildlife. (Refer to “Wildlife and Plants” below for information on riparian-associated wildlife species and connectivity of habitat.)

During the past few decades, land managers have recognized the importance of riparian ecosystems in maintaining water quality and terrestrial and aquatic habitat. As a result, riparian conservation measures have been developed for Federal, state, and private lands, helping to preserve and protect the integrity of the riparian and wetland habitats and the water quality of associated waterbodies.

Disturbance Processes

Riparian and wetland vegetation communities have been altered on the Ashley National Forest since the time of European settlement. Historical grazing decreased vegetation cover and altered soil composition in riparian areas (Neff et al. 2005; Fernandez et al. 2008), which led to incised channels, headcutting[4], and changes in the water table. Adaptive grazing management since the early twentieth century has alleviated these conditions with increased vegetation cover and less damage to stream channels. Improper livestock grazing and wild ungulate grazing can impact riparian areas with the greatest potential of impacts occurring during periods of drought (Forest Service 2017c).

Dams on the Ashley National Forest have changed hydrologic flow patterns by displacing riparian vegetation with their reservoir pools and have altered riparian vegetation communities downstream; however, studies have found woody riparian vegetation in good condition downstream of dams and diversions, with good survival. These results indicate that flood disturbance is adequate for cottonwoods, willows, and other pioneer species and that adequate groundwater is available to maintain growth and survival.

Invasive and encroaching species are also an issue for riparian and wetland communities on the Ashley National Forest. Conifers are encroaching across elevations on the Uinta Mountains, with 500 acres observed during vegetation mapping (Forest Service GIS 2020). Conifer encroachment is common for the mid- to low elevations and is likely attributed to fire suppression. Conifers have also been observed encroaching into subalpine meadows. Conifer encroachment suppresses growth of wet meadows and decreases cover of wetland and riparian plant species. Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix* spp.) are also encroaching into riparian areas in low to mid-elevations. Lower reaches of streams near the Flaming Gorge Reservoir include a high cover of invasive species.

Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems

Methodology and Analysis Process

This section describes the methodology and analysis processes used to determine the environmental consequences of each alternative on watersheds and aquatic and riparian ecosystems. Environmental consequences are not site specific at this planning level and are described with qualitative descriptions, supported by past studies and observations.

[4] A break in slope along a stream profile which indicates an area of active erosion.

The qualitative analysis is based primarily on the best available scientific information derived from the forest assessments (Forest Service 2017b, 2017d, 2018a), climate vulnerability assessments (Forest Service 2017c, 2018b), and recent reports and publications that assess current conditions and trends in conditions. In particular, soil and water best management practices monitoring data were reviewed to evaluate the effectiveness of current constraints on management actions. In addition, watershed condition assessments using the Forest Service WCF were examined for the Ashley National Forest to assess the existing watershed condition ratings and to identify restoration opportunities. Stream condition inventory monitoring and assessment data and Clean Water Act, section 303(d) listings for Wyoming and Utah were also examined where available to evaluate impacts across the Ashley National Forest.

Groundwater

In north-central Utah, most groundwater is withdrawn on lands outside the Ashley National Forest; therefore, the Forest Service has no influence on this practice. Forest Service groundwater policy (Forest Service Manuals 2560, 2880) and agency technical guides provide direction for well drilling and pumping on the Ashley National Forest. They specify that these activities must not adversely affect connected riparian habitat and water quantity and quality. Because direction in the Forest Service manual is considered adequate and groundwater withdrawal is governed by state regulations, additional management direction was not specified under any of the action alternatives, and they were not analyzed in this EIS.

Analysis Assumptions

- The various watershed restoration activities described in the plan will occur to the extent necessary to achieve the objectives described for each alternative. The specific locations and designs of these activities are not known at this time; therefore, this analysis refers to the potential of the effect to occur, taking into account that, in many cases, these are only estimates.
- The actual improvement rates of watershed condition depend on funding and support by Forest Service leadership and collaborators.
- Water conservation practices (best management practices) will be implemented during all management activities. Based on results of past monitoring, best management practices are expected to reduce both short- and long-term adverse impacts to less than significant levels.
- Some resources, such as groundwater, are not within the Forest Service's authority to control; these were noted.
- Conditions described in this analysis are generalized for the entire Ashley National Forest and may not represent water quality or flow conditions at any specific location.
- The Forest Service will continue to pursue opportunities to retrofit, relocate, or decommission roads and trails to reduce potential sediment transport to rivers and streams, especially in priority watersheds, as outlined in watershed restoration action plans. System trails are undergoing a similar assessment and retrofit program, but they are not considered to present the same degree of water quality threat as the road network; this is because of their relatively small footprint.
- Some management activities, such as mechanical vegetation treatments, minerals authorization, grazing management, and national forest infrastructure, such as roads and campgrounds, can cause both short- and long-term adverse impacts on water quality, which are evaluated and mitigated at the site-specific project level when projects are proposed and designed.
- In riparian areas, vegetation will be treated to move it toward the desired conditions. This will be primarily to restore native species composition and reduce the encroachment of such species as

conifer trees and salt cedar, where appropriate. The end result of the treatments will generally be more diversity of riparian species, as well as vigorously growing herbaceous vegetation.

- Aquatic habitat restoration in streams, meadows, and other special aquatic habitats will be primarily to improve habitats for at-risk species and to improve downstream beneficial uses. Aquatic habitat restoration will be integrated into landscape treatment designs, where appropriate. Partnerships and additional funding opportunities from sources outside the Forest Service will be sought to increase the pace and scale of aquatic habitat restoration.

Indicators

Effects indicators are measures of an action's impact on the environment (beneficial and adverse; direct, indirect, and cumulative). Appropriate effects indicators are those that would best reflect how the plan-guided management actions would likely affect watersheds and wetland and riparian ecosystems, and those that would also translate into measurable indicators. Such indicators may be incorporated into specific projects proposed in the future to accomplish the forest plan's guidance and objectives. These indicators are as follow:

- Changes in water quality
- Changes in riparian, wetland, or fen vegetation structure and composition, including such indicators as species richness, vegetation cover, and plant structure
- Changes in overall watershed condition, as measured by the WCF

Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems Common to All Alternatives

Water Quality

Effects from Recreation

Recreation is especially harmful where there is repetitive and heavy use close to a waterbody. The construction of campgrounds, picnic areas, and trails disturbs the soil, making it more likely to erode and become deposited into a waterbody. Sediment and turbidity adversely affect aquatic habitat and can cause geomorphic processes to become imbalanced. Construction also typically involves heavy machinery, which can adversely affect water quality. Best management practices that would be followed under all alternatives, including grading and erosion control measures, would lessen the effects of construction and heavy machinery.

Dispersed recreation areas are detrimental to surface water, when compared with developed sites, because they are often situated too close to streams and lakes. By their nature they offer no services, such as toilets or fencing, to mitigate potential water contamination or other water quality impacts. Dispersed sites are typically difficult to manage because they can be numerous and in remote locations. Especially where accessible by vehicle, but also possible at wilderness sites, soil compaction and bare soil from overuse can result in erosion and sedimentation (Leung and Marion 2000). Dispersed camping is common on the Ashley National Forest and is concentrated on the east side of Highway 191, adjacent to the shoreline of the Flaming Gorge Reservoir, as well as on Taylor Mountain, Iron Springs, Dry Gulch, and Hickerson Park Road.

Streambanks are often destabilized through walking along the banks, adversely affecting aquatic and riparian habitat, where banks become less resilient to flood flows, eliminating under-cuts, and adding sediment to streams. Water quality is adversely affected when human waste, fuel from stoves and OHVs, and other contaminants are introduced to waterbodies. Several water resources on the Ashley National Forest are affected by dispersed camping and overcrowding.

While developed sites permanently alter the environment, they are generally designed with best management practices in mind, meaning properly sited developed recreation should affect surface water resources less than dispersed sites; this is because they concentrate and manage the use. Developed recreation sites guide people to have a contained, minimal impact on the local environment and are monitored for condition and use. That being said, impermeable surfaces, faulty sanitation services, and water supply diversions can be detrimental to water quality if not well sited and managed. This is because they can contribute pollutants and alter flow volumes.

Roads, trails, and stream crossings are known to cause sedimentation and erosion. High road densities degrade floodplain function, increase erosion, and decrease vegetation cover. Roads that cross riparian areas have direct impacts through vegetation removal and water flow alteration. Roads outside riparian areas may have indirect riparian effects, including concentrated overland flow, increased sedimentation, and accelerated runoff, with increased peak flows and related damage.

Trails can adversely affect surface water resources where they concentrate water over long distances, giving it erosive power. The effect is amplified on motorized trails, which are typically wider, more compact, more disturbed, and often rutted; this all further concentrates water. If the eroded soil is delivered to a stream channel, sedimentation can adversely affect water quality and aquatic habitat (Olive and Marion 2009). Where trails intercept overland flow, they can dewater soil and stream channels downslope, while augmenting flow to other hillslopes and streams. Adding water to drier areas can result in erosion, channel incision, and channel widening, which have implications for water quality and geomorphic processes.

Effects from Designated Areas

The designated High Uinta Wilderness Area is addressed under every alternative (274,000 acres in the Ashley National Forest). Management of wilderness prohibits motorized and mechanized ground disturbance and establishes wilderness guidance for recreation, such as camping a minimum distance from surface water. Wilderness management protects water quality through minimizing ground disturbance, erosion, and sedimentation.

Effects from Restoration

Stream channel restoration projects should have the long-term beneficial effects of rehabilitated geomorphic and biological processes, which would help to restore stream and riparian ecosystem services. Changed stream sinuosity, width-to-depth ratios, and frequency and depths of pools; removal of physical barriers, such as culverts, headcuts, and dams; and side channel restoration would restore natural stream processes. These activities also would improve aquatic habitat, stream temperature and sediment patterns, and streambank stability. The placement of wood, boulders, and gravel would improve channel morphology by creating pools, dissipating energy, and increasing sinuosity.

While improvement projects are typically successful on long-term resource conditions, they usually pose some localized risk of unintended, short-term adverse impacts on stream channels, water quality, and stream temperature. With the implementation of effective best management practices, the long-term benefits to water resources usually outweigh the short-term risks.

Effects from Livestock Grazing Management

Livestock grazing can adversely and directly affect water quality (Armour et al. 1991). Where animals concentrate at stream channels and springs, they are most likely to contaminate surface waters. Most livestock-generated pollution is related to soil disturbance and erosion. Soil becomes compacted in areas where livestock habitually congregate. Compacted soil is less hospitable to plant roots than uncompacted soil. Where roots are unable to penetrate the soil, they are less able to take in nutrients and water, making plants more vulnerable to toppling, disease, and drought. Compacted soil also decreases bank strength (Abernethy and Rutherfurd 2001), causing streams to become more susceptible to erosion.

Livestock, with their hooves and body weight alone, easily collapse and otherwise erode streambanks as they trail along, cross, and drink from streams. Soil can be dislodged by hoof action where the ground is moist and sloped (Warren et al. 1986). The loosened soil becomes entrained during precipitation and high flows, contributing to turbidity and sedimentation. Significant contributions of sediment to a channel can disrupt the delicate balance between incision and aggradation, adversely affecting aquatic and riparian habitats.

Through their feces and urine, livestock contribute nutrients and organic matter (Sheffield et al. 1997), bacteria, such as *E. coli* (Davies-Colley et al. 2004), and protozoan pathogens, such as *Giardia* (Nader et al. 1998) to stream channels. When nutrients, particularly phosphorus and nitrogen, are added to surface waters, they can cause algal growth to increase, water clarity to decrease, and ammonia concentrations to increase, which can be toxic to fish. The increased organic matter also serves as a food source for bacteria and other microorganisms, which lower oxygen levels in the water. Also, bacteria and protozoan pathogens can be harmful to humans and wildlife.

Livestock grazing can adversely affect stream temperature. Where stream channels lack sufficient vegetation due to grazing, the sun may warm surface water, harming cold water-dependent aquatic species.

Allotment level assessments conducted over the past decade have identified specific locations where past livestock may be a factor that has contributed to water quality impacts (see for example, Goodrich and Huber 2015).

Riparian Vegetation Structure and Composition

Effects from Recreation

Dispersed recreation areas can be detrimental to riparian areas where human use concentrates in riparian areas next to streams and wetland features. Detrimental effects intensify if sites are accessed by motorized vehicles.

Dispersed sites that are merely closed and not rehabilitated would not experience the short-term impacts from heavy equipment use in riparian areas; however, they also would not likely improve or recover completely on their own. Sites would remain compacted from years of vehicle traffic; the compaction would inhibit revegetation, leaving exposed soils and vulnerabilities to invasive plant encroachment.

Roads and trails can also facilitate the introduction and spread of nonnative species. As noted above in the affected environment, nonnative invasive plants and animals are already present in or next to many riparian and aquatic ecosystems. Nonnative invasive plants can displace native species, alter vegetation structure, and lead to declines in ecological status and functional diversity. They can also interfere with natural processes, such as nutrient and fire cycles, and alter water quality status, which reduces resilience and adaptive capacity.

Effects from Designated Areas

The High Uinta Wilderness Area is designated under every alternative (274,000 acres on the Ashley National Forest). Management of designated wilderness areas prohibits motorized and mechanized ground disturbance, establishes wilderness guidance for minimized disturbance for wildfire suppression activities, and limits access for recreationists. Wilderness management protects riparian and wetland ecosystems through minimizing ground disturbance, eliminating motorized access, and reducing recreation use, all of which reduce impacts on riparian and wetland vegetation and inhibit the spread of nonnative species.

Effects from Livestock Grazing Management

Livestock grazing would continue to affect many riparian and wetland ecosystems under all alternatives. Streamside vegetation is most affected by grazing, because riparian-aquatic zones are usually grazed more heavily than are upland-terrestrial zones. Also, livestock congregate along streams for shade and water.

Livestock grazing can affect the riparian environment in a number of ways. Grazing can change and reduce riparian vegetation, alter vegetation community structure and function, and introduce nonnative plant species, thereby affecting the riparian habitat needed to support terrestrial and aquatic species (Forest Service 2017c). Trammeling by livestock can degrade or even eliminate riparian and wetland ecosystems by eroding streambanks, widening channels, causing sedimentation and aggradation of channels, and lowering the water table, with some impacts observed on the Ashley National Forest riparian communities (Forest Service 2009a). This can then reduce the amount of water available to support aquatic communities and terrestrial wildlife (Rasby and Walz 2011).

Overall Watershed Condition

Effects from Recreation

Motorized routes in watersheds can have many long-term adverse impacts on hydrologic processes (Gucinski et al. 2001), including altering hydrographs, causing channels to widen, incise, and aggrade, degrading water quality through sedimentation and turbidity, disrupting geomorphic and biologic connectivity, and increasing stream temperatures.

While various plan components in the *Transportation*, *Riparian*, and other sections seek to diminish the adverse effects by roads, as motorized route density increases in a watershed, water resources are more likely to be adversely affected. In general, watersheds with more than 1 mile of road per square mile can be considered to have moderate to high road density (Forest Service 2011c).

Eighty-five percent of the watersheds on the Ashley National Forest rate either fair or poor on the roads and trails condition indicator for the WCF score (table 3-4). These watersheds are spread across the Ashley National Forest; watersheds rated poor are on the Tavaputs Plateau, along the FGNRA, and scattered throughout the Uinta Mountains (Forest Service 2017b). The roads and trails condition indicator considers the road density in a watershed, whether best management practices are implemented, the percentage of roads and trails within 300 feet of streams or other waterbodies, and whether roads are on unstable landforms subject to mass wasting and sedimentation (Forest Service 2011c).

Effects from Vegetation and Fire Management

Vegetation and fuels management strategies affect the fire regime on the Ashley National Forest. The WCF indicated that 90 percent of watersheds had fair scores for the fire regime or wildfire indicator over the Ashley National Forest (Forest Service 2017b). This indicated that most watersheds have a moderate departure from the reference fire regime. This increases the potential for high-intensity wildfires with the potential to affect the overall watershed condition.

Effects from Restoration

Hydrologic processes can be adversely affected by management activities, such as fire suppression, prescribed fire, timber extraction, fuels reduction, noxious weed treatments, road construction, recreation, and livestock grazing. The watershed condition becomes adversely affected where most watershed acres have compromised hydrologic function. Where degraded, the beneficial effects of properly functioning watersheds are most likely realized if restoration is coordinated in time and location. While every alternative contains plan components that encourage and guide restoration, the scale and degree of coordination differs, and in turn, their likely effectiveness.

Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems—Alternative A

Water Quality

Effects from Recreation
Alternative A does not provide direction on mitigating resource damage from developed recreation sites. It also does not provide direction on dispersed camping, such as whether to close, rehabilitate, or mitigate dispersed sites where there is resource damage. Many of the popular dispersed sites are on routes parallel to streams and lakes on the Ashley National Forest. Without plan components to address these problems, adverse impacts on surface waters from sedimentation, soil compaction, and bare soils would continue, as described in "Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems Common to All Alternatives."

Since alternative A provides minimal guidance on trail construction and conducts little trail maintenance, impacts on water quality from sedimentation, vegetation removal, and water flow alteration would continue.

Effects from Designated Areas
Alternative A would manage 6 miles of the Green River and 42 miles of the Uinta River as suitable for wild and scenic river designation. Standards direct managers to protect and enhance the river values for which they were designated, as well as their water quality and free-flowing nature. Standards also limit facility, road, and trail construction, especially in wild segments. Ultimately, wild and scenic river management should benefit surface water quality because ground disturbance and recreation access are limited, minimizing the potential for adverse effects.

Alternative A also retains seven RNAs totaling 7,700 acres. Surface-disturbing activities and access are limited in the RNAs. These protective plan components would reduce impacts on water quality from surface disturbance, recreation, and motorized and nonmotorized users.

Alternative A does not recommend the designation of any additional wilderness areas.

Effects from Vegetation and Fire Management
Alternative A does not include specific direction for managing most vegetation types, but vegetation treatments and prescribed burning would be used. An objective was set to manage 11,000 acres of lodgepole pine habitat; however, due to policy changes, that objective is no longer achievable. The focus of the 1986 forest plan was for timber production and not to move vegetation types toward desired conditions or their natural range of variation. The threat of uncharacteristic wildfire would continue and be the highest of all alternatives. This raises the possibility of increased sedimentation, higher water temperatures, and shifts in flood severity or frequency, essentially destabilizing watersheds.

Effects from Restoration
Alternative A does not include quantifiable objectives for restoring water resources and considers these projects as opportunities arise. Watershed and waterbody restoration would proceed at current levels,

albeit without a coordinated focus on priority watersheds. Water quality would continue to deteriorate on the Ashley National Forest under alternative A.

Riparian Vegetation Structure and Composition

Effects from Recreation

Alternative A manages for a variety of developed and dispersed recreation experiences and provides a system of trails and roads for motorized recreation. It does not include management for dispersed camping or motorized and nonmotorized trails in riparian areas. Impacts on riparian areas from riparian vegetation removal, sedimentation, and soil compaction would continue as described under "Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems Common to All Alternatives."

Effects from Designated Areas

Alternative A would manage 6 miles of the Green River and 42 miles of the Uinta River as suitable for wild and scenic river designation. In turn, 1,670 acres of riparian vegetation communities, 1,000 acres of wetland vegetation, and 960 acres of possible or likely fens would receive increased protection through designation of these river corridors (table 3-9). Management activities, such as timber harvest and erosion mitigation, would be prohibited within eligible river corridors, unless treatment is needed to protect eligibility, classification, or values. Such designations can limit disturbance-related impacts, such as road building, recreating, timber harvesting, and grazing.

Table 3-9. Riparian, Wetland, and Fen Acreage in Designated Areas

Designated Area	Riparian Vegetation (Acres)	Wetland Vegetation (Acres)	Possible Or Likely Fens (Acres)
Wild and scenic river corridors	1,670	1,000	960
RNAs	140	260	280

Sources: Forest Service GIS 2020; Smith and Lemly 2017

Alternative A also retains seven RNAs that include 140 acres of riparian vegetation communities, 260 acres of wetland vegetation, and 280 acres of possible or likely fens (table 3-9). RNAs provide additional protection for riparian and wetland vegetation through plan components that protect and maintain the biodiversity that the RNAs represent, through minimizing disturbance.

Effects from Restoration

Alternative A provides some direction for rehabilitating and maintaining riparian conditions, including prioritizing rehabilitation projects in riparian areas; however, it lacks clarification on how to prioritize riparian restoration, contains no objectives for riparian restoration, and does not establish riparian management zones. Accordingly, riparian area restoration projects would continue in a slow and fragmentary fashion under this alternative, which would contribute to the continued departure of riparian and wetland vegetation from desired conditions.

Effects from Livestock Grazing Management

Approximately 1,000,700 acres of active allotments are addressed under alternative A; there are no specific grazing utilization or stubble height parameters at the forest-wide level, these parameters are discussed during allotment-level NEPA analysis. As a result, there would be no consistent guidelines for these parameters, and the utilization rates and stubble heights could vary by allotment. Accordingly, impacts in some riparian and wetland areas would continue as they have under the 1986 forest plan. Such impacts could potentially include loss of water available to support riparian and wetland ecosystems and the species that depend on them; increased runoff to streams and rivers; removal of desirable riparian and wetland species; streambank headcutting and incisement, sedimentation, and compaction; and spread of nonnative, invasive plants.

Overall Watershed Condition

Effects from Recreation

Alternative A would maintain current road densities in watersheds across the Ashley National Forest. It would not designate recreation management areas, nor include objectives to expand the motorized and nonmotorized trail systems on the Ashley National Forest. The current WCF scores for the roads and trails condition indicator would continue to show impacts from high road densities, with impacts from altering stream flow, increasing sedimentation, and increasing stream temperatures; however, such impacts would not be expected to decrease further.

Effects from Vegetation and Fire Management

The current 1986 forest plan (alternative A) does not contain specific direction for managing most terrestrial vegetation types. It also does not include objectives for using mechanical treatments and prescribed fire to treat vegetation communities and move them toward desired conditions. Alternative A is not likely to adequately address watershed condition indicators, such as water quantity, fire regime, forest cover, and forest health issues, such as tree mortality and insect infestation over the long term. This is because these require an increase in pace and scale of terrestrial restoration to moderate the risk of large high-intensity fires at a landscape scale.

The threat of uncharacteristic wildfires would continue and would be the highest under all alternatives; the overall watershed condition would be at risk from uncharacteristic wildfires with the potential to reduce overall WCF scores.

Effects from Restoration

Alternative A encourages restoration under the 1986 forest plan, but it does not include identification of priority watersheds or other landscape-scale restoration strategy to maintain or improve watershed condition. Under the 1986 forest plan, watersheds are restored when and where funding becomes available and does not prioritize areas of degradation or high visitor use. Overall, the watershed conditions would continue to degrade.

The WCF assessment identified 47 percent of watersheds to be functioning at risk (table 3-4). Restoration under the 1986 forest plan was not successful at moving watersheds toward proper functioning. This is due to a lack of guidance that provides focused coordinated treatments at the landscape scale.

Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems—Alternative B

The most significant change between alternative B and the existing 1986 forest plan (alternative A) is the incorporation of forest-wide desired conditions, standards, and guidelines that together provide more detail and clarity regarding the conditions and management of watersheds that would contribute to the overall goal of maintaining the integrity and resilience of watersheds and riparian, wetland, and fen vegetation communities on the national forest.

Water Quality

As described above, several municipalities extend their source water protection areas into the Ashley National Forest. The greatest concern is with surface water intakes. Vegetation management activities as proposed for all alternatives can cause sedimentation and erosion that could enter streams. All alternatives would implement best management practices to reduce the potential of pollutants affecting water quality and aquatic habitat.

Overall, alternative B includes plan components to protect groundwater quality and source water protection areas. It would ensure that best management practices are implemented, activities are consistent with applicable source water protection requirements and goals, and beneficial uses are provided for.

Effects from Recreation

Alternative B would support recreation by providing infrastructure, while taking into account other resource values. It would continue to provide for a variety of recreation possibilities, including developed and dispersed opportunities. It would establish three different recreation management areas that would support different recreation opportunities. Alternative B would include 670,000 acres under the general recreation area where motorized and nonmotorized trail use is a priority.

Through these management areas, alternative B would include objectives that would expand both the motorized and nonmotorized trail system on the Ashley National Forest. These objectives include constructing 10 miles of mountain bike trails over the life of the plan, improving or maintaining 1 mile of road to dispersed camping sites every 3 years, constructing two OHV loop trails within 10 years of plan approval, improving 2 miles of motorized trails every 3 years, and expanding 10 miles of OHV trails to 60 inches wide to support larger OHV. Under alternative B, the motorized and nonmotorized trail networks would increase, including adding more trail miles, improving those trails that have higher usage, and transitioning trails to allow for larger OHVs. This would increase impacts on water quality from sedimentation, water flow alterations, and decreased vegetation cover. In addition, alternative B would improve access to popular dispersed camping sites, with water quality impacts from soil compaction, streambank destabilization, and pollutants introduced to streams from human waste and fuel for stoves and OHVs. Impacts on water quality would increase, compared with alternative A, due to increased trail construction, better access to dispersed recreation sites, and the potential for increased trail use.

Effects from Designated Areas

Alternative B would include the same suitable wild and scenic river segments and RNAs as alternative A, with impacts as described under “Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems—Alternative A.”

Alternative B would recommend 10,300 acres of wilderness, which would limit access and surface disturbance and prohibit any motorized trail use. Recreation in wilderness is generally spread throughout a large area with limited visitation, when compared with areas open to motorized travel. These areas are remote, with limited access; therefore, a reduction in impacts from motorized trail use would be minimal but would protect water quality compared to alternative A.

Effects from Vegetation and Fire Management

Alternative B would mechanically treat 1,500 acres annually during the first decade and 1,200 acres annually during the second decade of the plan in areas suitable for timber harvest. It would include 6,600 to 32,000 acres of fuels treatments annually to move vegetation communities toward desired conditions. Vegetation management objectives would be accomplished using wildfire and prescribed fire and mechanical treatments. By first reducing fuel levels through mechanical means, it minimizes the likelihood that prescribed fire would result in high soil burn severity and therefore adverse effects on hydrologic processes. Mechanized vegetation management has the potential for short-term negative impacts on water quality and increases in turbidity and sedimentation, due to erosion of soil disturbed by heavy machinery.

The use of fire to restore the natural fire regime in watersheds and mechanized vegetation management could degrade water quality, reduce water quantity, and increase turbidity and sedimentation due to the loss of vegetation or ground cover. Those effects caused by mechanized vegetation management and fire restoration are usually short term, 1 to 5 years on average or until groundcover has been reestablished.

Mechanical forest thinning, including timber harvesting, and prescribed burning should reduce the likelihood of uncharacteristic wildfire (Agee and Skinner 2005), benefitting surface water resources through maintaining ground cover. Adequate groundcover reduces erosion potential by slowing the flow of water over the landscape and adding root strength to the soil. Indirectly these activities maintain water storage capacity, while reducing erosion and sedimentation (Johansen et al. 2001). The long-term potential for indirect impacts of sediment delivery on streams is lower than under alternative A.

Stream temperatures may be improved slightly due to lessening the risk of uncharacteristic wildfire killing vegetation, especially in riparian areas. This would maintain cooler temperatures along riparian corridors by retaining more shade.

Effects from Restoration

Alternative B includes an objective to improve or rehabilitate five road or trail crossings every 5 years for the life of the plan and an objective to complete at least one project per year to restore habitat or populations of aquatic species. Precedence would be given to priority watersheds and fish-bearing or Clean Water Act section 303(d)-listed streams. The rehabilitated stream crossings and aquatic habitat would improve the hydraulics of the stream, decrease water velocity, decrease scouring and sedimentation downstream, and improve aquatic organism passage.

Riparian Vegetation Structure and Composition

Effects from Recreation

As described above, alternative B would increase the motorized and nonmotorized trail systems on the Ashley National Forest and improve access to dispersed recreation sites. This would increase impacts on riparian and wetland species composition from soil compaction, removal of riparian and wetland vegetation, and possible introduction of nonnative species, compared with alternative A.

Effects from Designated Areas

Alternative B would include the same two suitable wild and scenic rivers segments and RNAs as alternative A. It would include 10,300 acres of recommended wilderness that includes 210 acres of riparian vegetation, 120 acres of wetland vegetation, and 80 acres of possible or likely fens. Recommended wilderness areas include extra protection for riparian and wetland vegetation, including restrictions on surface disturbance, development, and access that would preserve riparian and wetland vegetation and structure in these areas; however, restrictions on restoration in recommended wilderness could affect the Forest Service's ability to improve these riparian, wetland, and possibly fen communities.

Effects from Vegetation and Fire Management

Alternative B would use a combination of mechanical treatments and prescribed fire to reduce the risk of uncharacteristic wildfire on the Ashley National Forest. The increased emphasis on vegetation and fire management to meet resource objectives would continue to improved riparian vegetation conditions. It also would reduce the risk of uncharacteristic wildfire across large landscape areas, especially those in higher elevations where there are fewer opportunities for more direct restoration. Alternative B would lead to more improvement of riparian ecosystem resilience to fire and climate change, compared with alternative A. The emphasis on restoring low- and medium-intensity fires across the landscape (including in riparian areas) would limit the accumulation of fuels and encourage vigorous riparian habitats.

Effects from Restoration
Alternative B would establish riparian management zones to protect the ecological integrity of these areas from potential harmful effects of catastrophic wildfire, unmanaged recreation, and potential overgrazing. Riparian management zone widths are generally defined in table 3-10 but may be wider or narrower, depending on the site.

Table 3-10. Riparian Management Zone Widths

Riparian Management Zone Type	Default Riparian Management Zone Distance from Feature
Perennial streams, natural ponds, lakes, open water wetlands, seeps, springs, and reservoirs	150-foot slope distance, or a distance equal to the height of two site potential trees or the outer edge of riparian vegetation, whichever is greater
Intermittent seasonally flowing channels and waterbodies supporting riparian vegetation	100-foot slope distance, or the outer edge of riparian vegetation, whichever is greater
Ephemeral stream channels and waterbodies, unstable or potentially unstable areas	50-foot slope distance

Alternative B would include plan components that restrict equipment refueling, maintenance, and storage of fuels and other materials in riparian management zones, locating timber roads and infrastructure outside of riparian management zones, and avoiding riparian management zones when construction roads and trails with some exceptions. These plan components would protect riparian, wetland, and possible fen areas for surface disturbance and would reduce access.

There would be more emphasis on ecosystem restoration, including riparian vegetation restoration, under alternative B than under alternative A. Alternative B includes an objective to improve or protect at least five groundwater-dependent ecosystem features (springs, seeps, or other wetlands) every 5 years for the life of the plan. It also would have an objective to improve the watershed condition of two priority watersheds every 10 years.

All restoration that reduces conifer encroachment and increases heterogeneity in riparian areas would move riparian vegetation composition and structure toward the natural range of variation. This would improve growing conditions for riparian hardwoods and shrubs that are often shaded out by upland trees and shrubs. Prescribed fire and wildfire managed to meet resource objectives would improve the condition, vigor, and health of most native riparian plants. Many native riparian plants sprout as an adaptation to flooding and this often allows them to respond positively to fire as well (Fites-Kaufman et al. 2006). The trend in composition and structural heterogeneity of native species would increase.

Effects from Livestock Grazing Management
Alternative B would have the same number of acres for active grazing allotments as alternative A. Under alternative B, forage for livestock grazing would have utilization guidelines included in management (50 percent) as well as 4-inch stubble height guidelines in riparian areas to help meet desired conditions for terrestrial vegetation; however, alternative B would provide some flexibility by allowing adjustments for site-specific conditions. This guidance would help reduce impacts on riparian and wetland vegetation in terms of maintaining species richness, vegetation cover, and plant structure, compared with alternative A. It also would reduce the potential for plant species composition to shift toward unpalatable or grazing-tolerant plant species, where livestock graze, and away from native riparian and wetland species.

Overall Watershed Condition

Effects from Recreation

Alternative B would designate recreation management areas with objectives that would expand both the motorized and nonmotorized trail system on the Ashley National Forest. Expanding the trail systems could increase road densities in watersheds that already rate fair or poor for the roads and trails indicator of the WCF scores (table 3-4); however, alternative B includes plan components that would avoid wetlands and unstable areas. The impacts on streams would be considered when reconstructing or constructing new roads. These plan components combined should reduce impacts on watershed condition from any new roads or trails constructed under alternative B, and they would not appreciably reduce WCF scores for the roads and trails condition indicator.

Effects from Vegetation and Fire Management

Alternative B would use mechanical treatments and prescribed fire to treat ERUs and move them toward desired conditions. Vegetation management objectives would be accomplished using wildfire, prescribed fire, and mechanical treatments. This would improve the fire regime and move vegetation communities toward desired conditions on the Ashley National Forest watershed. They also could increase WCF scores for treated watersheds. In addition, alternative B would manage 10 percent of natural unplanned ignitions to meet resource objectives associated with vegetation types.

The likelihood of large high-intensity fires would continue to increase but at a lower rate than under alternative A. This would be due to the combined mechanical treatments and prescribed burning, along with using unplanned natural ignitions to promote resource objectives. As a result, fuel reduction work under alternative B would provide benefits to maintaining water and soil quality and watershed condition over the long term. There would be expected improvements in WCF scores for the fire regime or wildfire indicator. As the pace and scale of mechanical tree thinning and prescribed fire increases, the Ashley National Forest should become more resilient to climate change than under alternative A.

Effects from Restoration

The Forest Service has identified priority watersheds on the Ashley National Forest to focus work in such a way that produces overall benefits to a watershed, rather than restoring disparate locations throughout the national forest. For all priority watersheds, the Forest Service develops watershed restoration action plans. The Forest Service has identified essential projects to restore sites with legacy erosion and degraded aquatic and riparian habitats, such as streams and meadows. The watershed restoration action plans provide managers with a list and schedule of projects to be completed and are designed to improve the condition class rating of priority watersheds.

The proposed forest plan does not determine the development of new priority watersheds; instead, watershed managers use the WCF process to recommend new priority watersheds to responsible officials after assessing the need to restore degraded aquatic and riparian habitats. Recommendations are based on national forest inventory and monitoring data and such factors as interest and availability of partners, the presence of a listed species or SCC, and the risk of large, high-intensity wildfire. Managers will also consider watersheds already identified for fuel reduction and other ecological restoration. As new priority watersheds are selected, essential projects are identified in watershed restoration action plans.

Currently, alternative B has three identified priority watersheds: Cart Creek, Wolf Creek, and Whiterocks River. Once restoration work is completed on these watersheds, the Forest Service would select other watersheds where restoration is needed. Alternative B would increase the rate and scale of restoration above those under alternative A. Alterative B objectives include improving the WCF scores for two priority watersheds every 10 years, restoring at least five groundwater-depended ecosystem features every 5 years, and improving aquatic habitat along 30 miles of stream during the first 10 years of plan implementation. These objectives, combined with focused restoration in priority watersheds, would improve WCF scores and overall watershed conditions, compared with alternative A.

Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems—Alternative C

Water Quality

Effects from Recreation
Alternative C would establish the same recreation management areas as alternative B, but it would reduce motorized recreation. It would do this by increasing the acreage of backcountry recreation areas (335,500 acres more than alternative B) and reducing acreage of general recreation areas (329,900 acres less than alternative B). Backcountry recreation areas emphasize lower visitor use and density levels and a low density of trails. It would reduce the miles of trail improvement and construction, compared with alternative B, and would prohibit wheeled motorized travel in the backcountry recreation area. This differs from alternatives B and D, where wheeled motorized travel is allowed. Alternative C would include less new trail construction and would restrict wheeled motorized travel in the backcountry recreation areas. This would reduce impacts on water quality from sedimentation and water flow characteristics.

Effects from Designated Areas
Alternative C would recommend 50,200 acres of wilderness, the largest of any of the alternatives, and one additional RNA (1,400 acres). Impacts on water quality would be reduced, compared with alternative A, from reductions in surface disturbance, restrictions on motorized travel, and a reduction in the concentration of recreation users.

Alternative C would also recommend four additional river segments as suitable for inclusion in the Wild and Scenic River System. This would protect an additional 14 miles of rivers on the Ashley National Forest by decreasing the potential for surface disturbance and by limiting recreation access.

Effects from Vegetation and Fire Management
Unlike alternative B, alternative C would rely more on natural processes, such as wildfire, to treat vegetation communities. It would reduce objectives for vegetation treatments to 1,000 acres annually during the first decade and 800 acres annually in the second decade of the plan, but it would maintain the same acreage of fuels treatments as alternative B. Alternative C would treat a smaller proportion of the lands needing treatment to substantially reduce the risk of uncharacteristic wildfire. Alternative C would have fewer short-term impacts from vegetation treatments, compared with alternative A, but it would not have long-term benefits for vegetation communities and fire regimes.

Alternative C would also increase the percentage of unplanned natural ignitions used to meet resource objectives, from 10 percent under alternative B to 20 percent. Using wildland fire as a management tool without first reducing fuel loads with mechanical treatments could increase the potential for some areas to burn especially hot. This would result in some areas with high soil burn severity that affect hydrologic processes and a temporary loss of riparian cover that moderates stream temperature. Overall, it would still decrease the potential for uncharacteristic wildfire and subsequent adverse impacts on water quality, compared with alternative A.

Effects from Livestock Grazing Management
Livestock grazing would be restricted in destination recreation areas under alternative C. This would remove 13,000 acres from grazing and would eliminate potential impacts on water quality for streams

located in the destination recreation areas, as described under "Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems Common to All Alternatives."

Riparian Vegetation Structure and Composition

Effects from Recreation
Alternative C would decrease the motorized and nonmotorized trail systems, compared with alternative B, and would restrict wheeled motorized travel in backcountry recreation areas. This reduction of trail improvement and construction and motorized trail use would decrease impacts on riparian areas from sedimentation and riparian and wetland vegetation removal; it would reduce the potential for the spread of nonnative species.

Effects from Designated Areas
The greatest acres of riparian, wetland, and possible or likely fens would be included in designated areas under alternative C (table 3-11). Alternative C would reduce disturbance from such activities as recreation and mechanical treatments, compared with alternative A; however, additional constraints on restoration treatments could also affect the effectiveness of restoration.

Table 3-11. Riparian, Wetland, and Fen Acreage in Designated Areas for Alternative C

Designated Area	Riparian Vegetation (Acres)	Wetland Vegetation (Acres)	Possible Or Likely Fens (Acres)
Proposed wild and scenic river corridors (Dowd Creek, Honslinger Creek, Spring Creek, and North Skull Creek)	50	50	0
Proposed RNAs	140	260	20
Recommended wilderness	1,830	1,600	1,410

Sources: Forest Service GIS 2020; Smith and Lemly 2017

Effects from Vegetation and Fire Management
Alternative C would focus on natural processes to manage riparian communities, including the use of wildland fire to move toward desired fire regimes and limited mechanical thinning. There is a high uncertainty as to how much fire and thinning would be used because of limitations on mechanical thinning and wildfire to meet riparian resource objectives. If there is an increase in low to moderate intensity wildfire, there could be a benefit to riparian species and composition under alternative C, similar to alternative B; however, if the rate of managed wildfire and prescribed fire remains low, then riparian vegetation restoration and improvement in ecological conditions would not be achieved as well as under alternative B.

Effects from Restoration
Alternative C would establish the same riparian management zones as alternative B and would include the riparian restoration objectives described under alternative B.

Effects from Livestock Grazing Management
Alternative C would reduce acres available for active grazing allotments by 130 acres, compared with alternative A. Furthermore, alternative C forage for livestock grazing would have no greater than 40 percent utilization levels as well as a minimum 4-inch stubble height to help meet desired conditions for riparian and wetland vegetation. This would maintain native riparian and wetland vegetation in terms of species richness, vegetation cover, and plant structure to a greater extent, compared with alternative A. It would also provide guidance for moderate forage utilization levels that could reduce the potential for plant species composition to shift toward unpalatable or grazing-tolerant species.

Livestock grazing would be restricted in destination recreation areas under alternative C. This would remove 2,100 acres of riparian vegetation and 600 acres of wetlands from grazing and would eliminate potential impacts, such as altering the species composition and introducing nonnative species.

Overall Watershed Condition

Effects from Recreation

Alternative C would assign more acres to the backcountry recreation area, compared with alternative B. Backcountry recreation areas emphasize nonmotorized recreation, and motorized trails are a minimal part of the trail network. WCF scores for roads and trail condition indicators are not expected to increase under alternative C and could decrease for watersheds, where road densities and trail use decreases. New road and trail construction would follow the same restrictions near streams and wetlands as described under alternative B and could improve WCF scores for the roads and trail condition indicator, compared with alternative A.

Effects from Vegetation and Fire Management

Alternative C would reduce the overall acreage of mechanical treatments, compared with alternative B, but it would maintain the same acreage of prescribed burning. This would reduce the benefits of combining mechanical treatments and prescribed burning. Alternative C would also increase to 20 percent unplanned natural ignitions managed for resource objectives. This, combined with decreased mechanical thinning, could increase the percentage of fires with high soil burn severity, which would increase impacts on watershed condition.

Overall, it is reasonable to assume that some watersheds would be adversely affected by high soil burn severity, while other watersheds would have improved conditions, with corresponding increases or decreases in WCF scores for the fire regime or wildfire indicator. Alternative C could reduce the long-term beneficial impacts on watershed condition by increasing the potential for high soil burn severity in some watersheds; however, it would still decrease the potential for uncharacteristic wildfires, compared with alternative A.

Effects from Restoration

Same as those described under alternative B.

Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems—Alternative D

Water Quality

Effects from Recreation

Alternative D would designate the least acreage for backcountry management areas with most acreage in general recreation areas (99,800 acres more than alternative A). Alternative D would increase objectives for the construction and improvement of motorized and nonmotorized trails, including expanding access for wider OHVs. The increased trail system and trail use would increase impacts on water quality, compared with alternative A, from sedimentation and changes to stream morphology.

Effects from Designated Areas

Impacts are the same as those described under alternative A. Alternative D does not recommend any wilderness.

Effects from Vegetation and Fire Management

Alternative D promotes active management of wildland fire. It would include slightly higher vegetation treatment acreages and higher prescribed burn acreages (10,000 to 40,000 acres annually), compared with alternative B; however, the focus would be on suppression and protection of developed areas, rather than moving vegetation communities toward desired conditions. This would maintain the risk of uncharacteristic wildfire outside of developed resources and highly valued resources and assets (HVRAs), with the potential for increased sedimentation and higher water temperatures.

Riparian Vegetation Structure and Composition

Effects from Recreation

Alternative D would expand and improve the motorized and nonmotorized trail systems and would designate the most acreage in the general recreation area. This emphasizes multiple use, including motorized and nonmotorized access. The emphasis on trail improvement, construction, and access would increase impacts on riparian areas, compared with alternative A, the most of all the action alternatives.

Effects from Designated Areas

Alternative D would include the same suitable wild and scenic river segments and RNAs as alternative A. It would not include any recommended wilderness areas. Impacts on riparian vegetation structure and composition from designated area management would be the same as alternative A.

Effects from Vegetation and Fire Management

Alternative D emphasizes active management of wildland fire. All fuels treatments would be designed to support the protection of developed resources and to reduce fire intensity. Alternative D would also include the greatest acreage of vegetation management of all the action alternatives. There still would be the potential for uncharacteristic wildfire outside the HVRAs and not next to developed resources; however, alternative D would reduce the risk of uncharacteristic wildfire, compared with alternative A. Compared with alternative B, however, this focus on suppression and protection of developed resources would decrease the effectiveness of vegetation treatments to improve riparian vegetation conditions.

Effects from Restoration

Alternative D would establish the same riparian management zones as alternative B and would include the same objective for improving groundwater-dependent features with impacts as described under alternative B.

Effects from Livestock Grazing Management

Similar to alternative A, alternative D would have 1,000,700 acres of active grazing allotments, with no Forest-wide grazing utilization or stubble height parameters; however, it would address these parameters during allotment-level NEPA analysis, which is the same as under alternative A. Guidelines state that utilization and stubble height would meet desired conditions for soils and vegetation types. Impacts would be as described under alternative A. This would provide flexibility for grazing management and may result in utilization levels higher or lower than 50 percent, and increased or reduced stubble height of plants at the end of grazing seasons.

Improper grazing, such as intensive grazing in riparian, wetland, and fen communities may change the vegetation composition by reducing highly palatable plant species while increasing less palatable plant species, including nonnative and invasive plant species; reduce vegetation cover; diminish plant species richness; and reduce the hydrological function related to the quality and quantity of riparian and green line vegetation. Desired condition plan components common to all action alternatives for riparian areas, livestock grazing, and soil should minimize the potential for adverse impacts related to livestock grazing.

Overall Watershed Condition

Effects from Recreation

Alternative D would assign the most acreage to general recreation areas, where motorized and nonmotorized use is emphasized. It includes objectives for the most motorized and nonmotorized trail construction of all the alternatives, with the most potential to decrease the road and trail condition indicator for watersheds. It has the increased potential to have impacts such as sedimentation, stream flow alteration, and stream temperature increases.

Effects from Vegetation and Fire Management

Alternative D promotes active management of wildland fire. It would increase the overall acreage of both vegetation treatments and prescribed burning over the life of the plan; however, alternative D would focus the vegetation treatments and prescribed burning on fire suppression and the protection of developed resources, with most of treated acres in and around HVRAs. Alternative D would decrease to 5 percent the unplanned natural ignitions used to support resource objectives.

Despite an increased acreage of vegetation treatment compared with alternative A, alternative D's focus on suppression would increase the risk of high-intensity wildfires, compared with alternative B. This is because the level of vegetation treatment would not be adequate to reduce the risk of high-intensity wildfires enough to offset the impacts of increased fire suppression. This would increase the risk of adverse impacts on watershed condition and decreases in WCF scores for the fire regime or wildfire indicator. Alternative D would still reduce the risk of high-intensity wildfires, compared with alternative A, with a subsequent reduction of risk to watershed condition due to the objectives for vegetation treatment and prescribed burning.

Effects from Restoration

Effects from restoration activities would be the same as described under alternative B.

Cumulative Environmental Consequences for Watersheds and Aquatic and Riparian Ecosystems

The timeline for assessing cumulative effects on water resources is 15 years, the life of the plan. That is because this is the time frame in which the proposed activities could occur. In addition, 15 years is enough time for the effects of the new plan components on water resources to become evident. The spatial boundaries of the analysis are the 147 subwatersheds that overlap the Ashley National Forest but also extend beyond its boundaries. For the most part, stream systems originate in headwaters on the Ashley National Forest and flow downstream onto lands owned or administered by entities other than the Forest Service.

Past, present, and future activities within the administrative boundary of the Ashley National Forest include livestock grazing, prescribed and natural fires, wildfire suppression, recreation, vegetation management, nonnative invasive plant treatments, road construction and maintenance, road decommissioning, wildlife habitat restoration and management, oil and gas development, and watershed restoration and management. Beyond the Ashley National Forest boundary, past, present, and future actions by other entities, as well as activities associated with rural residential communities. In any watershed, regardless of landownership, these activities cumulatively affect, both beneficially and adversely, water quality, riparian and wetland vegetation communities, and watershed condition. All action alternatives would implement the proposed forest plan, while modifying a few of the plan components and would have similar cumulative impacts on water resources.

Lands under other entities' management policies are likely to continue affecting riparian and aquatic resources. The cumulative effects across the large, geographically complex, and diverse Ashley National Forest are difficult to analyze, considering the uncertainties associated with government and private actions, and ongoing changes to the region's economy. Whether those effects would increase or decrease across the Ashley National Forest in the future is a matter of speculation; however, based on the growth trends and current uses identified in this section, cumulative effects are likely to increase.

Many activities occur on private lands. These include water diversion, irrigation, livestock grazing, farming with varied cash crops, timber harvest, angling, construction of subdivisions, housing, and commercial development, building and stocking of private fish ponds, chemical treatment of noxious weeds, and flood control and stream channel manipulation.

Several municipalities have source water protection areas that include large portions of the Ashley National Forest. The Forest Service manages these headwaters to protect drinking water supply downstream, based on the Utah Department of Environmental Quality Division of Drinking Water's requirements. Alternatives B, C, and D include plan components to protect water quality in these areas, including objectives for restoration and vegetation treatments to improve the condition of these watersheds and reduce the risk of uncharacteristic wildfires.

One of the major issues affecting watershed condition and downstream water quality is the departure of vegetation communities from their historical fire regimes and the increased risk for uncharacteristic wildfire. Alternatives B, C, and D include plan components to move vegetation communities toward desired conditions, including objectives for annual mechanical treatment, prescribed burning, and restoration objectives to improve priority watersheds on the Ashley National Forest. These actions would improve fire regimes and decrease the risk of uncharacteristic wildfires, reducing the cumulative impacts on water quality downstream, including changes to stream morphology and sedimentation.

The effectiveness of Forest Service management under all alternatives may be reduced or enhanced by the cumulative efforts of adjacent landowners. For all alternatives, without concerted efforts by many landowners, the potential for long-term, adverse, cumulative watershed impacts from high-intensity wildfire remains high.

Terrestrial Vegetation

Introduction

This section evaluates terrestrial ecosystems on the Ashley National Forest. The national forest is in three major areas: the northern and southern slopes of the Uinta Mountains, the Green River Basin, and the Tavaputs Plateau. Elevations range from 5,500 feet on the Green River, below Little Hole near Dutch John, to 13,528 feet at the summit of Kings Peak (the highest point in Utah). About 70 percent of the Ashley National Forest is in the Uinta Mountains. The Uinta is the largest east-west trending mountain range in the lower 48 states. Together with the Tavaputs Plateau, the Uinta provides a unique ecological transition zone, connecting the northern and southern Rocky Mountains.

The following section summarizes and updates the information found in the Ashley National Forest Assessment, Terrestrial Ecosystems, System Drivers, and Stressors Report (Forest Service 2017e).

Terrestrial ecosystems were evaluated by assessing key ecosystem characteristics that sustain the long-term integrity of these ecosystems. Key ecosystem characteristics were evaluated based on the influence of stressors and drivers and the estimated degree of departure from natural range of variation. Natural range of variation is defined as the variation of ecological characteristics and processes over scales of time and space that are appropriate for a given management application (Forest Service Handbook 1909.12). The time frame for natural range of variation is generally considered pre-European influence and should be "sufficiently long, often several centuries, to include the full range of variation produced by dominant natural disturbance regimes such as fire and flooding and should also include short-term variation and cycles in climate" (Forest Service Handbook 1909.12). The natural range of variation is a tool for assessing the ecological integrity and does not necessarily constitute a management target or desired condition.

The current status and trends of key ecosystem characteristics are also summarized considering current management and climate associated risks. The terrestrial ecosystems used in this assessment were selected vegetation types and landtype associations that were mapped based on the National Hierarchical Framework of Ecological Units (Cleland et al. 1997). This is a systematic land classification and mapping method developed to provide a scientific basis for implementing ecosystem management.

Regulatory Framework

The National Forest Management Act is a law that requires the Forest Service to develop forest plans, and in 2012 the U.S. Department of Agriculture (USDA) issued a new rule to guide the forest planning process. Known as the 2012 Planning Rule, it emphasizes that forest plans are to guide management of the national forests so they are ecologically sustainable. This includes managing terrestrial vegetation communities for long-term resilience to stressors and toward the natural range of variation. National forests are managed to provide ecosystems and watersheds with ecological integrity and diverse plant and animal communities. NEPA requires the Forest Service to disclose the potential effects of revising forest plans.

Analysis Areas

The analysis area for evaluating terrestrial vegetation communities includes all lands under the management of the Ashley National Forest. The spatial scale looked primarily at the vegetation type spatial scale for most key ecosystem characteristics. Landtype associations were also used as a spatial scale for evaluation for other ecosystem characteristics. Further, landtype associations were used to describe the geomorphic influences these landscapes exert on vegetation communities on the Ashley National Forest.

Description of Affected Environment

The Ashley National Forest is made up of diverse ecosystems spanning three physiographic divisions, four sections, and fifteen subsections that are defined by the National Hierarchical Framework of Ecological Units. The four sections are the Uinta Mountains, Green River Basin, Tavaputs Plateau, and a very small portion of the Uinta Basin.

Within each subsection, the Ashley National Forest mapped landscapes at the landtype association scale. There are 24 distinct landtype associations on the Ashley National Forest (table 3-12, figure 3-1, rest (Smith and Lemly 2017) are in table 3-12.

Table 3-12. Descriptions of Landtype Associations in the Ashley National Forest

Name	Acres	Description
Alpine Moraine	259,100	Glaciated lands including cirque basins and side slopes at the heads of the glacial canyons of the Uinta Mountains and pothole or knob and kettle landforms. This includes scoured basins and drift basins above the tree line, with alpine plant communities.

Name	Acres	Description
Antelope Flats	7,400	Includes sandy and gravelly quaternary pediments associated with the Green River and gypsiferous and alkaline or saline sediments of Mancos Shale.
Anthro Plateau	108,600	Consists of plateau lands dissected by long canyons with comparatively wide, flat bottoms. Canyons are cut through calcareous sandstones and marly, shale-like mudstones of the Green River and Uinta Formations.
Avintaquin Canyon	82,400	Composed of dendritically dissected plateau lands, underlain by marly, shale-like mudstones of the Green River and Uinta Formations, with narrow or moderately wide flat ridges and northerly gradients of about 5 percent. The dendritic canyons have steep walls and very narrow drainage bottoms.
Dry Moraine	9,600	Older glaciated landforms associated with the major glacial canyons of the central Uinta Mountains. Vegetation is variable and includes mountain big sagebrush/needle-and-thread grass, mountain brush, ponderosa pine, and aspen communities.
Glacial Bottom	14,000	Current floodplains and terraces along the bottoms of lower reaches of the major canyons of the south slope of the Uinta Mountains. Vegetation structure is the most complex in the Uinta Mountains. Coniferous trees including ponderosa pine and limber pine.
Glacial Canyons	71,800	Consists of the steep canyon walls of the glaciated canyons of the south slope of the Uinta Mountains. It includes small to large areas of boulder fields with little vegetation or sometimes with scattered coniferous trees and aspen.
Green River	62,400	Flats, hills, and canyons underlain by the Green River Formation. This association flanks the Flaming Gorge Reservoir in the Wyoming portion of the Ashley National Forest. Vegetation is generally dominated by cold desert shrub species of sagebrush.
Greendale Plateau	52,400	Flats, hills, and canyons underlain by the Green River Formation. This association flanks the Flaming Gorge Reservoir in the Wyoming portion of the Ashley National Forest. Vegetation is generally dominated by cold desert shrub species of sagebrush.
Limestone Hills	18,500	Scarp and dip slopes of Mississippian Limestone of the south slope of the Uinta Mountains. This is part of the limestone donut that interruptedly surfaces around the Uinta Mountains. Douglas-fir generally dominates the scarp slopes.
Limestone Plateau	7,400	Plateau lands underlain by Mississippian Limestone of the south slope of the Uinta Mountains. Karst topography, including depressions of internal drainage is included in the association. In general the association is of higher elevations than the Limestone Hills.
Moenkopi Hills	2,100	Foothills of the Uinta Mountains underlain by the Moenkopi Formation. This includes vegetated slopes and slopes eroding to badlands. Pinyon-juniper and mountain brush communities, dominated by alderleaf mountain mahogany, are common to this association.
North Flank	50,200	Comprised of some of the youngest deposits and oldest rocks in Utah. This association contains the classic faults and folds of Laramide orogeny that uplifted the Uinta Mountains about 70 to 40 million years ago.
Parks Plateau	95,800	Plateau lands of Bishop Conglomerate and possibly Browns Park Formation of the eastern Uinta Mountains. Vegetation includes large stands of lodgepole pine with an obvious history of stand replacement fire; stands of stable or persistent aspen.

Name	Acres	Description
Red Canyon	28,500	Precipitous walls of Red Canyon are the central theme of this association. It also includes some tributary canyons that feed into Red Canyon. Vegetation varies with aspect, depth to bedrock, and other features.
Round Park	10,500	Vegetation is dominated by large stands of lodgepole pine at lower elevations and by mixed coniferous stands at higher elevations. Meadows including Round Park are included.
South Face	46,300	Slopes of the south face of the Uinta Mountains. Gravel and cobble debris washed from Parks Plateau cover large areas of this association. It also includes dip slopes of the Park City Formation. Mountain big sagebrush/grass communities cover much of this association.
Strawberry Highlands	12,400	Characterized by high plateau lands dissected by long canyons with narrow to moderately wide bottoms underlain by calcareous sandstones and marly, shale-like mudstones of the Green River and Uinta Formations.
Stream Canyon	43,400	Stream-formed canyons of the south slope of the Uinta Mountains, including Dry Fork and Brownie Canyons, and Ashley Creek and Brush Creek Gorges. Geologic strata is variable and includes Mississippian Limestone and Weber Sandstone.
Stream Pediment	8,100	Gravel, cobble, and boulder pediments associated with streams at lower elevations on the south slope of the Uinta Mountains. Coarse fragments are mostly quartzitic sandstone; mountain big sagebrush/grass and mountain brush communities with alderleaf.
Structural Grain	21,500	The Structural Grain Association is composed of landtypes of the Uinta Mountain Group on the North Flank of the Uinta Arch; these are high angle north-dipping against Paleozoic through Mesozoic rocks to the north.
Trout Slope	142,000	Large, continuous subalpine forests of lodgepole pine, Engelmann spruce, and some subalpine fir dominate the association. Meadows or "parks," including Trout Creek Park, Big Park (of North Fork Ashley Creek), and Summit Park are included.
Uinta Bollie	174,600	Alpine summits and slopes above glaciation including Matterhorn type peaks, rounded bollies, low gradient benches, talus of cirque headwalls and side slopes with underlying or exposed Precambrian quartzitic sandstones and shales of the Uinta Mountain Group.
Wolf Plateau	5,900	Limited to the far western corner of the Ashley National Forest. The largest portion is an upland plateau underlain by a variety of sandstones and some shales. The topography is nearly level to rolling.

Sources: Smith and Lemly 2017; Forest Service 2017e; Forest Service GIS 2020

In addition to landtype associations, vegetation types were also used to describe ecosystem characteristics on the Ashley National Forest (table 3-13, figure 3-9). Selected vegetation types were evaluated using landtype associations to distinguish certain characteristics and distinctions of the same vegetation type that span various landscapes on the Ashley National Forest. The vegetation types were selected based on their percentage of representation on the Ashley National Forest (5 percent or more), the ecosystem services they provide, and potential risk to sustainability. The vegetation types most prevalent on the national forest that are the primary focus of this section are alpine, coniferous forest, aspen, sagebrush, pinyon and juniper woodlands, and desert scrub. Rare and unique terrestrial habitats are also discussed.

Table 3-13. Vegetation Types on the Ashley National Forest

Vegetation Type	Acres	Percentage of Total Acres
Alpine	168,700	12
Coniferous Forest	621,600	45
Deciduous Forest	35,300	3
Seral Deciduous Forest	116,300	8
Mountain Brush	43,000	3
Shrubland	119,100	9
Riparian	33,300	2
Grassland	14,600	1
Forb	100	<1
Woodland	120,300	9
Desert Shrub	59,900	4
Water	44,700	3
Total	**1,376,700**	**100**

Source: Forest Service GIS 2020

Alpine

Alpine vegetation is a complex of communities at high elevation that consist of an array of plants adapted to harsh environmental conditions. Plants are typically low growing, mat forming, small or dwarfed in their structure, or some combination of these characteristics (Forest Service 2017e). Non-forest or alpine plant communities of high elevation are mostly found in the Alpine Moraine and Uinta Bollie landtype associations and to a small extent in the Trout Slope landtype association (see figure 3-1). Alpine ecosystems make up 12 percent of the total Ashley National Forest plan area, with alpine boulder, talus, and cliff communities comprising most of the alpine vegetation type.

Influences of Drivers and Stressors

The most significant ecological drivers for alpine communities are frost, running water, and wind. These processes shape the landscape and influence vegetation communities, with running water being the most influential. Potential stressors include browsing by wild ungulates, pocket gopher activity, and sheep grazing in a few areas. The most common human disturbances are trails, dispersed camping, and recreation horse use. Impacts from humans in alpine environments have been relatively limited, due to the remoteness and harsh conditions associated with high elevations; however, increased recreation is a foreseeable stressor during the next plan period.

Comparison of Natural Range of Variation and Current Conditions

Current conditions of the alpine plant communities and structure in the plan area closely align with the natural range of variation. Studies indicate that native plants totally dominate all alpine communities in the plan area. These communities show satisfactory plant composition and ground cover conditions, with mostly stable trends within the natural range of variation (Forest Service 2017e).

Some evidence indicates alpine areas in the Uinta Mountains exhibit changing community dynamics, such as an increase in density and canopy cover of low willow (*Salix* sp.) in many alpine communities, both wet and dry, that has been documented for at least 50 years (Forest Service 2017e). This increase of willow has occurred concurrent with livestock grazing. Another trend is the increase of and gradual displacement by conifers in low willow communities, drier meadows, and a few riparian ecotones at or near the timberline. Pocket gopher activity in the Uinta Mountains is an inherent disturbance. This activity is indicated to be the major biotic factor controlling plant community dynamics and ground cover in select alpine communities (Forest Service 2017e).

Coniferous Forest

Coniferous forest is broadly classified into five major types: ponderosa pine, lodgepole pine, Douglas-fir, mixed conifer, and Engelmann spruce. Some of these have aspen as an associated species. Together, these coniferous vegetation types cover about 53 percent of Ashley National Forest lands, with mixed conifer and Engelmann spruce comprising the largest amounts. A summary of acres distribution is listed in table 3-14. Minor types that occur on the Ashley National Forest are grouped as miscellaneous. Woodland forest and persistent aspen are not displayed.

Table 3-14. Coniferous Forest Communities and Associated Seral Aspen

Community	Acres	Acres Seral Aspen
Ponderosa pine	37,800	7,900
Lodgepole pine	150,700	18,800
Douglas-fir	46,700	38,000
Mixed conifer	236,400	44,200
Engelmann spruce	144,400	N/A
Seral aspen only	N/A	2,100
Miscellaneous (subalpine fir, blue spruce, five-needle pines, riparian forest*)	5,500	1,900
Total**	**621,500**	**112,900**

Source: Forest Service GIS 2020
* May include a mix of conifers or deciduous trees such as aspen, cottonwood, willows, maples, and boxelder.
N/A = not applicable
** Due to rounding, the total acres of coniferous forests in table 3-13 is slightly different than it is in table 3-12.

Coniferous forest distribution is displayed in figure 5 in the Ashley National Forest Assessment, Terrestrial Ecosystems, System Drivers, and Stressors Report (Forest Service 2017e).

Ponderosa pine (*Pinus ponderosa* var. *scopulorum*) occurs in three major landtype associations on the Ashley National Forest: Dry Moraine, Greendale Plateau, and Stream Pediment. Ponderosa pine occurs to a lesser extent on the Red Canyon and Structural Grain landtype associations.

Persistent lodgepole pine (*Pinus contorta* var. *latifolia*) occurs in two major landtype associations—Greendale Plateau and Parks Plateau—and to a lesser extent on the Round Park. Limited stands of lodgepole pine also occur on the Trout Slope, Alpine Moraine, and Dry Moraine landtype associations. On the Trout Slope and Alpine Moraine landtype associations, lodgepole pine occurs more often at the lower to mid-elevations, where it can be seral to spruce and subalpine fir. Lodgepole pine is typically an early seral tree species with a range extending beyond the Intermountain Region. Persistent lodgepole pine forests often occur at lower elevations (below 9,600 feet), are generally heavily stocked, and comprise large pure stands often exceeding 200 acres (Forest Service 2017e).

Douglas-fir (*Pseudotsuga menziesii*) occurs on many landtype associations across the Ashley National Forest. On the Uinta Mountain Section, it is most prevalent on the North Flank and on the northerly aspects of the Stream Canyon and Red Canyon. Douglas-fir is most common, however, on the Tavaputs Plateau Section of the Ashley National Forest, on the Avintaquin Canyon and Anthro Plateau. The Douglas-fir forest type is well distributed across the national forest.

Mixed conifer and Engelmann spruce (*Picea engelmannii*) are extensively distributed, occurring on many landtype associations across the Ashley National Forest. These types are most prevalent on the Alpine Moraine, Trout Slope, Glacial Canyon, Stream Canyon, and Uinta Bollie landtype associations. Mixed conifer generally occurs in the lower dry to moist subalpine habitats, and the Engelmann spruce type generally occurs in the colder, upper subalpine habitat, often at elevations over 10,000 feet. Most Engelmann spruce is in the High Uintas Wilderness, where there is little to no management.

Influences of Drivers and Stressors

Conifer forest ecosystems are shaped by many drivers, including soils, precipitation, elevation, climate, and amount of sunlight. Stressors in coniferous forest communities are uncharacteristic wildfires, invasive species, warming temperatures due to climate change, or other human impacts, all of which may degrade or impair ecological integrity. These can affect such characteristics as the age, structure, and composition of forest stands. A lack of fire has caused departures in structure and function in forest vegetation types. Without fire, some forests become dense with closed canopies and can become more susceptible to large-scale insect and disease outbreaks. As trees die in large numbers, there are fewer large, old trees and an overall loss of structural and species diversity in the stand.

Disturbance regimes, especially fire, shape the composition, distribution, and stand structures of coniferous forests on the Ashley National Forest. Historical fire suppression has departed much of the coniferous forest communities away from the natural range of variation. For seral species that depend on frequent and mixed severity fires, stand structures have become more uniform. Without natural fire disturbances, stands have shifted toward denser younger trees and more shade-tolerant species.

To maintain dominance, ponderosa pine needs natural surface burning on a frequent fire return interval to eliminate other less fire-tolerant conifers. Vegetation treatments, including prescribed burning, pre-commercial thinning, and timber harvest, can also support ponderosa pine communities, especially in the absence of natural fire regimes. Recent harvests of ponderosa pine have been almost exclusively salvage harvest and have occurred in response to tree mortality from mountain pine beetle epidemics.

Lodgepole pine is the only conifer tree species present that is adapted to large stand-replacement fire. Stands of persistent lodgepole pine have a high percentage of closed cones, indicating a highly fire-adapted system. Harvested areas regenerated well to approximately the same species composition as the original stands.

On the Ashley National Forest, beetle outbreaks in the last two decades have affected the larger tree sizes in lodgepole pine, ponderosa pine, and Douglas-fir. Now, spruce beetle is affecting large Engelmann spruce trees as well. This means that the forest structure is likely to shift from mature and older trees, to younger trees or even delayed regeneration. While large diameter trees can still be found across the Ashley National Forest, the current distribution of sizes indicates a trend toward smaller trees that are not the preferred host size for bark beetles.

Douglas-fir stands were historically influenced by mixed-severity and low-severity fires. Low-severity fires that thinned the understory left older, fire-resistant survivors that provided seed and partial shade for the establishment of seedlings. The presence of low- to mixed-severity fire has been largely absent in Douglas-fir forests since settlement; it is likely outside the natural range of variation. Fire suppression led to Douglas-fir forests that had become increasingly dense, more mature, and susceptible to bark beetles.

A more frequent fire regime could change fuel dynamics, making the establishment of Douglas-fir a more likely outcome. Some studies suggest that Douglas-fir distribution will increase in a warmer climate (Forest Service 2017e). Yet others anticipate more frequent high-severity fires that will lead to loss of mature trees that serve as seed sources to the next generation of Douglas-fir. Where Douglas-fir is a seral species, it could increase in distribution since it is more fire tolerant than associated species.

In the mixed conifer habitat type, the disturbance regime is significant in driving species composition. In both the mixed-conifer and Engelmann spruce vegetation types, insects are an important driver of change and composition in the subalpine system.

Comparison of Natural Range of Variation and Current Conditions

Table 3-15. Comparison of Natural Range of Variation in Coniferous Forest Types

Forest Community	Comparison of Natural Range of Variation: Composition and Distribution	Comparison of Natural Range of Variation: Structural Stages
Ponderosa Pine	Tree composition characteristics appear to be in the natural range of variation, at least in areas that have had some form of disturbance, like harvest or under burning (including prescribed burning). Up to an estimated 20 percent of the Ponderosa Pine Forest has not had recent disturbance; the estimated departure from the natural range of variation for undisturbed, untreated ponderosa pine is low to moderate.	Fire suppression has altered ponderosa pine structure. Although some areas have an uneven-aged structure that is closer to historical conditions, the larger tree component has become deficient in general. Other areas have an uneven-aged structure uncharacteristic of ponderosa pine, where saplings are greater in number. Fewer large trees are largely due to mountain pine beetle outbreaks that have targeted dense stands. These stands had likely missed fire cycles that would have kept tree density lower historically and less susceptible to bark beetle attack. Although the return of fire is trending the structure in this type back to historical conditions, there is still a moderate degree of departure from the natural range of variation.
Persistent Lodge-pole Pine	This appears to be at low departure from the natural range of variation. This is indicated by the dominance of the lodgepole pine species in the overstory, the lack of other conifer tree species in the understory, and the response of the lodgepole pine type to regenerate lodgepole pine after a disturbance.	Based on the structure characteristic, the system appears to be operating at moderate departure from the natural range of variation, due to some fire suppression. Stand-replacing fires supportive of lodge-pole pine communities would likely have been larger had they not been suppressed. Contributing to departure is patch size due to timber harvest, which occurred at much smaller sizes than would have occurred historically with wildland fire.
Douglas-fir	Based on the tree composition characteristic, the successional potential of species other than Douglas-fir varies across the Ashley National Forest. This characteristic appears to be at moderate departure from the natural range of variation.	The diverse structure characteristic, inherent of a mixed severity fire regime in the Douglas-fir type, appears to be lacking on most landtype associations on the Ashley National Forest. This characteristic appears to be a moderate to high departure from the natural range of variation.

Forest Community	Comparison of Natural Range of Variation: Composition and Distribution	Comparison of Natural Range of Variation: Structural Stages
Mixed Conifer and Engelmann Spruce	The current composition is consistent with that described in the natural range of variation. Native bark beetles, however, are altering this characteristic. With bark-beetle-caused tree mortality, tree composition is expected to shift to subalpine fir where it is present. Composition in the Engelmann spruce type is estimated to be trending to a moderate departure from the natural range of variation. With increase in severe fire, lodgepole pine and aspen are expected to persist where they are present. Douglas-fir could increase in distribution where fire is mixed severity. Mixed conifer is therefore estimated at moderate departure, due to some fire suppression and expected climatic trends that would shift tree composition away from historical conditions.	Mixed conifer: Some fire suppression had led to greater prevalence of older structure classes, especially in the Alpine Moraine and Trout Slope landtype associations. With bark beetle-caused tree deaths and subsequent wildland fire, tree structure is expected to shift from continuous mature and old structure to younger. It is likely that the size, shape, and patterns of stands in a particular structural stage created by timber harvest are much different from stands driven by fire of the past. Due to these reasons, the mixed conifer is estimated at moderate departure from the natural range of variation. Engelmann spruce: Tree structure is changing with the advance of spruce beetle-caused tree deaths. Combined with projected increases in fire, regeneration back to spruce would be delayed where seed tree sources are unavailable, possibly creating non-forest-like conditions. Structure in the Engelmann spruce type is estimated to be trending at moderate departure from the natural range of variation.

Aspen

Aspen is a common montane plant community in the Uinta Mountains and is represented across the landscape within a broad range of environments, successional states, and community types. Aspen communities are found in a number of landtype associations and represents about 11 percent of the vegetation types in the plan area. Although aspen communities have a high number of different plant associations, two types—seral aspen and persistent aspen—are generally recognized and discussed, based on successional features. Seral aspen occurs over approximately 112,900 acres in the plan area and is distributed throughout conifer forest vegetation types (see table 3-14). Persistent Aspen stands total approximately 35,100 acres. Together seral and persistent aspen total about 148,000 acres on the national forest.

Seral aspen functions as a seral species in many conifer communities (Forest Service 2017e). Over three-quarters of aspen on the Ashley National Forest is classified as seral and is found primarily at higher elevations. Seral aspen depends on periodic stand-replacing fire or catastrophic regeneration in order to persist in most conifer communities (Forest Service 2017e).

Persistent aspen accounts for about 24 percent of all aspen in the plan area. Conifers are absent or nearly absent in these communities, which indicates aspen to be the long-term dominant type and is recognized as a stable plant community. Persistent aspen communities in the plan area are typically found on south-facing or warmer aspects, and at lower to mid-elevations that are usually below the conifer zone (Forest Service 2017e).

Influences of Drivers and Stressors

Complexities within aspen communities are influenced by genetic variability, environmental conditions, and disturbance mechanisms. The most recognized and understood driver of aspen communities is fire. Three modes of aspen regeneration are found in the plan area, as follows:

- Stand-replacing or catastrophic regeneration
- Continuous regeneration—A few aspen clones perpetually show continuous regeneration, producing new sprouts regardless of disturbance or stress. This regeneration mechanism is relatively uncommon.
- Episodic regeneration—The most common non-stand-replacing regeneration mode in persistent aspen is episodic regeneration. Aging aspen stands lose vigor and are less resistant to disease, insects, and drought, and ultimately succumb to these stressors. Aspen dieback triggers increased and abundant aspen sprouts in affected aspen stands. Regeneration is expected to continue during the next plan period, as aspen clones age and begin to dieback. Persistent aspen is expected to be sustained or show modest increases in clone size under processes of age deterioration and dieback, coupled with occasional stand-replacing fire.

The most recognized and understood driver of aspen communities is fire. Numerous stands of persistent and seral aspen, both small and large, have burned in wild and prescribed fires over the last 30 to 40 years. Successful sprouting following fire has routinely occurred concurrent with other drivers and stressors of aspen.

Prescribed fire in persistent and seral aspen are expected to either occur at current rates or possibly increase during the next plan period. Wildfire occurrence is strongly related to environmental and climatic conditions. If the climate continues to warm, fire frequency is predicted to increase. Increased fire frequency in a warmer climate is predicted to benefit seral aspen communities. In persistent aspen stands, Increased fire frequency would likely reduce the number of older, declining aspen stands and perhaps improve clone vigor and health with more frequent cohort turnover. Since stand expansion often occurs with new sprouting, frequent fire would increase the total area of persistent aspen over time.

Some human disturbance, such as timber harvest, is beneficial to seral aspen. Where aspen is present, tree removal triggers new sprouting and increased cover of aspen. Timber harvesting, however, trended downward between 1987 and 2008 and has remained level since that time. Timber harvesting is expected to remain level or possibly trend farther downward during the next plan period, which will limit the benefits to seral aspen.

Persistent aspen communities are important for forage and cover by both domestic and wild ungulates. Livestock browsing of aspen sprouts has been minimal and not sufficient to affect successful recruitment or diminish stand persistence. Livestock grazing in the terms of numbers, class of livestock, and management is expected to remain relatively constant during the next plan period. Persistent aspen is expected to be sustained, and successful aspen recruitment is expected to occur concurrently with contemporary livestock stocking rates and management strategies. Livestock grazing is expected to minimally affect seral aspen communities.

Elk browsing has affected recruitment in some persistent aspen stands during the last 20 years. For the most part, elk browsing of aspen sprouts is not sufficient to suppress successful recruitment or diminish stand persistence. One exception is in the Anthro Mountain landtype association where the elk population rose from a few dozen animals in the 1970s to about 1,450 animals by 2009. Due to the limited number of acres of aspen on the Anthro Plateau landtype association, aspen is more susceptible to elk browsing than other aspen-bearing landtype associations.

Elk populations are predicted to increase on the Ashley National Forest during the next plan period. If elk populations continue an upward trend, more aspen stands in the plan area would be susceptible to elk browsing following disturbances. This may threaten successful aspen recruitment and diminish aspen persistence or stand size over time.

Recreation is a minor stressor of aspen communities. Increased recreation use of the Ashley National Forest is predicted during the next plan period, but this trend is not expected to adversely affect aspen persistence in the plan area.

Comparison of Natural Range of Variation and Current Conditions

Aspen communities on the Ashley National Forest have been subject to numerous stressors, disturbances, and management practices during the last 30 years; however, distribution, abundance, and function of aspen have been relatively constant and within expected parameters.

Seral aspen

Current monitoring on the Ashley National Forest indicates that seral aspen is diminishing in the plan area in terms of a “decrease in aspen density, basal area (size of the stem), or cover.” This is because the frequency and extent of fires have been reduced, which indicates moderate departure from the natural range of variation (Forest Service 2017e). Large and small fires and timber harvest have temporarily removed conifers at a number of seral aspen sites on the Ashley National Forest, but their occurrence is not sufficient to maintain seral aspen in the long term. If the climate continues to warm and become drier, fire frequency and size is predicted to increase, which would be beneficial to seral aspen. More conifer-aspen communities would transition to early and mid-seral stages, from an increase in stand-replacing fires.

Persistent aspen

Persistent aspen has persisted on the landscape at levels equal to or greater than at the beginning of the last plan period, which indicates sustainability over a 30-year period. Many persistent aspen stands show expansion due to new sprouting outside the perimeter of the dying cohort (Forest Service 2017e). Existing conditions and current trends indicate that persistent aspen is near or within natural range of variation and is expected to remain so during the next plan period.

Climate-Related Risks and Trends

Climate change is a potential driver of aspen. Seral aspen may benefit from a warmer and drier climate. More frequent and larger fires would move conifer-aspen communities toward early seral and mid-seral stages, which would favor greater aspen dominance of these communities. If the changing climate becomes drier and precipitation falls below required water needs, affected persistent aspen may be displaced by other communities, such as mountain big sagebrush (*Artemisia tridentata* var. *vaseyana*). In this case, upslope migration of persistent aspen must occur to maintain these communities, or seral aspen becomes persistent as conifers die-off and these communities migrate upslope.

Sagebrush

Communities of sagebrush are common to the Uinta Mountains, Tavaputs Plateau, and high deserts of Wyoming. These communities are represented across the landscapes of the Ashley National Forest within a broad range of environments, successional states, and community types. Sagebrush prefers drier and cooler environments generally, but species diversification exists because of variability in geography, climate, and topography.

Sagebrush communities are found in a number of landtype associations on the Ashley National Forest and occur on approximately 119,300 acres (9 percent of the total plan area). Mountain big sagebrush (*Artemisia tridentata* var. *vaseyana*, 70,900 acres), Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*, 38,100 acres), and black sagebrush (*Artemisia nova*, 9,300 acres) account for about 99 percent of sagebrush found in the plan area. Basin big sagebrush (*Artemisia tridentata* var. *tridentata*) is less than 1 percent of the sagebrush communities on the Ashley National Forest.

Since the early 1900s, almost all big sagebrush communities within the plan area have been affected by human uses and management. Livestock have grazed has occurred in various forms and intensities for more than 100 years. Since the 1940s, thousands of acres of mountain big sagebrush have been plowed and seeded into introduced grasses, sprayed with herbicide, and treated with prescribed fire (Forest Service 2017e).

Mountain big sagebrush of the Parks Plateau, Anthro Plateau, Avintaquin Canyon, and Strawberry Highlands landtype associations are located mostly above 8,000 feet where annual precipitation is higher and summer temperatures are lower. Mountain big sagebrush communities of considerable size occur on these landtype associations. These communities are currently in satisfactory condition and have demonstrated resilience to disturbances both past and present. Herbaceous understories have responded rapidly and vigorously following disturbance. Mountain big sagebrush communities currently show high resilience to annual invasive plants, following episodes of disturbance, such as fire or drought. Little to no cheatgrass or other invasive annuals are documented in early, mid, or late seral mountain big sagebrush communities of these landtype associations.

Many communities of mountain big sagebrush of the South Face, Dry Moraine, Glacial Canyon, Stream Pediment, and Structural Grain landtype associations are currently in satisfactory condition in regard to plant species composition, species richness, shrub cover, and total ground cover; however, these communities are potentially at risk due to their moderate to high susceptibility to annual invasive plants. Annual invasive plants degrade sagebrush communities by changing plant composition and structure, lowering species richness, and narrowing fire frequency. Long-term monitoring shows that cheatgrass is present and increasing in mountain big sagebrush communities with native herbaceous understories, especially following fire and severe drought. In contrast, communities where seeded nonnative grasses dominate herbaceous cover, cheatgrass is absent or has minor presence, with no indication of spread or increase. These communities typically have satisfactory plant composition, species richness, and total ground cover. Historical seeding treatments of these shrublands with nonnative grasses have demonstrated high resilience to invasive annuals.

Montane black sagebrush, mostly found in the Anthro Plateau and North Flank landtype associations, benefit from a cooler and wetter environment found at higher elevations. Black sagebrush has been less affected by human activities than mountain big sagebrush, due to lower productivity.

Black sagebrush communities of the South Face and Green River landtype associations are in satisfactory condition in regard to plant composition, species richness, total ground cover, and shrub cover; however, they have a moderate to high susceptibility to invasive annuals. Black sagebrush communities have low to moderate resilience to annual invasive plants.

Wyoming big sagebrush communities have shown resilience to disturbance during the last 30 years. For the most part, these communities are in satisfactory condition in terms of plant composition, species richness, total ground cover, and shrub cover. After a drought, Wyoming big sagebrush has shown resilience, capability, and proper function. Wyoming big sagebrush communities have moderate to high susceptibility to cheatgrass invasion. Cheatgrass spread appears to increase during and shortly following severe drought or fire. This susceptibility increases these communities' risk to loss of resilience, capability, and function.

Influences of Drivers and Stressors

Natural disturbances play an important role in many sagebrush communities. Such disturbances as insects, disease, winter exposure, or snow layer are relatively minor in their effects on sagebrush spatially; however, fire and drought have affected sagebrush distribution, structure, and composition at larger scales (Forest Service 2017e).

Invasive grasses, such as cheatgrass, have become a significant stressor for many sagebrush communities. Cheatgrass is capable of altering fire patterns in low elevation sagebrush; as a result, sagebrush communities become more prone to fire. When infested sites eventually burn, cheatgrass outcompetes and displaces native vegetation, dominates cover, and is capable of creating annual monocultures. Under these conditions, fire frequency increases, often at intervals that preclude shrubs from reestablishing.

Although cheatgrass is present in some Wyoming big and black sagebrush communities of lower elevation, these communities are intact due to the absence of fire. Further spread of cheatgrass is predicted, which will make more communities prone to fire. In addition, as cheatgrass becomes more widespread, the incidence of fire and the size of burns are predicted to increase. The spread of annual invasive plants in sagebrush is predicted to continue, whether or not the climate becomes warmer and drier or droughts become more frequent; however, if the climate does become warmer and drier and droughts do become more frequent, the rate of spread is predicted to accelerate.

Fire appears most important in sagebrush communities of mid-elevations where conifer encroachment may displace shrubs. Historical fire patterns were sufficient to maintain sagebrush in these settings. Most black sagebrush communities in the pinyon-juniper belt require periodic fire to maintain shrubs (Goodrich 2001). If fire frequency remains constant during the next plan period, additional treatments would be necessary to curtail conifer displacement of sagebrush and help neutralize current trend. But fire frequency may increase in many sagebrush communities if the climate becomes warmer and drier, if severe and prolonged drought events become more common, and if the establishment and spread of annual invasive plants increases. During the next plan period, natural fire frequency of montane sagebrush communities is expected to remain outside the natural range of variation, but management prescriptions would be implemented to maintain these communities.

Many communities, especially those within and above the pinyon-juniper belt, are susceptible to conifer encroachment and displacement. Some sagebrush communities have transitioned into conifer forest or woodland types, with prolonged absence of fire.

In relative terms, sagebrush has limited recreation value. In the Uinta Mountains, forest visitors typically drive through these communities to access forests, lakes, and streams of higher elevations. The highest recreation use is big game hunting. Many unauthorized roads and trails in sagebrush are either created, maintained, or expanded by hunters in ATVs and pickups. Overall, sagebrush communities nearest to main roads receive the highest use. Additional unauthorized roads and trails and noxious weed infestations are predicted to increase with increased recreation use.

Oil and gas exploration and development occurs in sagebrush communities on the Anthro Plateau landtype association. Many acres of mountain big, Wyoming big, and black sagebrush have been affected by this management activity. The greatest impact of oil and gas exploration is the introduction, establishment, and spread of noxious weeds and invasive annuals into the area. Increased vehicle use, mostly from the oil and gas industry, has accelerated noxious weed infestations.

Drought is a natural disturbance that occurs regularly in arid regions of North America. Under the natural range of variation, response mechanisms to drought have successfully maintained sagebrush on western landscapes. Where herbaceous plants have died back, two responses have been documented. In most cases, herbaceous plants reestablish or recover from dieback within 2 to 5 years post drought. Where present, annual invasive plants are beginning to alter the sagebrush community’s ability to respond to drought. Cheatgrass spread has accelerated and native perennial understories have been displaced by the annual grass during severe droughts.

Livestock grazing is a stressor of sagebrush communities. This long-term and enduring practice has affected plant compositions in most communities. Adjustments in grazing management to lower grazing intensity and improve range conditions of sagebrush communities have become more common. Native plant compositions of sagebrush communities can remain in the natural range of variation with appropriate livestock management.

Comparison of Natural Range of Variation and Current Conditions

Existing conditions and current trends indicate that sagebrush communities of higher elevations are near or in the natural range of variation and are expected to remain so during the next plan period. Sagebrush in higher elevation functions properly following disturbances, with sagebrush and herbaceous vegetation returning in the intervals described for the natural range of variation. Conifers encroach and displace some sagebrush communities, but not of the magnitude in and directly above the pinyon-juniper belt. These communities show low to moderate departure from the natural range of variation. Invasive annual plants are rare to nonexistent in these higher elevation communities and are not predicted to increase during the next plan period. Resilience is high and is expected to remain high during the next plan period. If the climate becomes warmer and drier, these communities may become more stressed and less resilient. Invasive annuals may become established and begin to spread in these communities.

Sagebrush communities below 8,000 feet are more susceptible to drought, fire, and invasive annuals than those of higher elevation. Invasive annuals are the primary cause of sagebrush communities not being in, or trending away from, the natural range of variation. At this time, many of these communities are currently in or of low departure from the natural range of variation, but many are predicted to depart from the natural range of variation during the next plan period.

Other stressors of sagebrush, such as livestock grazing, recreation OHV travel, wild ungulate use, and oil and gas exploration, may affect sagebrush communities and may even contribute to the spread of invasive annual plants; but these can be or have been appropriately managed or mitigated to maintain sagebrush communities in the natural range of variation.

Pinyon and Juniper Woodland

Pinyon-juniper consists primarily of Utah juniper (*Juniperus osteosperma*) and two-needle pinyon pine (*Pinus edulis*) but may also include Rocky Mountain juniper (*J. scopulorum*). Pinyon and juniper are widespread generalists occupying broad climatic, soil, and thermal ecological zones. Persistent pinyon-juniper woodlands occur on many landtype associations across the Ashley National Forest. On the Uinta Mountain Section, it is most prevalent on Structural Grain, Red Canyon, and North Flank landtype associations, with some moderate presence on South Face. On the Tavaputs Plateau Section, this type occurs primarily on the Anthro Plateau and the Avintaquin Canyon landtype associations. In the plan area, pinyon-juniper woodlands occur on 120,400 acres, 9 percent of the total plan area, on the Ashley National Forest.

Influences of Drivers and Stressors

Disturbance in pinyon and juniper types may be necessary to maintain plant diversity. The primary disturbance of landscape change in the pinyon-juniper woodland and sagebrush ecosystem complex was fire, and fire patterns were generally tied to topography, soils, and existing vegetation composition. Fires ranged from low-intensity surface fires to stand-replacement fires, depending on the existing understory vegetation and density of pinyon and juniper. Historical fire rotations were generally very long, approximately 2 to 6 centuries. Fire return intervals typically driven by cheatgrass are too frequent for the development of pinyon-juniper communities.

Comparison of Natural Range of Variation and Current Conditions

The fire return interval for pinyon-juniper communities is estimated to be a low departure from the natural range of variation, based on recent assessments of fire in pinyon-juniper communities on the Ashley National Forest and in other areas in the West.

The departure from the natural range of variation for pinyon-juniper communities on the Ashley National Forest varies according to landtype association. Most pinyon-juniper communities are considered to be at a low departure from the natural range of variation. The exception is pinyon-juniper communities found on the Structural Grain landtype association. These communities are considered to be at high departure from the natural range of variation, due to the presence and high frequency of invasive species, including cheatgrass, and their strong biological capability to alter plant community dynamics.

Desert shrub

Desert shrub communities are found mainly in the Green River landtype association, with some Antelope Flat, North Flank, and Moenkopi Hills landtype associations. These communities make up 4 percent, 59,900 acres out of 1,376,700 acres total, of the Ashley National Forest.

Most desert shrub communities on the Ashley National Forest are in cold desert environments along the Flaming Gorge Reservoir in southwestern Wyoming. Desert shrub communities of the Green River landtype association grow only when temperatures are favorable and soil moisture is present, which indicates weather as a primary driver in community dynamics. Years of drought usually lead to meager vegetation and seed production, but shrubs and herbaceous plants may die back if the drought is severe or persisting. There is a resurgence of vegetation production, cover, and seed production with subsequent years of abundant moisture (Forest Service 2017e).

In general, desert shrub communities consist of a shrub or sub-shrub component, with few herbaceous plants. Herbaceous vegetation production is relatively low and perennial grasses make up most of that production. Mixed shrub communities, such as shadscale and Wyoming big sagebrush, are common.

Influences of Drivers and Stressors

For 30 years, most desert shrub communities showed resilience to drought, ungulate grazing, and other disturbances up to about 2002. Since then, some desert shrub communities have become particularly susceptible to invasive annual plants. Gardner saltbush (*Atriplex gardneri*) communities are most vulnerable to invasive annuals and were the first communities to be negatively affected. Many Gardner saltbush communities are outside of or are trending away from the natural range of variation. Invasive annual plants are the greatest threat to desert shrub communities because of their ability to change vegetation compositions and eradicate native shrubs and perennial grasses.

Because of its harsh environment, low annual precipitation, and limited vegetation production, desert shrub communities have fewer human and ecological services than their montane or high elevation counterparts. Similar to many other vegetation types, livestock grazing is the most extensive and enduring human use of desert shrub communities. Livestock use shrubs and herbaceous forage during winter, spring, and early summer. Shrub cover, herbaceous cover, and total ground cover have been reduced, but grazing practices have not interrupted ecological processes of desert shrubs. Livestock have contributed to the spread of weeds and invasive annuals, which has diminished resilience of some grazed desert shrub communities, particularly Gardner saltbush.

Desert shrub communities usually have limited recreation value; however, the Flaming Gorge Reservoir continues to attract hundreds of thousands of visitors annually. Much of the recreation area is in these desert shrub communities during the summer and autumn. Many unauthorized roads are created and maintained near the shores of the reservoir. Overall, desert shrub communities nearest to main roads receive the highest use and greatest impacts. Most new noxious weed and annual invasive plant infestations are along the drawdown basin of the reservoir and along authorized and unauthorized roads. The Flaming Gorge Reservoir is also a vector of spread for noxious weeds and invasive annual plants. Seeds and plant materials from the Green River watershed are deposited along the shoreline of the reservoir. Increased recreation use of the Flaming Gorge Recreation Area is expected during the next plan period. With increased visitation, additional noxious weed and invasive annual plant infestations are predicted.

Fire rarely occurs in desert shrub communities, because vegetation production is low and bare-soil to intermittent herbaceous cover between shrubs is typical; however, cheatgrass is capable of altering fire frequency and disturbance response sequences of desert shrubs, especially since most desert shrubs do not sprout following fire. Although cheatgrass is present in some desert shrub communities, these communities are relatively intact due to the absence of fire; however, further spread of cheatgrass is predicted during the next plan period, which makes desert shrubs more susceptible to fire.

Comparison of Natural Range of Variation and Current Conditions

Invasive annual plants are the primary cause of desert shrub communities' departure or trend away from the natural range of variation. Where invasive plants are absent, there is a low departure from the natural range of variation. Where invasive annuals are present, desert shrub communities are of moderate to high departure and are trending away from the natural range of variation. As invasive annuals increase, the resilience of these desert shrub communities rapidly diminishes. Within the plan period, substantial change in vegetation composition of many desert shrub communities is predicted, because of the presence and spread of invasive annual plants.

At this time, community structure of most desert shrub communities shows low departure from the natural range of variation. These include spiny hopsage, Wyoming big sagebrush, gray molly, black sagebrush, and most shadscale and winterfat communities. A few shadscale and winterfat communities show low to moderate departure from the natural range of variation because of halogeton presence and spread. Most Gardner saltbush communities show moderate to high departure from the natural range of variation because of their displacement by halogeton. This trend is predicted to continue during the next plan period. Decreases in shrub structure of many desert shrub communities is likely because of predicted increases in fire frequency due to the presence and continued spread of cheatgrass.

Rare and Unique Habitat Types

The Ashley National Forest consists of numerous plant communities, many of which are considered rare because of their limited distribution and infrequent occurrence on the landscape. Some rare plant communities also have extraordinary qualities that further distinguish them from others, such as supporting federally listed or SCC. Rare plant communities are likely more susceptible to stressors, whether natural or human caused, that may threaten their integrity or existence. The susceptibility is caused by the plant community's limited distribution and occurrence on the landscape.

Eighteen habitats were initially identified and evaluated using four rare and unique criteria (Huber 2016a). In order to qualify as a rare or unique habitat, at least three of the four criteria must apply. Of the 18 habitats evaluated, three qualified as rare and unique habitats. All three habitats are specific types of fens: calcareous/rich fens, peatlands/glacial canyon fens, and peatlands/limestone fens.

Although all fens do not meet the criteria for rare or unique habitats, they are important ecologically and are an irreplaceable resource.

Calcareous or rich fens

The South Fork Rock Creek Fen is in the South Fork Rock Creek drainage at approximately 9,300 feet elevation, is about 10 acres, and is on a gentle to moderate gradient (see figure 3-10, Rare and Unique Habitats). The fen is relatively open, with scattered and stunted Engelmann spruce trees, and mature spruce forests established along the perimeter. The fen consists of a patchwork of community types, and most of these are rare to the Uinta Mountains. The fen supports about 80 plant species, including several species unique to cold and wet conditions. There are no known threatened, endangered, or sensitive species, but two plant SCC are found in the fen. These plants are handsome pussytoes and wetland kobresia.

Potential stressors on this fen type include increased recreation use of the area, trampling due to livestock grazing, and avalanche disturbance. Long-term monitoring indicates that the fen has been in satisfactory condition, with stable trends, for at least the past 20 years (Forest Service 2017e). During this time, plant species composition has remained constant, and repeat photography indicates no change in community structure and size of the area. Based on these findings, the South Fork Rock Creek fen is considered to be trending toward its natural range of variation.

Peatlands or fens found in glacial canyons

The peatlands or fens found in glacial canyons (Glacial Bottom landtype association) of the Uinta Mountains at elevations between 7,200 and 8,500 feet meet the criteria for a rare habitat. These fens are in or next to forested areas and are fed by small springs or aquifers found near the base of canyon slopes. Documented sites are Whiterocks Canyon (see figure 3-8), Uinta Canyon, and Rock Creek Canyon, but fens can be expected in other glacial canyons in the plan area. There are no known threatened, endangered, or sensitive species from this habitat type, but one plant SCC, bristlestalked sedge, grows here.

The primary driver of these fens are springs or seeps at the toe of canyon slopes. Disturbances are minimal due to these fens' location and current management direction. A road runs through the fen in Whiterocks Canyon and likely has affected the hydrology and possibly plant species composition of the fen below the road. The other documented fens are remote and are not affected. No notable human impacts have been observed in the fens; however, increased recreation use of the area is a foreseeable stressor.

Long-term monitoring indicates that the habitat is in satisfactory condition, with stable trends (Forest Service 2017e). No change in plant species composition or structure has been detected over 20 years. These fens are considered to be within their natural range of variation, except the fen in Whiterocks

Canyon. Due to a road that crosses the fen, it is considered to be slightly departed from its natural range of variation.

Peatland or fen with limestone influence

A few peatlands or fens with limestone influence are found in Sheep Creek and Hickerson Parks of the Greendale Plateau landtype association (see figure 3-8). The approximate area influenced by fens in Sheep Creek and Hickerson Parks is 85 and 30 acres, respectively. The fens are found within depressions, have relatively flat surfaces, and are fed by underground springs that create hydrostatic cones. There are no threatened, endangered, or sensitive species associated with the fens, but two plant SCC are found: wetland kobresia and silvery primrose.

The primary driver of these fens is springs that surface periodically throughout the fen. There are no known diversions, dams, or other human disturbances that would alter groundwater flow to the fens. Livestock grazing is a stressor and has occurred in the area for many decades, but livestock access to the interior of the fens is minimal, due to saturated soils. The fens are near major Forest Service roads on the Ashley National Forest, and their perimeters are easily accessible by off-road recreation vehicles; however, there is little to no evidence of vehicle disturbance in the fens. Increased recreation near the fens is a foreseeable stressor.

Long-term monitoring indicates that the habitat is in satisfactory condition, with stable trends (Forest Service 2017e). No change in plant species composition or structure has been detected over several decades. These fens are considered to be within their natural range of variation.

Climate-related effects

The Intermountain Adaptation Partnership (IAP) identified climate change issues relevant to resource management on Federal lands in Nevada, Utah, southern Idaho, eastern California, and western Wyoming. It developed solutions to minimize the negative effects of climate change and to facilitate the transition of diverse ecosystems to a warmer climate (Halofsky et al. 2018a, 2018b).

The following is a summary from the findings of the IAP's Climate Change Vulnerability and Adaptation in the Intermountain Region. This summary is for the relevant terrestrial communities found on the Ashley National Forest, described below.

Subalpine spruce-fir forest

This forest type is moderately vulnerable. Subalpine fir and Engelmann spruce may have increased growth in a longer growing season. Bark beetles will be a stressor for Engelmann spruce. If wildfire increases, crown fires may quickly eliminate mature trees across the landscape. Quaking aspen will be minimally affected by a warmer climate.

Mesic[5] mixed-conifer forest

Late-seral forests will be susceptible to wildfire, especially where fuel loads are high. Douglas-fir and ponderosa pine, which have high fire tolerance, may become more common and late-seral species less common. Growth rates of most species will decrease. Lodgepole pine and quaking aspen will persist, perhaps with increased stress from insects and pathogens.

[5] Receiving a moderate or well-balanced supply of moisture

Dry mixed-conifer forest

Most species in mixed-conifer forest (ponderosa pine, Gambel oak, quaking aspen) can cope with dry soils and wildfire. Growth of less drought-tolerant species (Douglas-fir, white fir) will decrease. With increased fire frequency, early-seral species will become more common and late-seral species less common.

Aspen mixed-conifer forest

Increased wildfire frequency and extent will determine future composition and structure of this forest type. Conifers at higher elevations (mostly not fire resistant) will become less common, confined to northern slopes and valley bottoms. Quaking aspen and Gambel oak will attain increasing dominance because of their ability to sprout vigorously after fires, outcompeting species susceptible to drought and fire.

Persistent aspen forest

Conifers at higher elevation (mostly not fire resistant) will become less common, confined to northern slopes and valley bottoms. Aspen will attain increasing dominance because of its ability to sprout vigorously after fire, outcompeting species susceptible to drought and fire. Douglas-fir will persist in locations with sufficient soil moisture. Overall productivity will probably decrease.

Montane pine forest

Ponderosa pine will persist in this forest type because it is drought tolerant and fire tolerant, outcompeting other species following wildfire, but it will grow more slowly. Limber pine and bristlecone pine will probably persist at higher elevations where fuel loads are low. If insect outbreaks are more prevalent in a warmer climate, they could increase stress in pine species, especially during drought.

In non-forest ecosystems, increasing frequency and duration of drought are expected to drive direct changes on soil moisture, which will reduce the vigor of some species, causing death or making woody species especially more susceptible to insects and pathogens. Increasing frequency and extent of wildfires will be a major stressor for species that regenerate slowly following fire, especially non-sprouting vegetation, such as most sagebrush species.

The dominance of nonnative plant species, especially annual grasses, such as cheatgrass, will be enhanced by increasing disturbance and will themselves encourage more frequent fire—a significant change in the ecology of most vegetation assemblages. Although productivity may increase in some grasslands, most other non-forest ecosystems will experience lower productivity. Most native species are expected to persist if they can move to favorable portions of the landscape and are sufficiently competitive. Climate change effects on specific non-forest vegetation are discussed below.

Pinyon-juniper shrublands and woodlands

These woodlands are sensitive to chronic low soil moisture during prolonged droughts (to which pinyon pines are more sensitive than junipers), increased insect outbreaks that follow drought stress, and increased frequency and extent of wildfire. These species will persist across the landscape, although the distribution and abundance of species may change.

Mountain big sagebrush shrublands

Vulnerability varies from moderate to high because of the broad elevation range at which mountain big sagebrush occurs and because of the wide range in current conditions. Significant stressors are livestock grazing, expansion of pinyon pine and juniper species, altered wildfire patterns, and nonnative invasive species. These factors may be worsened by a warmer climate, especially in drier habitats.

Dry big sagebrush shrublands

Vulnerability is high, as evidenced by significant deaths that occurred during recent drought. Conditions suitable for seedling establishment are infrequent under current climatic conditions and are likely to become less frequent in a warmer climate. Lower elevations of the Great Basin are especially vulnerable, whereas sagebrush in wetter locations may be able to persist. Stressors are overgrazing, expansion of pinyon pine and juniper species, nonnative invasive species, and altered wildfire patterns and intervals. A warmer climate may worsen these factors.

Sprouting sagebrush shrublands

Warmer, drier climate will negatively affect the vigor and abundance of sprouting sagebrush species, which are adapted to more mesic conditions. These species can sprout following wildfire, but seed viability is short and unreliability of spring soil moisture will make them susceptible to prolonged droughts. Overall vulnerability is moderate, and regeneration will be critical to long-term persistence across the landscape.

Salt desert shrublands

These shrublands have low to moderate vulnerability, depending on their location relative to soil moisture availability. Many of them have relatively high species diversity; some are well-adapted to periodic drought, and some may be able to migrate to higher elevations. Salt desert shrubland communities at lower elevations may be vulnerable to drought and are intolerant of wildfire. A warming climate may increase the susceptibility of salt desert shrubland communities to nonnative, invasive species.

Alpine communities

The composition and distribution of alpine ecosystems will be affected by decreasing snowpack, altering plant vigor, and regeneration. Specific effects will depend on vulnerability thresholds of diverse species and the rate and magnitude of changes over time. Some species may be able to persist or migrate to suitable habitat, but the lower extent of some communities will be compromised by tree establishment (Halofsky et al. 2018a, 2018b).

Environmental Consequences for Terrestrial Vegetation

The key differences in effects on vegetation by alternative can be summarized based on the degree to which vegetation is treated for resource objectives and multiple uses.

Methodology and Analysis Process

For forest plan revision, management direction that may lessen or worsen threats to terrestrial vegetation are evaluated at a programmatic level. The forest plan does not authorize site-specific projects or activities; therefore, there are no direct effects from adopting the forest plan. Direct and indirect site-specific effects will be further analyzed when future projects are proposed. Although potential short-term consequences may be described where appropriate from implementing the programmatic approach, this evaluation focuses on longer term indirect and cumulative effects that may occur over the life of the forest plan.

Analysis Assumptions

- Direction for vegetation management described in the plan will occur to the extent necessary to achieve the objectives described by each alternative. The specific locations and designs of these activities are not known at this time; therefore, this analysis refers to the potential of the effect to occur, realizing that in many cases, these are only estimates.

- Nonnative, invasive plants will continue to be introduced and to spread from natural and human sources outside the authorization of the Forest Service. Establishment and spread of nonnative, invasive plants will move vegetation types away from the natural range of variation and will reduce ecological resilience and ecosystem function.
- For each vegetation type, the closer its ecological composition, structure, species richness, and disturbance response is to its natural range of variation (having low departure versus high departure), the more properly each vegetation type is functioning, and the more resilient plants and animals are in the associated habitats.
- Disturbances such as fire, insects, disease, and decay are essential ecosystem processes in forested vegetation types. Disturbance regimes closer to the natural range of variation in frequency and intensity move vegetation types toward desired conditions that promote vegetation resilience. In contrast, the disruption of historical disturbance regimes would move vegetation types away from desired conditions and could, in turn, contribute to disturbances that are uncharacteristic, causing widespread tree mortality.
- Natural disturbance regimes remain a part of the landscape and will continue to affect ecosystems found on the Ashley National Forest. While these disturbance regimes would be somewhat influenced on a local scale due to vegetation treatments or fire management, predicting their effects on a large scale or over the long term is difficult. For this reason, they are not included as indicators of forest conditions; however, they are mentioned in the effects analysis.

Indicators

- Plant community composition, cover, and structure
- Plant species richness
- Ground cover
- Vegetation type disturbance response

Environmental Consequences for Terrestrial Vegetation Common to All Alternatives

Effects from Vegetation Management

Two broad categories of active vegetation treatments were evaluated: timber harvest and prescribed fire. These treatments change terrestrial vegetation indicators in both the short term—1 to 5 years—and the long term. Timber management actions consists of five general types: uneven-aged regeneration harvest, even-aged regeneration harvest, thinning harvest, sanitation or salvage harvest, and pre-commercial thinning. These vegetation management practices vary in the number of potential acres treated under alternatives B, C, and D and are discussed below. Prescribed fires are planned ignitions where fire is deliberately applied to the landscape. The range of potential burned acres by vegetation types does not vary by alternative (see table B-10, Potential Number of Acres Burned per Decade and Desired Severity Based on Each Vegetation Type).

Timber harvest

An even-aged harvest (or two-aged with reserves) is a type of regeneration harvest. It includes clearcuts, seed tree, and shelterwood cuts. All of these harvest types remove most of the trees, opening up the forest canopy sufficiently to allow new tree seedlings to become established and grow. Vegetation cover is greatly decreased from removal of mid and top canopy species. Ground vegetation cover also decreases from heavy equipment impacts and could be short term until revegetation occurs or long-term from soil compaction and erosion effects preventing reestablishment.

After even-aged regeneration harvest, the forest size class changes to seedling or sapling, which is an early-seral forest condition. Forest dominance types and species richness may also change, depending on the composition of the regenerated forest. Forest cover and forest fuels, such as downed wood and snags, may decrease or increase, depending on the pre-harvest forest conditions, and may affect forest disturbance response. Nonnative species could spread or become established and out-compete native vegetation, changing species richness and composition.

Pre-commercial thinning occurs in stands of saplings that are generally 15 to 30 years in age and reduces tree densities and vegetation cover. Species composition may change if different species are targeted or left for improvement. Tree structure may be maintained or improved. Forest structure may be affected over the long term, affecting tree sizes, vegetation cover, and seral classes. Reducing tree densities could alter forest type disturbance responses to be more resilient to wildfire from less fuel loading and ladder fuel.

Selection harvest is a type of uneven-aged regeneration harvest that creates or maintains a multi-aged structure by removing some trees in all size classes either singly, in small groups, or in strips; this allows for a new age class to establish. Openings are created over a portion of the stand in each harvest entry. This process may change forest structure, and potentially species composition, sometimes gradually over many decades. Moving forest communities toward a diversity of age classes, where younger seral stages are in the mix, could improve forest resilience and response to insect outbreaks, which typically occur in mature dominant forest stands.

Commercial thinning is an intermediate harvest type that removes fewer trees than in a regeneration harvest, leaving a forest that is less densely stocked but still dominated by trees larger than seedling or sapling size class. The focus is not on regenerating a new forest stand; rather, it is on changing the condition of the current one to improve growth and enhance forest health and other resource objectives. Not only is forest cover reduced, but species compositions and forest structure may change due to the unequal removal of trees of different species or size. Tree growth is typically accelerated. Downed wood may be reduced and forest response to disturbance may be altered.

Surface-disturbing activities, including those associated with vegetation treatments, would disturb soils. This would indirectly promote nonnative, invasive plant introduction and spread (Mack et al. 2000), potentially leading to increases in cover of these species and changes to plant community composition. Nonnative, invasive plants and seeds may be transported on equipment and machinery used during treatments. Treatments would alter light, moisture, and nutrient availability and would provide roughened surfaces where weed seeds may germinate.

Prescribed fire and naturally ignited fire management
Prescribed fire treatments are planned fire ignitions used to meet a variety of vegetation-related resource objectives, including the improvement of wildlife habitat, stimulation of aspen regeneration, reduction of stand densities, reduction of forest fuels, creation of openings of early-successional habitat, and restoration of natural disturbance processes. Prescribed fires may be designed to be of low severity (less than 40 percent tree death), mixed severity (between 40 to 70 percent tree death) or high severity (greater than 70 percent tree death), depending on the desired post-fire vegetation conditions. Prescribed fire would be most likely to be used outside most species' active growth periods, when low biomass moisture levels would facilitate prescribed fire objectives.

Historically, naturally ignited fires were quickly controlled and put out by aggressive fire suppression activities. This altered the vegetation type composition, structure, and cover and moved them away from the natural range of variation.

Fires can shift plant community seral stages; this would depend on the severity of the fire. High severity fires that remove most or all vegetation would shift to early seral stage classes, whereas low severity would thin out young vegetation and retain mature trees trending toward mature seral stages. Fires affect species composition where some vegetation types require fire (or other large disturbances) for regeneration, such as aspen, or to stimulate reproduction and reduce competition from fire-intolerant fir species, such as ponderosa pine (Forest Service 2017e).

Heat generated during fire treatments can damage or kill existing desired vegetation; the amount of damage would depend on the species, its ability to withstand fire or regrow following fire, and fire timing. Nonnative, invasive plant cover is highest where fire intensity was greatest, indicating that relatively low-intensity fires would have less potential to result in nonnative, invasive plant spread (Forest Service 2017e). Vegetation composition, cover, and structure would change in both the short term and long term where fire treatments are used. Using fire to shift vegetation types toward historical fire patterns would improve vegetation type disturbance response and resilience in fire-dependent ecosystems. For example, ponderosa pine and aspen stands need frequent low to mixed-severity fire to reduce competition of shade-tolerant conifer species.

Effects from Recreation

The effects on vegetation may result from various forms of recreation use. Development of new roads, trails and facilities, human ignition of unwanted fires, and unauthorized OHV use could change terrestrial vegetation indicators. The effects of these activities are the loss or modification of vegetation, spread of noxious weeds, and compaction of soil.

The level and intensity of change to vegetation indicators depends on the scale of recreation. For example, human-caused ignitions could result in small acres being burned or over thousands of forested acres being lost from a high-severity fire, depending on current conditions.

New development or expansion of trails, roads, campgrounds, or facilities would result in the permanent loss of vegetation types. All alternatives would be subject to these effects; however, adverse effects on vegetation indicators are most prominent in areas of higher recreation, such as in motorized and rural areas. The alternatives vary by the number of acres allotted to different recreation opportunity spectrum (ROS) classes (see chapter 2, table 2-1, Sustainable Recreation by Alternative).

Effects from Designated Areas

Management of certain designated areas varies by alternative and is discussed below under the alternatives. In general, designated areas, such as recommended wilderness, suitable wild and scenic rivers, and RNAs, would reduce surface disturbance adverse impacts from management activities such as removal and modification of vegetation. This is because these areas rely more on natural processes to influence vegetation types toward or away from natural range of variation. Wilderness management would generally reduce the intensity and extent of direct impacts on vegetation types. This would come about because surface-disturbing activities would be reduced; however, ecosystem resilience may decline over time due to the lack of vegetation restoration and treatments to move vegetation types toward desired conditions.

Effects from Livestock Grazing Management

The extent and intensity of effects from livestock grazing and rangeland management would depend on where grazing is allowed and the level of use. This is determined by such factors as stocking rate, class and kind of livestock, season and duration of use, fences, water developments, other rangeland infrastructure, soil moisture, plant palatability, the amount and timing of annual precipitation, and temperature.

Direct impacts on vegetation from livestock grazing are trampling, removed herbaceous biomass, reduced plant cover and height, reduced litter amount, increased soil compaction, increased amounts of bare ground, and the potential for nonnative, invasive plant seed dispersal. In the long term, livestock grazing may shift plant composition toward a community in which unpalatable or grazing-tolerant plant species are overrepresented.

Environmental Consequences for Terrestrial Vegetation—Alternative A

Effects from Vegetation Management

The current 1986 forest plan (alternative A) does not contain specific direction for managing most terrestrial vegetation types. It emphasizes mountain pine beetle impacts in the lodgepole pine type and even-aged regeneration harvests that encourage natural revegetation. Regeneration harvests in this decade and the last decade were projected to be an average of 4,000 acres a year. However, these objectives are no longer achievable given that the suitable timber base has decreased from approximately 490,000 acres to approximately 130,000 acres, largely due to policy changes such as the roadless area designations. Timber production and harvest would continue to be managed consistent with current guidelines and regulations; 213,419 acres are currently considered suitable for timber harvest.

As determined in the Ashley National Forest Assessment (Forest Service 2017e) all terrestrial vegetation types have some level of vegetation departure, indicating a need for vegetation management specific to vegetation types and informed by the best available science (see table 3-22). Alternative A does not provide such direction; therefore, terrestrial vegetation would likely continue to trend toward higher departure across all vegetation types. This results in more homogenous and increased densities in forest types that shift plant structure, cover, and composition away from desired conditions. Forest types would continue to have less resilience to disturbances and stressors, such as climate, uncharacteristic wildfire (increased intensity and frequency), disease and insect outbreaks, and susceptibility to nonnative and invasive species. Non-forest types would not be managed for conifer encroachment or for desired species composition and cover.

Under alternative A, fire and fuels management follows the direction in the 2001 Utah Fire Amendment to the 1986 forest plan. This plan does not incorporate new fire-predicting and planning tools now available for determining high-risk areas, prioritizing those areas, and predicting benefits from treatments. Alternative A does not include direction specific to treat different vegetation types, nor does it consider desired severity based on each vegetation type; therefore, fire management to move terrestrial vegetation toward the natural range of variation and natural fire patterns would have limited effectiveness. This would be especially true in fire-dependent vegetation types, such as aspen and ponderosa pine.

Effects from Recreation

A variety of ROS classes provides activities, from roaded natural to primitive setting, under alternative A. Alternative A has 276,400 acres in ROS primitive and 369,600 acres in ROS semiprimitive nonmotorized. These would have low recreation effects, as described under “Environmental Consequences for Terrestrial Vegetation Common to All Alternatives.” More direct recreation effects on terrestrial vegetation indicators, reduction in vegetation cover, spread of nonnative invasive species, and increased human-caused ignitions would occur on the 10,600 acres ROS rural, 437,100 acres ROS roaded natural, and ROS semiprimitive motorized (see figure 2-4). Alternative A does not designate recreation management areas, such as backcountry areas or destination recreation areas. There are no additional recommended wilderness or proposed RNAs under alternative A.

Effects from Designated Areas

Under alternative A, special management areas are the Sheep Creek Canyon Geologic Area, seven RNAs (7,700 acres), and the High Uintas Wilderness. In these designated areas, terrestrial vegetation would have low direct effects from management activities, including effects described for vegetation management in "Environmental Consequences for Terrestrial Vegetation Common to All Alternatives" (see figure 2-20).

Effects from Livestock Grazing Management

Approximately 1,000,700 acres of active allotments occur under alternative A. Alternative A uses project-level analysis and livestock grazing permit terms and conditions to meet desired conditions for key forage species. Under these conditions, the species composition in grazed upland plant communities could shift from dominance of less palatable or grazing-tolerant species, reduce the quantity and quality of vegetation cover, reduce total effective ground cover, and diminish plant species richness. Grazing in riparian areas may change the vegetation composition by reducing highly palatable plant species while increasing less palatable plant species, including nonnative and invasive plant species; reduce hydrological function related to the quality and quantity of riparian and green line vegetation; and diminish plant species richness.

Environmental Consequences for Terrestrial Vegetation Common to Alternatives B, C, and D

Effects from Vegetation Management

Terrestrial vegetation desired conditions for all vegetation types common to alternatives B, C, and D are maintaining essential ecosystem components, processes, and functions. This would result in ecosystems that are resilient or adaptive to disturbances, such as fire, insects, pathogens, and climate variability. Movement toward these desired conditions under alternatives B, C, and D would be greater than under alternative A.

Under alternatives B, C, and D, vegetation treatments would occur over every decade following plan implementation to move vegetation toward desired conditions. Movement toward these desired conditions would be greater than under alternative A; this is because treatment techniques would be chosen based on best available science, depending on the specific vegetation type in which treatments are proposed. Table 3-16 and table 3-17 show the projected vegetation management practices in the first and second decades under each alternative. The total for mechanical timber-orientated treatments is approximately (rounded to the nearest 100 acres) 1,500 acres for the first decade and 1,200 acres for the second decade. Combining mechanical treatments with prescribed burning treatments brings the totals to approximately 2,400 acres for the first decade and 2,100 acres for the second decade.

Table 3-16. Projected Forest-wide Vegetation Management Practices (Annual Average Acres First Decade)

Vegetation Type	Alternative B	Alternative C	Alternative D
Improvement/selection (uneven-aged harvest)			
Mixed conifer	16	12	17
Engelmann spruce	0	0	0
Lodgepole pine	0	0	0
Douglas-fir	10	10	10

Vegetation Type	Alternative B	Alternative C	Alternative D
Ponderosa pine	203	104	210
Persistent aspen	0	0	0
Total*	**229**	**126**	**237**
Regeneration* (even-age harvest)			
Mixed conifer	57	44	60
Engelmann spruce	3	2	3
Lodgepole pine	107	88	111
Douglas-fir	5	5	5
Ponderosa pine	1	1	1
Persistent aspen	2	2	2
Total	**175**	**141**	**183**
Thinning (intermediate harvest)			
Mixed conifer	0	0	0
Engelmann spruce	0	0	0
Lodgepole pine	32	26	33
Douglas-fir	0	0	0
Ponderosa pine	0	0	0
Persistent aspen	0	0	0
Total	**32**	**26**	**34**
Sanitation/salvage (intermediate harvest)			
Mixed conifer	187	109	192
Engelmann spruce	29	17	30
Lodgepole pine	178	132	182
Douglas-fir	33	18	33
Ponderosa pine	79	53	80
Persistent aspen	0	0	0
Total	506	**331**	517
Pre-commercial thinning (intermediate treatment)			
Mixed conifer	43	33	45
Engelmann spruce	0	0	0
Lodgepole pine	428	351	444
Douglas-fir	0	0	0
Ponderosa pine	127	65	131
Persistent aspen	0	0	0
Total	**598**	**449**	**620**
Prescribed fire			
Mixed conifer	18	0	17
Engelmann spruce	0	0	0
Lodgepole pine	7	0	6
Douglas-fir	12	0	12
Ponderosa pine	829	739	822
Persistent aspen	28	6	28
Total	**893**	**746**	**884**

Source: Forest Service GIS 2020
*Totals may not add up due to rounding.
**Regeneration harvest treatment includes clearcuts, shelterwoods, shelterwood removal, and seed tree methods.

Table 3-17. Projected Forest-wide Vegetation Management Practices (Annual Average Acres Second Decade)

Vegetation Type	Alternative B	Alternative C	Alternative D
Improvement/selection (uneven-age harvest)			
Mixed conifer	16	12	17
Engelmann spruce	9	7	10
Lodgepole pine	0	0	0
Douglas-fir	10	10	10
Ponderosa pine	203	104	210
Persistent aspen	0	0	0
Total	**239**	**133**	**247**
Regeneration (even-age harvest)			
Mixed conifer	57	44	60
Engelmann spruce	1	1	2
Lodgepole pine	107	88	111
Douglas-fir	5	5	5
Ponderosa pine	1	1	1
Persistent aspen	2	2	2
Total	**174**	**140**	**181**
Thinning (intermediate harvest)			
Mixed conifer	0	0	0
Engelmann spruce	0	0	0
Lodgepole pine	32	26	33
Douglas-fir	0	0	0
Ponderosa pine	0	0	0
Persistent aspen	0	0	0
Total	**32**	**26**	**34**
Sanitation/salvage (intermediate harvest)			
Mixed conifer	187	109	192
Engelmann spruce	29	17	30
Lodgepole pine	178	132	182
Douglas-fir	33	18	33
Ponderosa pine	79	53	80
Persistent aspen	0	0	0
Total	**506**	**331**	**517**
Pre-commercial thinning (intermediate treatment)			
Mixed conifer	43	33	45
Engelmann spruce	0	0	0
Lodgepole pine	107	88	111
Douglas-fir	0	0	0
Ponderosa pine	127	65	131
Persistent aspen	0	0	0
Total	**277**	**185**	**288**
Prescribed fire			
Mixed conifer	18	0	17
Engelmann spruce	0	0	0
Lodgepole pine	7	0	6
Douglas-fir	12	0	12
Ponderosa pine	829	739	822

Vegetation Type	Alternative B	Alternative C	Alternative D
Persistent aspen	28	6	28
Total	**893**	**746**	**884**

Source: Forest Service GIS 2020
*Totals may not add up due to rounding.
**Regeneration harvest treatment includes clearcuts, shelterwoods, shelterwood removal, and seed tree methods.

Timber Harvest
Timber harvest projects under alternatives B, C, and D would affect the vegetation types in which they were carried out; these effects would be the same as those described in “Environmental Consequences for Terrestrial Vegetation Communities Common to All Alternatives.” Acres of vegetation types suitable for timber production differ by alternative and are summarized in table 3-18, below.

Table 3-18. Acres of Vegetation Type that Overlap Suitable for Timber Production

Vegetation Type	Alternative B	Alternative C	Alternative D
Ponderosa pine	8,700	3,400	8,900
Mixed ponderosa pine	11,900	5,000	12,400
Lodgepole pine	26,100	21,700	27,300
Douglas-fir	2,800	2,800	2,900
Mixed conifer	29,00	20,500	30,600
Engelmann spruce/miscellaneous (subalpine fir, blue spruce, five-needle pines, riparian forest)	10,200	8,400	10,600
Coniferous forest types total*	**88,900**	**61,800**	**92,700**
Deciduous forest	3,800	3,200	3,900
Seral deciduous forest	17,000	15,400	17,600
Total	**109,700**	**80,500**	**114,200**

Source: Forest Service GIS 2020
*Totals may not add up due to rounding.

Prescribed fire and naturally ignited fire management
Alternatives B, C, and D have incorporated the best available science and historical disturbance patterns to guide fire management and to achieve desired conditions for terrestrial vegetation. Fire effects are described under “Environmental Consequences for Terrestrial Vegetation Communities Common to All Alternatives,” above. Prescribed fire and naturally ignited fire treatments would be used to move vegetation types toward more natural fire patterns, which would result in greater movement toward the natural range of variation, compared with alternative A. Alternatives B, C, and D would manage natural ignitions to meet resource objectives for the associated vegetation type, though the percent objective would vary.

Using prescribed fire and wildfire management to move vegetation types toward desired conditions would move plant community composition, cover, and structure toward the natural range of variation over the long term where burned acres occur. Table B-10 in chapter 2 summarizes the potential acres managed per decade based on historical fire regime groups for each vegetation type. Of the total proposed fuel treatment acres, a quarter to a half are estimated to represent the use of prescribed fire or wildland fire for resource objectives. This is because fire management is a cost-effective form of treatment, allowing more forest restoration with limited funding. The exact amount of burned acres would vary by year and would depend on current conditions.

Nonnative and noxious weed management

Plan direction to manage nonnative and noxious weeds is the same under alternatives B, C, and D. This management would move terrestrial vegetation types toward desired conditions, improve or maintain pollinator habitat, and maintain or improve plant species richness, composition, and native plant diversity, compared with alternative A.

Effects from Recreation

As described in "Environmental Consequences for Terrestrial Vegetation Common to All Alternatives," the effects on recreation management areas depend on management direction. Recreation effects would be fewer in backcountry management; higher use recreation areas would be subject to recreation development and increased recreation effects, as described in "Environmental Consequences for Terrestrial Vegetation Common to All Alternatives, Effects from Recreation."

Table 3-19. Acres of Vegetation Type that Overlap Recreation Management Areas

Vegetation Type	Alternative B	Alternative C	Alternative D
Backcountry recreation			
Alpine	48,900	51,100	44,000
Coniferous Forest	226,000	314,600	158,500
Deciduous Forest	7,900	28,400	5,400
Seral Deciduous Forest	39,200	83,100	33,100
Mountain brush	15,900	36,600	11,400
Shrubland	17,300	87,200	12,000
Riparian	8,900	14,700	7,300
Grassland	6,900	13,600	6,200
Forb	0	100	0
Woodland	32,300	84,400	20,400
Desert Shrub	100	24,800	100
Total	**404,100**	**739,500**	**299,000**
Destination recreation			
Alpine	0	0	0
Coniferous Forest	7,800	5,300	10,400
Deciduous Forest	800	500	800
Seral Deciduous Forest	2,700	2,100	3,700
Mountain Brush	600	600	900
Shrubland	4,000	3,500	4,400
Riparian	2,200	2,100	2,500
Grassland	0	0	0
Forb	0	0	0
Woodland	5,100	3,500	5,200
Desert Shrub	1,100	1,100	1,700
Total	**28,700**	**23,000**	**34,100**
General recreation			
Alpine	5,900	3,600	10,800
Coniferous Forest	238,500	152,200	303,200
Deciduous Forest	26,600	6,400	29,200
Seral deciduous Forest	71,700	28,400	76,800
Mountain Brush	26,400	5,800	30,600
Shrubland	97,700	28,500	102,600

Vegetation Type	Alternative B	Alternative C	Alternative D
Riparian	14,300	8,700	15,600
Grassland	7,600	1,000	8,400
Forb	100	0	100
Woodland	82,700	32,300	94,600
Desert Shrub	58,700	34,000	58,100
Total	**669,900**	**340,000**	**769,600**

Source: Forest Service GIS 2020

Effects from Designated Areas

As described in "Environmental Consequences for Terrestrial Vegetation Common to All Alternatives," the effects of designated areas depend on management direction. Management direction for recommended wilderness and RNAs would have fewer direct effects from management; terrestrial vegetation types outside these areas could be subject to more management actions, such as timber harvest and grazing. Table 3-20, below, summarizes the acres of vegetation types in recommended wilderness and the proposed RNA by alternative. Alternative C then alternative B would generally reduce the intensity and extent of direct impacts on alpine and coniferous forest vegetation types. As described above, this would come about because surface-disturbing activities would be reduced; however, ecosystem resilience may decline over time due to the lack of vegetation restoration and treatments to move vegetation types toward desired conditions. Alternative D does not have any recommended wilderness or proposed RNAs.

Table 3-20. Acres of Vegetation Type that Overlap Designated Areas

Vegetation Type	Alternative B	Alternative C	Alternative D
Proposed RNA (Gilbert Bench)			
Alpine	N/A	1,400	N/A
Recommended wilderness areas			
Alpine	3,300	20,600	N/A
Coniferous Forest	6,700	27,400	N/A
Deciduous Forest	0	0	N/A
Seral Deciduous Forest	60	60	N/A
Mountain Brush	0	0	N/A
Shrubland	0	0	N/A
Riparian	200	1,800	N/A
Grassland	0	0	N/A
Forb	0	0	N/A
Woodland	0	0	N/A
Desert Shrub	0	0	N/A
Total	**10,260**	**49,860**	N/A

Source: Forest Service GIS 2020
N/A = not applicable

Effects on vegetation types

Vegetation condition class (VCC) is a measure of departure from reference (pre-settlement, natural, or historical) ecological conditions that typically results in alterations of native ecosystem components (see table 3-21 for VCC descriptions). VCC is used to assess the ecological departure from the natural fire regimes for each of the forest and non-forest vegetation types (table 3-22).

Table 3-21. Vegetation Condition Class Descriptions from the LANDFIRE Classification System

Vegetation Condition Class	Description
1. Vegetation Condition Class I.A	Very low vegetation departure 0–16%
2. Vegetation Condition Class I.B	Low to moderate vegetation departure 17–33%
3. Vegetation Condition Class II.A	Moderate to low vegetation departure 34–50%
4. Vegetation Condition Class II.B	Moderate to high vegetation departure 51–66%
5. Vegetation Condition Class III.A	High vegetation departure 67–83%
6. Vegetation Condition Class III.B	Very high vegetation departure 84–100%
Other	Water, snow and ice, non-burnable urban, burnable urban, barren, sparsely vegetated, burnable agriculture

Source: LANDFIRE classification system

Table 3-22. Vegetation Condition Class in Forested and Non-forested Vegetation Types by Percentage of Area

Vegetation Types	VCC IA	VCC IB	VCC IIA	VCC IIB	VCC IIIA	VCC IIIB	Other[1]	Total Area
Ponderosa pine	0.01%	6.76%	48.38%	25.98%	16.40%	0.12%	2.35%	100%
Lodgepole pine	0.19%	0.12%	43.50%	46.21%	5.29%	1.92%	2.77%	100%
Douglas-fir	0.03%	11.04%	41.81%	37.05%	7.34%	0.17%	2.56%	100%
Mixed conifer	0.32%	0.62%	65.36%	28.53%	1.63%	0.82%	2.72%	100%
Engelmann spruce	1.85%	0.18%	84.94%	3.73%	0.05%	2.43%	6.83%	100%
Miscellaneous[2]	1.27%	1.73%	55.05%	22.30%	6.05%	3.46%	10.15%	100%
Seral aspen	0.05%	0.68%	35.02%	50.04%	12.09%	0.75%	1.38%	100%
Persistent aspen	0.04%	0.69%	16.28%	55.47%	25.53%	0.42%	1.58%	100%
Sagebrush	0.63%	5.47%	57.14%	24.55%	7.79%	0.72%	3.70%	100%
Pinyon-juniper	0.79%	20.40%	42.16%	21.37%	1.94%	0.02%	13.32%	100%
Desert shrub	5.99%	5.19%	3.38%	78.51%	0.05%	0.01%	6.87%	100%

Source: Ashley National Forest Assessment Terrestrial Ecosystems, System Drivers, and Stressors Report 2017
[1] Other includes water, barren ground, or sparse vegetation
[2] Miscellaneous forest vegetation types include subalpine fir, blue spruce, five-needle pines, and riparian forest.

One or more of the following activities may have caused departures: fire suppression, timber harvesting, livestock grazing, introduction and establishment of nonnative species, or other management activities. For landscapes that were moderately or severely departed, those acres can provide the foundation for how many acres potentially need restoration. Alternatives B, C, and D share the same vegetation desired conditions and guidelines that address the threat of invasive species, conifer encroachment, and beetle epidemics. This would maintain or improve vegetation types and provide ecosystem resilience, compared with alternative A.

In addition to VCC, vegetation classification, mapping, and quantitative inventory (VCMQ) has been completed for the Ashley National Forest (Forest Service 2019a). The VCMQ program provides classification, distribution, and a quantitative inventory of existing vegetation. This provides a baseline for terrestrial vegetation structure in the form of percentage of canopy cover and tree sizes using diameter at breast height. The Forest Service can use this information to better achieve desired conditions for terrestrial vegetation and to determine effectiveness of vegetation treatments through monitoring changes in VCMQ.

Ponderosa pine—The Ashley National Forest Assessment documented, approximately 42 percent of ponderosa pine is in VCC II.B to III.B (moderate to very high departure) with 48 percent in VCC II.A (moderate to low departure). This indicates ponderosa pine needs active management to trend this vegetation type back toward the natural range of variation or desired conditions. Alternatives B, C, and D aim to manage approximately 6,300 to 63,100 potential burned acres per decade, depending on funding and staffing resources (see table B-10, Potential Number of Acres Burned per Decade and Desired Severity Based on Each Vegetation Type, in chapter 2).

Fires would be mostly low to mixed severity to reduce conifer competition and maintain or improve ponderosa pine composition and structure where burning occurs. Fires of these severities would likely reduce fuel loading and ladder fuels, thereby reducing the potential for high-severity stand-replacing fires. This would increase ponderosa pine resilience to disturbance, such as wildfires and bark beetle outbreaks, when compared with alternative A. A guideline addresses beetle outbreaks in ponderosa pine: During mountain pine beetle outbreaks, with high beetle population pressures on surrounding landscapes, prescribed burn operations in ponderosa pine should limit scorch and lower crown damage. This treatment practice helps reduce tree susceptibility to bark beetle attack.

Lodgepole pine—The Ashley National Forest Assessment documented approximately 43 percent in moderate to low and 46 percent in moderate to high vegetation departure. Alternatives B, C, and D would focus on regeneration timber harvest and include clearcuts, shelterwoods, shelterwood removal, and seed tree methods. Distribution is based on a 120-year rotation. Where these treatments occur, they would greatly reduce structure and vegetation cover and would reset the forest to early seral stages and regeneration (see also “Environmental Consequences for Terrestrial Vegetation Common to All Alternatives, Effects from Timber Harvest”). Desired conditions for persistent lodgepole pine are based on best available science. They will be used to manage for large fluctuations in distributions of structural classes with old forests; decadence would be rare. Lodgepole pine management would move this vegetation type toward desired conditions, compared with alternative A.

Douglas-fir—This conifer forest type also demonstrates some vegetation departure that requires management to improve VCC. Under alternatives B, C, and D, the desired condition for interior Douglas-fir has greater than 75 percent composition, with less than 25 percent for true firs. Early seral stands of aspen may also be present after a stand-replacing event. Douglas-fir structure would be characterized by low-severity thinning fires and mixed-severity fires. Stand structure can range from uneven aged to even aged, but a dominating feature is that several structural classes tend to be evident in any landscape, comprised of even-aged patches of mature and younger trees. Alternatives B, C, and D would treat approximately 2,400 to 13,600 potential acres per decade . Management would be determined based on historical fire regime groups with a mix of fire severities (low to high) would be desired to maintain and improve vegetation types (see appendix B, table B-10). Vegetation management for Douglas-fir would be more effective to achieve desired conditions with specific science-based guidance, compared with alternative A.

Mixed conifer/Engelmann spruce—Desired conditions for the mixed conifer vegetation types is the same for alternatives B, C, and D, with Engelmann spruce and lodgepole pine being the dominant species. In Engelmann spruce vegetation type, greater than 40 percent to near 100 percent of Engelmann spruce would be desired, and subalpine spruces would be the only seral species. The Ashley National Forest Assessment documented approximately 94 percent of mixed conifer in VCC IIA and IIB and 85 percent of Engelmann spruce in VCC IIA (see tables 28 and 29).

Table 5, Desired Mix of Structural Stages by Mixed Conifer Vegetation Type, in the proposed plan details the desired mix of structural stages by mixed conifer vegetation types to guide management toward achieving desired conditions. Alternatives B, C, and D would improve mixed conifer and Engelmann spruce vegetation types where there would be vegetation treatments, including potential burned acres managed in both types (see table B-10 in chapter 2). This would help improve these vegetation types species composition, structure, and cover and their disturbance resilience.

Aspen—Desired conditions and guidelines for aspen are the same for alternatives B, C, and D. Plan direction for aspen in the form of desired conditions and guidelines would help move persistent and seral aspen stands toward the natural range of variation where treatments occur. The Ashley National Forest Assessment determined that most of seral aspen (85 percent) has moderate to low (VCC II.A) and moderate to high (VCC II.B) vegetation departure; persistent aspen is mostly (81 percent) in moderate to high (II.B) and high (III.A) vegetation departure (see table 29).

Guidelines for aspen include limiting livestock utilization of key forage species, restricting vehicle use (except in emergencies) in disturbed persistent aspen areas, designing aspen regeneration projects of appropriate size and methods, and using timber harvest prescriptions to facilitate new aspen sprouting. Implementation of these guidelines would maintain or improve aspen species composition, structure, and cover.

Successful restoration treatments would maintain and increase the distribution of aspen communities where treatments occur and would extend to the perimeter of aspen clones. Depending on the methods of aspen regeneration, treatments could shift seral stages to younger successional classes. Aspen desired conditions state new aspen sprouting should occur equal to, but may extend beyond, the pre-disturbance perimeter of the regenerating clone. Crown cover of aspen sprouts is 40 percent or greater at 5 years post-disturbance.

Treating areas of persistent aspen stands with prescribed fire would move aspen community composition toward a higher percentage of aspens, would decrease conifer composition, and would stimulate aspen generation; this would move this vegetation community toward early seral classes where treatments occur. Depending on the extent of conifer removal and treated areas beyond existing stands, there would be an increase in aspen distribution.

Pinyon-juniper woodlands—The Ashley National Forest Assessment determined the majority (84 percent) of pinyon-juniper woodlands are in VCC I.B to II.B (low to moderate through moderate to high vegetation departure) (see table 29). The desired condition for pinyon-juniper woodlands is the same for alternatives B, C, and D and would aim for desired successional and structural stage measurements. Furthermore, plan direction would maintain or improve 500 acres of burned pinyon-juniper woodland composition, structure, and disturbance response where vegetation treatments occur. Alternatives B, C, and D would maintain and improve pinyon-juniper woodlands, compared with alternative A, where vegetation treatments occur.

Non-forested types—Desired conditions for non-forest vegetation types are the same for alternatives B, C, and D. These communities would typically be controlled by natural conditions, such as topography, geology, elevation, and natural disturbance, and would vary across landscapes. Conifer encroachment would be limited to 10 percent tree crown cover or less. The Ashley National Forest Assessment determined that 75 percent of desert scrub is in VCC II.B and 82 percent of sagebrush is in VCC IIA and IIB (see table 29). Alpine communities were not assessed for vegetation departure in 2017.

Alternatives B, C, and D share an objective to restore or maintain 2,500 acres (on average) annually of non-forested vegetation types during the life of the plan. This would apply to non-forest areas threatened by conifer encroachment or invasive plants or that are in degraded condition. Sagebrush habitat would be managed to provide appropriate habitat for greater sage-grouse. Alternatives B, C, and D would maintain or improve non-forest vegetation type structure, composition, and cover, compared with alternative A.

This is because specific and current science-informed management direction is lacking in the 1986 forest plan.

Environmental Consequences for Terrestrial Vegetation—Alternative B

Effects from Vegetation Management

Alternative B aims to treat 1,500 acres annually in the first decade and 1,200 acres annually in the second decade of vegetation management. Table 3-16 and table 3-17 show the projected vegetation management practices by vegetation type in the first and second decades under each alternative. Openings created by timber harvest treatments would not exceed 40 acres, unless when they are determined necessary to achieve desired ecological conditions. Additional exceptions apply for regeneration and even-aged timber stands in a single harvest operation (200 acres maximum opening size for persistent lodgepole pine and 100 acres for seral aspen). This would ensure that forest stands where treatments occur are structurally diverse and vary across landscapes in time and space.

Approximately 109,700 acres are suitable for timber production under alternative B (table 3-18). Timber harvest focus would be to maintain or restore forest and woodland types through science-informed management specific to vegetation types over commercial extraction. This would provide long-term vegetation resilience to support ecosystem health and sustainable forest economics, compared with alternative A.

Under alternative B, naturally ignited fires would be managed on at least 10 percent of the ignitions every 10 years. The Forest Service would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on 6,600 to 32,000 acres per year during the life of the plan. The emphasis would be to use fire for ecosystem maintenance and restoration. Where these treatments occur, vegetation types would move toward desired conditions, compared with alternative A.

Effects from Recreation

Alternative B has the same acreage ROS rural as alternative A but slightly more acreage in motorized ROS acres (plus 6,300 acres in semiprimitive motorized and 1,100 acres in roaded natural) (see figures 2-4 and 2-5). In addition, there are objectives for increased motorized and non-motorized routes. Compared with alternative A, this could slightly increase the effects on terrestrial vegetation indicators from motorized recreation, such as the loss or degradation of vegetation and spread of nonnative invasive species, as described under "Environmental Consequences for Terrestrial Vegetation Common to All Alternatives."

Timber harvest and motorized use is permitted in backcountry management areas and destination recreation areas. Terrestrial vegetation would be subject to timber harvest and motorized recreation effects, as described previously, in these areas.

Effects from Designated Areas

Alternative B would recommend 10,300 acres of wilderness in two areas (see figure 2-21). Terrestrial vegetation would be subject to wilderness management direction, as described in "Environmental Consequences for Terrestrial Vegetation Common to All Alternatives," in these areas. Impacts from RNAs and the two wild and scenic rivers would be the same as alternative A.

Effects from Livestock Grazing Management

Alternative B would have the same number of acres for active grazing allotments as alternative A; however, under alternative B, forage for livestock grazing would have forage utilization guidelines included in management (50 percent) as well as 4-inch or greater stubble height guidelines in riparian areas; there would be flexibility to adjust to site-specific conditions to help meet desired conditions for terrestrial vegetation. Forage utilization guidelines would help maintain native terrestrial vegetation indicators—species richness, vegetation cover, and plant structure—compared with alternative A. It also would reduce the potential for plant species composition to shift toward unpalatable or grazing-tolerant plant species where grazing occurs.

Environmental Consequences for Terrestrial Vegetation—Alternative C

Effects from Vegetation Management

Alternative C emphasizes passive vegetation management rather than active increased vegetation treatments. Alternative C aims to treat 1,000 acres in the first decade and 800 acres in the second decade of vegetation management. Table 3-16 and table 3-17 show the projected vegetation management practices by vegetation type in the first and second decades under each alternative. Openings created by timber harvest treatments would not exceed 40 acres. Short-term effects from vegetation management, as previously described, would occur only where treatments are implemented. This would improve or maintain terrestrial vegetation indicators in these areas, compared with alternative A. Such stressors as insect outbreaks, uncharacteristic wildfires, and climate effects would continue in untreated forest types.

Alternative C has the least acreage (approximately 80,500 acres) suitable for timber production and timber harvest (93,700 acres) (see table 3-18); therefore, more terrestrial vegetation in unsuitable timber harvest areas would not have potential short-term effects from timber harvest, as described above. These areas would maintain current trends (higher vegetation departure) of terrestrial vegetation indicators; however, alternative C may be less effective in moving vegetation types toward the natural range of variation and improving ecosystem resilience at large scales, compared with the alternatives having more acres treated with multiple vegetation methods.

Under alternative C, naturally ignited fires would be managed on at least 20 percent (10 percent more than alternative B) of the ignitions every 10 years and would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on 6,600 to 32,000 (same as alternative B) acres per year during the life of the plan. The full range of fuel reduction methods is authorized, consistent with forest and management area emphasis and direction. Where fire is managed terrestrial vegetation would trend back toward the natural range of variation and historical fire regimes, and terrestrial indicators would likely improve, as described in "Environmental Consequences for Terrestrial Vegetation Common to All Alternatives."

Effects from Recreation

Alternative C has approximately the same acreage of ROS semiprimitive motorized, ROS roaded natural, and ROS rural as alternative A; however, 83,000 acres of ROS semiprimitive nonmotorized would be moved into ROS primitive to connect to the existing primitive area in the High Uintas Wilderness under alternative C (see figures 2-4 and 2-6). There may be a decrease in recreation effects on terrestrial vegetation, as previously described; however, because primitive and semiprimitive nonmotorized ROS have similar effects on terrestrial vegetation, this change would be slight.

Timber harvest and motorized use would be excluded from backcountry recreation areas. Terrestrial vegetation types in these areas would not be directly affected by timber harvest treatments or motorized recreation, as described in "Environmental Consequences for Terrestrial Vegetation Common to All Alternatives." Livestock grazing would be excluded from destination recreation areas (23,000 acres).

However, only 13,000 acres currently have active grazing, therefore reduction of potential effects to terrestrial vegetation would be limited to this area.

Effects from Designated Areas

Alternative C has the most acres recommended for wilderness: 50,200 in four areas (see figure 2-22). Terrestrial vegetation types, primarily alpine and conifer forest, would be subject to wilderness management direction, as described previously. In addition to existing RNAs, alternative C would propose RNA Gilbert Bench (1,400 acres in alpine vegetation), where vegetation management would follow RNA direction; it would also exclude timber harvest.

Effects from Livestock Grazing Management

Alternative C would have reduced acres (13,400 acres closed) available for active grazing allotments and fewer HMs, compared with alternative A. Alternative C forage for livestock grazing would have no greater than 40 percent utilization levels, as well as a minimum 4-inch stubble height guideline for key forage species in riparian areas to help meet desired conditions for terrestrial vegetation. This would help maintain native terrestrial vegetation indicators of species richness, vegetation cover, and plant structure. It also would reduce the potential for plant species composition to shift toward unpalatable or grazing-tolerant plant species, which occurs with grazing overutilization.

Environmental Consequences for Terrestrial Vegetation—Alternative D

Effects from Vegetation Management

Alternative D aims to treat 1,600 acres in the first decade and 1,300 acres in the second decade of vegetation management. Table 3-16 and table 3-17 show the projected vegetation management practices by vegetation type in the first and second decades under each alternative. Openings created by timber harvest treatments are the same as alternative B and would not exceed 40 acres, unless determined necessary to achieve desired ecological conditions. This would ensure forest stands where treatments occur are structurally diverse and vary across landscapes in time and space.

Approximately 114,300 acres are suitable for timber production and 189,400 for timber harvest under alternative D (table 3-18). Alternative D has more emphasis on commodity timber harvest but would still use vegetation treatments to move terrestrial habitats toward desired conditions, compared with alternative A.

Under alternative D naturally ignited fires would be managed on at least 5 percent of the ignitions every 10 years and would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on 10,000 to 40,000 acres per year during the life of the plan. The full range of fuel reduction methods is authorized, consistent with forest and management area emphasis and direction. Alternative D also allows for minimum impact suppression tactics only in wilderness. Emphasis is to manage fire for protecting developed resources and would have limited focus to maintain or improve terrestrial vegetation types.

Fire to achieve resource objectives is prohibited in HVRAs. Terrestrial vegetation around HVRAs would be modified to protect developed areas and not movement toward the natural range of variation. Plant structure, densities, and vegetation cover would decrease to allow for better fire suppression. Still, plan direction under alternative D for vegetation management would maintain or improve terrestrial vegetation, compared with alternative A. This would be due to management actions being based on current best available science and techniques, compared with alternative A.

Effects from Recreation

Alternative D emphasizes recreation and public access rather than restoring vegetation types. Alternative D has the same acreage of ROS primitive as alternative A but more acreage of ROS rural (plus 24,300 acres) (see figures 2-4 and 2-7 Alternative D: Recreation Opportunity Spectrum). This would increase the effects on terrestrial vegetation indicators from high-use recreation development and motorized use, as described under “Environmental Consequences for Terrestrial Vegetation Common to All Alternatives,” compared with alternative A. This could include higher incidents of human-caused ignitions, increased effects from motorized recreation, increases in unauthorized trail creation, and the spread of nonnative invasive species. Furthermore, alternative D has plan direction to expand or improve campgrounds, motorized routes, mountain bike trails, and dispersed camping docks in Flaming Gorge Reservoir. This would further increase potential recreation effects on vegetation types where recreation access is expanded or recreation use increases.

Timber harvest and motorized use is permitted in backcountry management areas and destination recreation areas. Terrestrial vegetation would be subject to timber harvest and motorized recreation effects, as described previously, in these areas. The same as alternative B, 13,400 acres of active grazing allotments are allowed in destination recreation areas, and terrestrial vegetation types could be affected where grazing occurs.

Effects from Designated Areas

There are no additional RNAs, wild and scenic rivers, or recommended wilderness under alternative D. Impacts on terrestrial vegetation indicators would be the same as alternative A.

Effects from Livestock Grazing Management

Similar to alternative A, alternative D would have 1,000,700 acres of active grazing allotments, and guidelines state utilization and stubble height would meet desired conditions for soils and vegetation types. This provides flexibility for grazing management and may result in utilization levels higher or lower than 50 percent and reduced or increased stubble height of plants at the end of grazing seasons. Plant communities where grazing occurs could shift species composition toward unpalatable or grazing-tolerant species, could reduce or remove vegetation cover, and could change species richness. Without a defined stubble height guideline for key forage species, grazing below 4-inch stubble height may prevent key forage species from reestablishing, and nonnative and invasive species may compete with native vegetation, altering species richness and acres of plant communities. However, terrestrial and soil desired condition plan components, common to alternatives B, C, and D, should minimize the potential for severe adverse impacts.

Cumulative Environmental Consequences for Terrestrial Vegetation

Several vegetation management projects in or near the Ashley National Forest would contribute to changes to terrestrial vegetation indicators, as follows:

- Ashley National Forest Aspen Restoration Project—A programmatic aspen stand restoration effort on the forest. This project would complement alternatives B, C, and D to move aspen communities toward the natural range of variation in the planning area.
- Little Pond Forest Restoration Project in the Duchesne Ranger District—A timber and forest health project that includes aspects of public safety, watershed restoration, and fuels reduction.
- West Northwest Wildlife Habitat Improvement Project in the Flaming Gorge Ranger District—This project will remove conifer species from shrub community types through lop and scatter on 19,682

acres. The project intent is to maintain native vegetation diversity and watershed stability, to reduce wildfire potential, and to improve wildlife habitat.

- Iron Mountain Juniper Fuels Treatment in the BLM Rock Springs Field Office—Fuels treatments and forest health projects at multiple locations would treat up to 3,614 acres to keep public lands healthy and accessible by improving forest health and sagebrush habitat and minimizing the threat of catastrophic wildfire.
- Red Creek and Lizzie Spring Fuels Treatment in BLM Rock Springs Field Office—Fuels treatments and forest health projects at multiple locations would treat up to 2,113 acres to keep public lands healthy and accessible. It would do this by improving forest health and sagebrush habitat and minimizing the threat of catastrophic wildfire.
- Western Smiths Fork Restoration in the Uinta-Wasatch-Cache National Forest—This project will treat approximately 1,872 acres affected by the mountain pine beetle epidemic. The project will move this area toward the desired future condition of a more healthy and resilient forest.
- Whitney Reservoir Restoration in the Uinta-Wasatch-Cache National Forest—Recent death of spruce trees due to the spruce bark beetle has appeared along the eastern slope next to Whitney Reservoir. The proposed action is to harvest spruce trees (fewer than 250 acres) in order to control the spread of insects.
- Western Area Power Administration Right-of-Way Maintenance and Reauthorization Project—Update vegetation management activities along 278 miles of transmission lines on National Forest System lands to protect the transmission lines by managing for stable, low growth vegetation.

The cumulative environmental consequences of proposed management in the context of the larger ecoregion would contribute to the movement of terrestrial vegetation toward desired conditions. The projects above, in combination with achieving the desired conditions shared by alternatives B, C, and D, would contribute to landscape restoration on a large scale, with a focus on reestablishing the composition, structure, species richness, and diversity of seral stages and structure to facilitate healthy, resilient, sustainable ecosystems. Cumulatively, these management efforts would also lessen the impact of invasive species, would provide resilience to disease and insect outbreaks, would improve wildlife habitat, and would reduce the risk of uncharacteristic wildfire. Increasing health and ecosystem function through management would also increase the ability of ecosystems in the region area to adapt to climate change. Ultimately, ecosystems exhibiting desired conditions better provide for multiple uses and better contribute to sustainable social and economic systems.

Fire and Fuels

Introduction

The effects of wildland fire have the potential to drive ecosystem change at a landscape scale (Hessburg et al. 2015). As such, wildland fire is considered a primary disturbance agent that both currently and pre-historically has created this type of change. Across the Ashley National Forest, fire has influenced vegetation patterns, composition, structure, and development of both individual stands and the larger landscape. Existing disturbance regimes are markedly altered from natural disturbance regimes. Today's landscape patterns are largely a byproduct of the cumulative effects of human activities and altered disturbance regimes.

The current national fire management policy is outlined in Guidance for Implementation of Federal Wildland Fire Management Policy (Forest Service et al. 2009) and the Review and Update of the 1995 Federal Wildland Fire Management Policy (Interagency Federal Wildland Fire Policy Review Working

Group 2001). This policy allows fires to be managed for resource benefit, depending on direction in the Ashley forest plan. In addition, the forest plans for all the national forests in Utah, including the Ashley National Forest, were amended in 2000, which allows for the full range of fire management responses and management of hazardous fuels through prescribed burning and other vegetation management methods.

The Utah fire amendment is consistent with national policy, which requires that each fire have a set of objectives, commensurate with the values at risk; therefore, a fire may have a mix of resource benefit and suppression objectives. The documentation for the decision of the strategic direction of the fire is made in the wildfire decision support system. Every fire with a resource objective or that escapes initial attack must have a decision in wildfire decision support system.

Regulatory Framework

Wildfire Suppression Assistance Act of April 7, 1989 (HR 4936)—Authorizes reciprocal fire protection agreements with any fire organization for mutual aid, with or without reimbursement. When reciprocal fire protection agreements do not exist, it allows for emergency assistance in the vicinity of agency facilities in extinguishing fires.

Healthy Forests Restoration Act of 2003 (HR 1904)—Aimed at expediting the preparation and implementation of hazardous fuels reduction projects on Federal land; encouraging collaboration between Federal agencies and local communities; requiring courts to balance the effects of action versus no-action before they halt a project's implementation; and requires Federal agencies to retain large trees under certain conditions.

Urban Wildland Interface Communities within the Vicinity of Federal Lands That Are at High Risk from Wildfire (*Federal Register* Vol. 66, No. 3, 2001—List of communities in the vicinity of Federal lands that are at high risk from wildfire.

FS Manual 5100—Provides direction on wildland fire, including suppression and fuels management, such as prescribed fire in general and within wilderness.

FS Handbook 5109—Provides direction for wildland fire managers.

National Fire Plan, August 2000—Outlines a plan of action for Federal agencies to protect wildland urban interface and to be prepared for extreme fire conditions.

Federal Wildland Fire Management Policy of 1995 (updated January 2001)—Guides the philosophy, direction, and implementation of wildland fire management on Federal lands.

2002 President's Healthy Forests Initiative—Emphasizes administrative and legislative reforms to expedite fuels treatments and post-fire rehabilitation actions.

Interagency Prescribed Fire Planning and Implementation Procedures Guide 2017—Provides standardized procedures, specifically associated with the planning and implementation of prescribed fire.

Guidance for Implementation of Federal Wildland Fire Management Policy 2009—Guidance for consistent implementation of the 1995/2001 Federal Fire Policy.

National Cohesive Wildland Fire Management Strategy 2014—A strategic document for all stakeholders across all landscapes to collaborate, using best science, to address the nation's wildfire problems by focusing on three key areas: restore and maintain landscapes, fire-adapted communities, and response to fire.

Interagency Standards for Fire and Fire Aviation Operations 2018 (NFES 2724)—A reference guide that documents the standards for operational procedures and practices for the Forest Service fire and aviation management program.

Analysis Areas

Wildland fires do not follow administrative boundaries but instead burn based on fuels, weather, and topography; because of this, the analysis area for the fire and fuels management effects includes the fire sheds overlapping the Ashley National Forest, encompassing both National Forest System lands and lands under other ownership, both in and next to the national forest. The analysis applies to the anticipated life of the plan, with some analysis occurring across the longer term (50 years); this is consistent with the analysis period for other key ecosystem characteristics associated with terrestrial vegetation.

Description of the Affected Environment

Natural Fire Regimes and Natural Range of Variation

A fire regime describes the general pattern in which fires naturally occur in a particular ecosystem over an extended period. Scientists classify fire regimes using a combination of factors: frequency, intensity, size, pattern, season, and severity (Weston 2010). Historical natural fire regimes are grouped into five categories, based on the average number of years between fires (fire frequency), combined with characteristic fire severity reflecting percent replacement of dominant overstory vegetation (see table 3-23).

Table 3-23. Fire Regime Group Descriptions

Group	Frequency	Severity	Severity Description
I	0–35 years	Low/mixed	Generally low-severity fires replacing less than 25 percent of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75 percent of the overstory
II	0–35 years	Replacement	High-severity fires replacing greater than 75 percent of the dominant overstory vegetation
III	35–200 years	Mixed/low	Generally mixed-severity fires; can also include low-severity fires
IV	35–200 years	Replacement	High-severity fires
V	200+ years	Replacement/ any severity	Generally replacement severity; can include any severity type in this frequency range

Source: National Interagency Fuels Fire and Technology Transfer System 2010

To better understand the historical fire disturbances in each of the vegetation types, LANDFIRE fire regime groups are used to characterize the severity and frequency of fires in forested and non-forested vegetation types. The dominant fire regime group and range of fire frequency within forested and non-forested vegetation types in the planning area is presented in table 3-24. Acres of each vegetation type in the planning area are shown in table 3-20 in the terrestrial vegetation section above.

Vegetation condition class is a measure of departure from reference (pre-settlement, natural, or historical) ecological conditions that typically alters native ecosystem components (see table 3-25 for VCC descriptions).

Table 3-24. Dominant Fire Regime Groups and Fire Frequency within Forested and Non-forested Vegetation Types

Vegetation Types	Dominant Fire Regime Groups	Fire Frequency (Years)
Ponderosa pine	I	6–60
Lodgepole pine	V	90–200
Douglas-fir	I, III	35–200
Mixed conifer	V	200–300
Engelmann spruce	V	200–400
Miscellaneous[1]	I	75–290
Seral aspen	I, III, IV	13–70
Persistent aspen	I	20–300
Sagebrush	III, IV	40–100
Pinyon-juniper	III, IV	150–200
Desert shrub	IV	100–240

Source: LANDFIRE 2020

[1] Miscellaneous forest vegetation types include subalpine fir, blue spruce, five-needle pines, and riparian forest.

Table 3-25. Vegetation Condition Class Descriptions

Vegetation Condition Class	Description
I.A	Very low vegetation departure, 0–16%
I.B	Low to moderate vegetation departure, 17–33%
II.A	Moderate to low vegetation departure, 34–50%
II.B	Moderate to high vegetation departure, 51–66%
III.A	High vegetation departure, 67–83%
III.B	Very high vegetation departure, 84–100%
Other	Water, snow and ice, non-burnable urban, burnable urban, barren, sparsely vegetated, burnable agriculture

Source: LANDFIRE 2020

VCC is used to assess the ecological departure from the natural fire regimes for each of the existing forest and non-forest vegetation types. As shown in table 3-26, most vegetation types on the forest are in VCC II.A and II.B, indicating moderate to low and moderate to high departure, respectively, from reference conditions. One or more of the following activities may have caused departures: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species. introduced insects or diseases, or other management activities (National Interagency Fuels Fire and Technology Transfer System 2010).

On the Ashley National Forest, the primary cause for departures is lack of disturbance, in particular, fire suppression. Areas affected by insects are shown in figure 3-11; the areas of highest damage are concentrated in the eastern portion of the High Uintas Wilderness.

In contrast to fire suppression, the forest has infrequently used unplanned ignitions to manage wildfires and reduce fuels. Out of an average 20 to 30 wildfires each year, one to two of them have been managed wildfires.

Table 3-26. Dominant VCCs in Forested and Non-forested Vegetation Types

Vegetation Types	Dominant VCCs
Ponderosa pine	VCC II.A
Lodgepole pine	VCC II.A, II.B
Douglas-fir	VCC II.A, II.B
Mixed conifer	VCC II.A
Engelmann spruce	VCC II.A
Miscellaneous[1]	VCC II.A
Seral aspen	VCC II.B
Persistent aspen	VCC II.B
Sagebrush	VCC II.A
Pinyon-juniper	VCC II.A
Desert shrub	VCC II.B

Source: LANDFIRE 2020

[1] Miscellaneous forest vegetation types include subalpine fir, blue spruce, five-needle pines, and riparian forest.

Recent Wildfire History and Trends

The departure from reference conditions is reflected in the recent wildfire trends, as the total number of acres burned has increased considerably over the last 3 decades. There was an abrupt transition in the mid-1980s from a regime of infrequent large wildfires that were generally short duration, to one with much more frequent larger fires. Reduced winter precipitation, early spring snowmelt, and warmer dry seasons have played a role in this shift. An increase of large wildfires greater than 1,000 acres is particularly robust in lower to mid-elevation forests that have missed one or more fire return intervals over the last 100 years. This area consists of dry forest types, such as ponderosa pine, Douglas-fir and pinyon pine, where fire exclusion has created a departure from the natural fire regimes (Westerling et al. 2006).

Over the last 3 decades, many areas have also experienced mountain pine beetle infestations. Those stands that have significant beetle infestations will continue to change the fuel profile and foliar moisture content over time, creating conditions that are potentially more susceptible to higher intensity wildfires (Cleetus and Mulik 2014).

While large fires have burned a significant number of acres across the Ashley National Forest, they are generally rare, with less than 1 percent burning more than 1,000 acres. Due to the strong influence of the monsoon weather, the fire season is determined by its occurrence or lack of occurrence. Lightning from thunderstorms typically begins in late May and accounts for 68 percent of the fires. Due to vegetation green up, 77 percent of the fires are usually less than a quarter of an acre and are easily suppressed. The potential for larger fires (greater than 100 acres) usually occurs between late-June and mid-July. As the monsoons become more common by mid- to late July, all fires are less than 100 acres. As the monsoon influence subsides in the fall, fires usually remain relatively small and manageable (Nauslar et al. 2018).

Over the past decade, many larger fires have been caused by recreationists on the forest. Figure 3-12 describes the percentage of fires by size class, and figure 3-13 shows the number of fires and total acres burned for the Ashley National Forest since 1970. The increase in acres burned in 2020 represents the East Fork fire, which burned approximately 90,000 acres.

Figure 3-12. Ashley National Forest percentage of fires by size class from 1970 to 2014

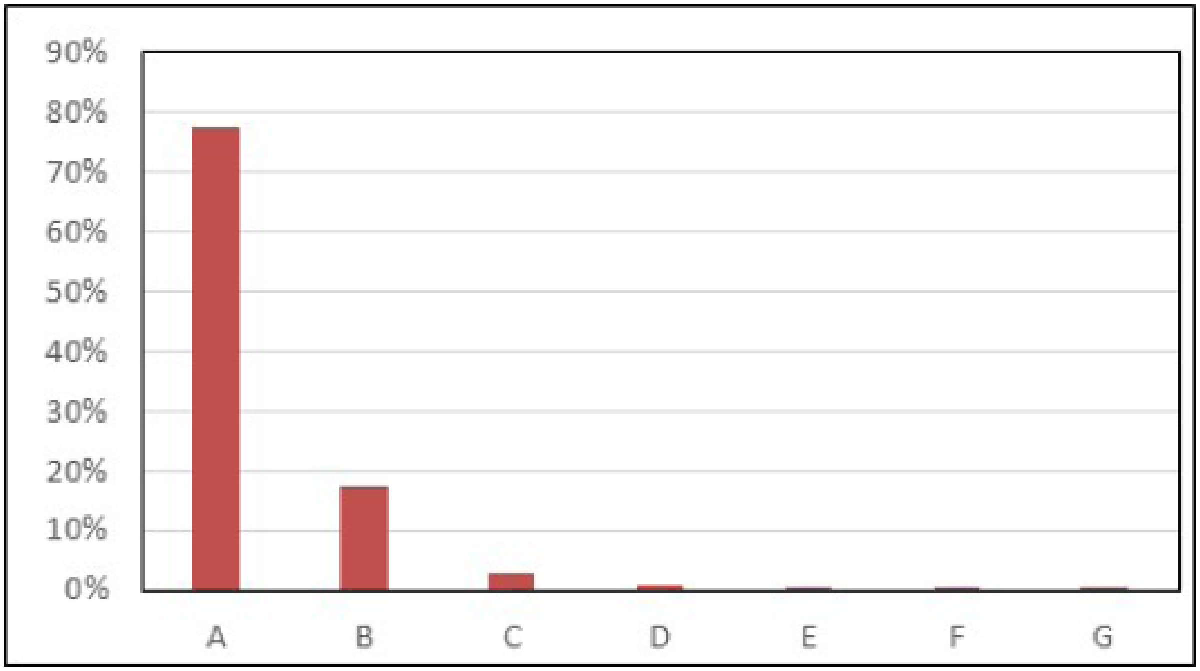
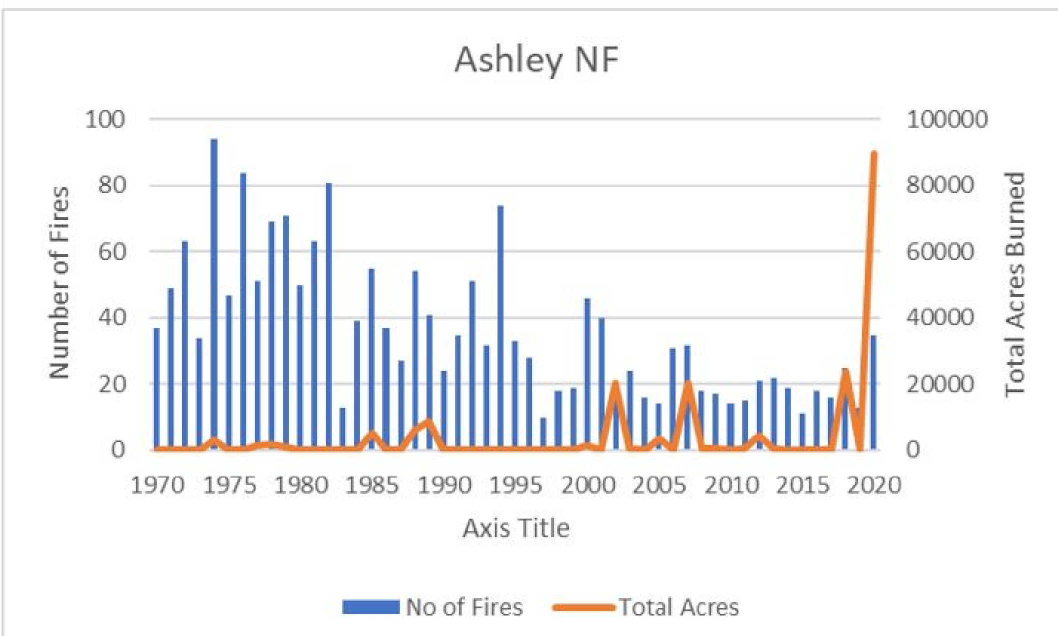


Figure 3-13. Ashley National Forest number of fires and total acres burned from 1970 to 2020



Forest Fuels and Fire Behavior

Given how conditions have changed, as described above, the Forest Service can characterize fuels to predict how fires may burn within the vegetation types. The Forest Service uses representative fuel models to quantify fire behavior characteristics and the potential effects on vegetation. Fuels are made up of the various components of vegetation, live and dead, that occur on a site. These components of surface fuels include litter and duff layers, the dead and downed woody material, grasses and forbs, shrubs, regeneration, and timber. Various combinations of these components define the major fuel groups of grass, shrub, timber, and slash. The differences in fire behavior among these groups are related to the fuel load and its distribution among the fuel particle size classes. In addition to surface fuels, crown fuels are described by canopy bulk density, canopy base height, and canopy fuel load (Scott and Burgan 2005).

The standard fire behavior fuel models are used to predict fire behavior resulting from various weather and topographic inputs. Crown fuels are important for determining crown fire characteristics, such as whether a fire can transition from the surface to the tree crowns. Fires in tree crowns are much harder to control because embers can result in spot fires[6] across control lines.

There are several outputs calculated from fire behavior modeling that are important to fire management decisions. The outputs of most concern are flame length and type of fire. Flame length is important in determining fire suppression techniques. In addition, these fire behavior characteristics are used to estimate resistance to control. This resistance is defined as the relative difficulty of constructing and holding a control line, as affected by resistance to line construction and by fire behavior (NWCG 2014). For instance, at flame lengths of 0 to 4 feet, a fire can be controlled by direct attack by hand and ground crews at the fire's edge. As flame lengths increase to over 11 feet, indirect attack is the only option, using a combination of aerial resources, mechanical equipment, and hand and ground crews (NWCG 2006).

In order to quantify fire behavior characteristics and the potential mechanisms to control a wildfire, fire behavior modeling was used across the entire Ashley National Forest. The national fire behavior modeling and mapping system called FlamMap produced fire behavior outputs for flame length and fire type, shown in table 3-27 and table 3-28.

Table 3-27. Flame Length and Percentage of Total Area Across Ashley National Forest

Flame Length Classes	Acres	Percent Total Area
Less than 0 feet	250,685	18
0 to 4 feet	625,265	45
4 to 8 feet	380,747	27
8 to 11 feet	64,404	5
More than 11 feet	79,160	5

Source: Forest Service GIS 2020

Table 3-28. Fire Type Acres and Percentage of Total Area Across Ashley National Forest

Fire Type	Acres	Percent Total Area
Unburnable	250,685	18
Surface fire	664,025	47
Passive crown fire (torching)	479,880	34
Active crown fire	5,670	Less than 1

Source: Forest Service GIS 2020

Wildland-Urban Interface and Values at Risk

Decades of fire exclusion in many areas has impeded the ecological benefits that result from fire. As a result, there has been a significant increase of fuel accumulations in systems that historically burned with high frequency at low severity. At the same time, there has been an increase in human improvements in or

[6] A fire started by flying sparks or embers at a distance from the main fire

next to the wildland fire fuels. These improvements continue to push outward from communities into the areas that have a higher risk of fire (Malesky et al. 2018).

The wildland-urban interface is an area where both human improvements and structures meet and intermingle with wildland vegetation on the Ashley National Forest. These are areas that could be threatened by a fire burning wildland fuels and are considered HVRAs in this forest plan. The values associated with these areas are private land and structures, summer homesites, aboveground utility corridors, developed recreation sites, administrative sites, watershed improvements, reservoirs, canals, electronic and communication sites, and oil and gas facilities.

Fire and risk are inevitably linked and provide the foundation for fire managers to assess their potential effects. Current wildfire risk is represented by the possibility of loss or harm from a wildfire. The risk is displayed by the fire risk index rating, from very low to extreme. Wildfire risk is used to determine the potential of a wildfire affecting these values. The fire risk index rating combines the likelihood of a fire occurring and the potential hazard (fire behavior characteristics) in relation to those current values of concern (Utah Department of Natural Resources 2016). Most fire risk is rated relatively low; however, with the exclusion of fire and continuation of climate change, more acres will continue to move toward the moderate to high risk. See table 3-29 for current fire risk index acres and percent across the Ashley National Forest.

Table 3-29. Acres and Percentage of Ashley National Forest Identified by the Fire Risk Index Rating

Fire Risk Index Rating	Acres	Percent
Non-burnable	205,969	18
Very low	610,938	53
Low	120,303	10
Low to moderate	99,412	9
Moderate	70,677	6
Moderate to high	35,870	3
High	12,951	1
Very high	4,495	0
Extreme	1,478	0

Source: Forest Service GIS 2020

Climate Change

With or without change in precipitation, temperature increases can decrease snow depth, alter timing and rate of snowmelt, lengthen or alter the timing of the growing season, and affect soil moisture levels. Climate changes will affect disturbances in the ecosystem, with fire, insects, and disease being the most notable for the Ashley National Forest (Malesky et al. 2018). Increasing air temperatures are expected to change the frequency, severity, and extent of wildfires. Large wildfires that have occurred during a warmer climatic period during the past two decades signify a future in which wildfire is an increasingly dominant feature of western landscapes (Vose et al. 2016).

With an increase in temperature over the last several decades, there has been an increase in the number of years of drought. Drought has a clear correlation to the biotic and abiotic (living and dead) conditions within forested and rangeland vegetation types, and drought increases the potential for large fires (Vose et al. 2016). Although some of these interactions are predictable, they can be difficult to quantify. The Forest Service has analyzed the fire danger index energy release component and Palmer drought severity index. It found a correlation of recent drought conditions to an increase in large fires on the Ashley National Forest (Forest Service 2017f).

Environmental Consequences for Fire and Fuels

Methodology and Analysis Process

The impacts analysis area for fire and fuels is the fire sheds overlapping the forest. Indicators were selected based on those management actions in the plan that would affect the forest's ability to improve or maintain desired vegetation conditions, protect high value resources, or manage wildland fire.

A qualitative approach was used to analyze the types of impacts on fire and fuels, based on an understanding of current conditions in the analysis area. The analysis by alternative is largely quantitative, comparing acres treated and percentage of ignitions that would be managed. Given the programmatic nature of the forest plan, the exact locations and number of acres that would be affected by proposed management are unknown. Similarly, the cumulative effects analysis tends to be broad and generalized to address potential effects that could occur from a reasonably foreseeable management scenario, combined with other reasonably foreseeable activities or projects; consequently, this assessment is primarily qualitative. This is because of a lack of detailed information that would result from project-level decisions and other activities or projects. The analysis assesses the magnitude of cumulative impacts by comparing the environment in its baseline condition with the expected impacts of the alternatives and other actions in the same analysis area.

Analysis Assumptions

The analysis is based on the following assumptions:

- Acres with fuels treatments have reduced departure because treatments have altered the structure and composition of vegetation or fuel loads; this moves vegetation toward desired conditions.
- Actual acres treated under each alternative will depend on resource availability, NEPA analysis, weather conditions, socio-political factors, or other unpredictable factors.
- A direct relationship exists between fuel loading and potential fire intensity and severity.
- Demand for fuels treatments will likely increase over the life of this plan.
- Management under all alternatives will not directly change the frequency of naturally ignited fires, because it will not change the sources of ignitions.

Indicators

Analysis indicators for fire and fuels are as follows:

- Future fuels treatments—Acres of projected vegetation treatments
- Protection of high value resources—Acres of projected vegetation treatments in HVRAs
- Flexibility of fire management—Percentage of natural, unplanned ignitions that would be managed for resource objectives

Environmental Consequences for Fire Common to All Alternatives

Fuels treatments under all alternatives, such as manual, mechanical, and chemical treatments, as well as prescribed fire, would reduce tree density and the quantity of surface fuels and would remove insect-affected trees. This would result in a more diverse forest structure by creating openings and clumps and generally reducing fuel density. Retained trees would generally be older and larger, with thicker bark and higher crown base heights; thus, they would be more fire resistant and less able to support crown fire

(Agee and Skinner 2005). Overall, fuels treatments would move areas toward natural fire regimes and desired conditions.

The reductions in tree density, standing dead trees, ladder fuels, and surface fuels would decrease the probability of ground fire escalating to crown fire in any stand or forest type, and would reduce unpredictable and hazardous high-intensity wildfire behavior, such as spotting, crowning, and torching (Weise et al. 2018).

The wildland-urban interface zone will continue to grow under all alternatives. It introduces additional ignition sources, which increase the probability of wildland fire and the need for fire suppression. This expanding wildland-urban interface zone affects the Forest Service's ability to manage wildland fire as a natural process, due to the necessity of protecting property, infrastructure, and public safety. Fire management within the wildland-urban interface zone is often more dangerous, time-consuming, and expensive than fire management in undeveloped areas. The need for fuel treatments in these areas is likewise increased in order to protect these values. Similarly, increased recreation use in the analysis area increases the probability of unintentional fire starts and the need for fire suppression.

Under all alternatives, there may be limitations on the timing or location of certain treatments to protect sensitive resources, such as archaeological sites, nesting wildlife, and steep slopes. Protection of these areas can modify the design of fuels treatments and result in higher management costs or the withdrawal of specific treatment areas. Should this occur, these areas would be at a continued risk for larger, more intense wildfires, with higher suppression costs and a higher risk of loss. The associated administrative workload would increase with an increase in acres treated and number of projects.

Environmental Consequences for Fire—Alternative A

Existing trends described in the affected environment section would continue under alternative A, including departure from natural fire regimes, fuel accumulation, and increase in acres burned and risk of higher intensity wildfires.

While the current direction in the 1986 Ashley National Forest Plan does not specify the acres of projected vegetation treatments, acres of projected treatments to protect high value resources, or the percentage of planned ignitions that would be managed for resource objectives, there is some direction to protect investments, use unplanned ignitions, and protect areas from insects and disease.

Further, federal wildland fire management policy and the Utah National Forests Fire Amendment would support some movement toward desired conditions through vegetation and fire management for resource benefit over the short term; however, the pace of treatments would not be sufficient to reverse the trend of fire regime departure and fuel loading over the long term. Over the long term, the likelihood for more frequent, severe, and intense wildland fires would continue to increase. Forest conditions, wildlife habitats, recreation opportunities, and watershed conditions would be at increasing risk from large-scale, high intensity wildfires. In addition, the risk of property damage and public and firefighter exposure to erratic fire behavior would continue to increase.

Environmental Consequences for Fire—Alternative B

Fuels treatments, projected at 6,600 to 32,000 acres per year under this alternative, would improve or maintain desired vegetation conditions, in comparison with alternative A. Over the long term, fuels treatments would develop a fire-resilient landscape, bringing the frequency and severity of wildland fire closer to the natural range of variation. Impacts would likely be concentrated in those vegetation states with the highest departure from the natural range of variation; these are shown in table 4 in vegetation types with VCC II.B: lodgepole pine, Douglas-fir, seral and persistent aspen, and desert shrub.

Impacts would also be concentrated in insect-affected areas, though there may be limitations on treatments in the High Uintas Wilderness, where the most severe insect damage is mapped (figure 3-11). The more acres treated, the more acres that would move toward desired conditions. This would reduce the extent and severity of wildfire in treated vegetation communities and would reduce suppression costs in the long term.

Alternative B includes management to prioritize and protect high value resources, with projected vegetation treatments in HVRAs a minimum of 1,000 to 3,000 acres per year. Such treatments would assist in the control and management of fires in HVRAs over the short and long terms to a greater extent than under alternative A. Education and working with outside interests could reduce the likelihood of human-caused ignitions, thereby reducing the number of fires that would need to be controlled in HVRAs over the long term.

Management of unplanned ignitions on at least 10 percent of ignitions would afford fire management greater flexibility to meet resource objectives through managed wildland fire, compared with alternative A. Given certain weather, fuels, and topography, fires can be managed with minimal risk to values. Where unplanned ignitions pose little risk to values, the Forest Service would be able to be managed for its longer term ecological benefits and potentially reduce treatment costs and improve efficiency over the long term. The location of these effects cannot be predicted because the locations of future unplanned ignitions are unknown. There may be a desire to use such an approach, depending on the potentially affected resources.

Environmental Consequences for Fire—Alternative C

Impacts under alternative C from fuels treatments would be the same as described for alternative B. Under alternative C, the lack of minimum treatment acres in HVRAs would have impacts similar to alternative A, with an emphasis on fuels treatments moving toward desired vegetation conditions and the use of fire to achieve resource objectives.

Management of unplanned ignitions would have impacts similar to those described for alternative B. By managing unplanned ignitions on at least 20 percent of ignitions, alternative C would allow the Forest Service to have increased flexibility to meet resource objectives through the use of managed wildland fire. Further, an increase in the use of managed wildland fire may reduce the need for prescribed fire and limit the resources available for, and costs associated with, prescribed fire treatments; as such, there could be a trend toward less use of prescribed fire under this alternative. However, with a greater proportion of managed wildland fire, there would be an increased risk of the unintended outcome/consequence that a fire could escape; this could lead to larger wildfires, habitat and watershed damage, and recreation closures. Depending on the extent of such fires, impacts may persist over the long term.

Environmental Consequences for Fire—Alternative D

Impacts from fuels treatments would be similar to those described for alternative B. The higher projected annual treatment acreage, from 10,000 to 40,000 acres, under alternative D would lead to a greater improvement of vegetation conditions. The likely location of impacts would be as described for alternative B. Alternative D would further reduce the extent and severity of wildland fires in treated vegetation communities and would reduce suppression costs in the long term.

Similarly, projected vegetation treatments in HVRAs would have the same types of impacts as described under alternative B. With the higher acreage of vegetation treatments under alternative D, a minimum of 5,000 to 10,000 acres per year, the Forest Service would have greater opportunity to control and manage fires near HVRAs over the short and long terms. This would result in a greater level of protection of these resources.

Management of unplanned ignitions for resource benefits would have impacts similar to those described for alternative B. With a reduced proportion of ignitions that would be managed under alternative D (at least 5 percent of ignitions) and increased focus on fire suppression, the Forest Service would have less flexibility to meet resource objectives through managed wildland fire. It would be less likely that the Forest Service would control the size and extent of wildfires through the use of managed wildland fire. Treatment costs may be higher than under alternative B since more resources would be devoted to active suppression.

Cumulative Environmental Consequences for Fire

Past and present management actions and natural events in the analysis area have altered the condition of vegetation and natural fire regimes across the landscape, such as fire suppression, development, drought, and insect and disease outbreaks. In many cases, areas are now more prone to large, intense fires.

The cumulative effect of many past, present, and reasonably foreseeable future actions on fire and fuels in the analysis area would be a gradual improvement of forest conditions through updated land management planning and partnerships, fuels treatment, and forest restoration projects. Examples of these actions are the BLM Vernal Field Office RMP; the Daggett, Uintah, and Duchesne Counties general plans; the Utah and Forest Service Shared Stewardship Agreement; the West Northwest D1 Wildlife Habitat Improvement Project; and Iron Mountain Juniper Fuels Treatment.

All action alternatives would contribute to these improvements through a minimum acreage of vegetation treatments, both within and outside of HVRAs, and increased management of unplanned ignitions. Without specific direction regarding treatments and the increased use of unplanned ignitions for resource benefits, alternative A would lead to slower improvement of forest conditions, which would not be sufficient to reverse the trend of fire regime departure and fuel loading over the long term, as described above.

Carbon Storage and Sequestration

Introduction

Forests provide a key ecosystem service in the form of carbon sequestration—the uptake and storage of carbon—which helps regulate climate by modulating greenhouse gas concentrations in the atmosphere (Deal et al. 2017; EPA 2018). Maintaining healthy, productive, native vegetation reduces carbon dioxide, a greenhouse gas that plays a major role in climate change (Forest Service 2016a).

Carbon in forests comes from carbon dioxide in the atmosphere. Through the process of photosynthesis, growing plants remove carbon dioxide from the atmosphere and store it in plant stems, branches, foliage, and roots, with much of this organic material eventually stored in forest soils (Dugan et al. 2020). Carbon is also stored in dead plant materials, including coarse woody debris and litter, and in harvested wood products (Forest Service 2015a). These different sources of carbon storage are known as carbon pools, while the amount of carbon stored in each pool is the carbon stock.

The amount of carbon that can be sequestered depends on many factors, including the type of vegetation community, parent materials, soils, and climate. Forested areas can store more carbon than non-forested areas, and meadows and healthy rangelands can store more carbon than arid shrubland and desert plant communities (Reeves et al. 2016). Soil carbon is a significant source of carbon storage, representing over 50 percent of the total carbon stored in forest systems in the U.S. (Forest Service 2020a).

Ecosystems are dynamic systems that store and release carbon, with carbon being released back to the atmosphere by respiration and decomposition processes or by disturbances such as land use changes, insect infestation, or fire. An area is called a carbon sink if it accumulates more carbon in plant biomass than the rate of releasing carbon dioxide; conversely, an area is a carbon source if it releases more carbon than the rate of carbon fixation into plant biomass (Forest Service 2015a). Forests store large amounts of carbon in their live and dead wood and soil and are an important carbon sink, removing more carbon from the atmosphere than they are emitting. Thus, forests play an active role in controlling the concentration of carbon dioxide in the atmosphere (Pan et al. 2011).

This section describes the existing conditions of carbon stocks on the Ashley National Forest, and analyzes the potential effects that the proposed forest plan and alternatives would have on carbon sequestration and storage potential.

Regulatory Framework

There are no regulatory requirements or established thresholds concerning management of forest carbon or greenhouse gas emissions; however, the 2012 Planning Rule and regulations require an assessment of baseline carbon stocks and a consideration of this information in management of the national forests (Forest Service Handbook 1909.12.4). The Forest Service recognizes the importance of managing forests and grasslands for their carbon storage potential to assist in regulating climate.

Analysis Areas

The importance of the carbon storage capacity of the world’s forests is tied to their role in the removal and storage of carbon from the atmosphere at a global scale. The influence and contribution of the Ashley National Forest to global carbon sequestration and storage is extremely small relative to the role the world’s forests play in lessening the effects of climate change; therefore, a meaningful analysis at the global scale is not practical.

Because the Forest Service has identified carbon sequestration as a key ecosystem service in regulating climate change, the affected environment provides information at a national, regional (Intermountain), and forest scale. The national and regional information provides context for carbon sequestration on the Ashley National Forest. The temporal scale for analyzing carbon sequestration and storage is the life of the proposed forest plan.

Description of Affected Environment

Forest Carbon Stocks and Trends

The forest carbon cycle starts with the sequestration and accumulation of atmospheric carbon, which is stored in different pools in the forest ecosystem: aboveground biomass (leaves, trunks, and limbs), belowground biomass (roots), deadwood, litter (fallen leaves and stems), and soils. As trees or parts of trees die, the carbon cycles through those different pools, from the living biomass pools to the deadwood, litter, and soil pools. The cycle continues as carbon flows out of the forest ecosystem and returns to the atmosphere through several processes, including respiration, combustion, and decomposition. Carbon also leaves the forest ecosystem through timber harvests, by which it enters the product pool. This carbon is stored in harvested wood products while the products are in use but eventually returns to the atmosphere upon the wood products' disposal and eventual decomposition (Hoover and Riddle 2020).

The amount of carbon sequestered in a forest relative to the amount of carbon that forest releases into the atmosphere is constantly changing, driven in large part by human and ecological disturbances. Human disturbances are activities such as timber harvests or human-caused fires, while ecological disturbances include insect and disease infestations, wildfires, and weather, such as drought. Disturbances generally result in tree death, causing the transfer of carbon from the living pools to the deadwood, litter, soil, and product pools or directly to the atmosphere, as in the case of fire. If a disturbed site regenerates as forest, the carbon releases caused by the disturbance generally are offset over time. If the site changes to a different land use (such as to agriculture or urban development), the carbon releases may not be offset (Hoover and Riddle 2020).

National Carbon Storage and Trends

The Ashley National Forest is about 1.4 million acres or 0.7 percent of the 190 million acres of National Forest System lands in the U.S. The National Forest System constitutes approximately one-fifth of the total forest land area and contains one-fourth of the total carbon stored in all U.S. forests, excluding interior Alaska (Forest Service 2015a). U.S. forests have been a strong net carbon sink since at least 1990, absorbing more carbon than they emit annually. In 2018, U.S. forests sequestered 211 million metric tons of carbon, offsetting approximately 12 percent of the gross annual greenhouse gases emitted in the U.S. that year (EPA 2020c).

The U.S. EPA measures total forest carbon (carbon stored in forests under public and private ownership) using data collected by the Forest Service's forest inventory and analysis program and reports the data in its annual inventory of greenhouse gas emissions and sinks. According to the most recent inventory, U.S. forest carbon stocks, including forest ecosystems and harvested wood products, contained 58.7 billion metric tons of carbon in 2019. Most carbon was stored in soils (54 percent) and aboveground biomass (26 percent). U.S. forest carbon stocks increased nearly 10 percent between 1990 and 2019, with every year experiencing a net increase (EPA 2020c; Forest Service 2020b).

The amount of carbon sequestration and storage is not uniform across the U.S. The inventory divides the country into four regions—North, South, Rocky Mountain, and Pacific Coast (which includes Alaska). The Rocky Mountain region, which includes the Forest Service's Intermountain Region, has lower carbon stocks than other regions of the U.S. (EPA 2020c).

Trends in sequestration and storage are described in the update to the Forest Service 2010 Resources Planning Act Assessment (Forest Service 2016b). At the national level, forest carbon stocks increased between 1990 and 2015, increasing at a rate of approximate 0.23 percent per year between 2010 and 2015. The rate of change reflected both the annual accumulation of new forested area and growth of existing forests, with the latter accounting for most of the increase.

The Rocky Mountain region was the only region where net sequestration of forestlands declined between 1990 and 2015, likely reflecting lower growth rates in aging forests (the dominant age class is over 100 years on both public and private lands) and disturbances, particularly wildfire, during that period. The Forest Service predicts increases in national carbon sequestration rates through 2025, followed by an overall decline in rates through 2060. The largest decline is predicted in the Rocky Mountain region, where timber harvesting and growth rates are the lowest and stand aging and disturbance govern forest change (Forest Service 2016b).

Regional Carbon Storage and Trends

The Intermountain Region is spread across six states and includes approximately 22.6 million acres classified as forest land. The Forest Service estimated the baseline of carbon stocks in forests and harvested wood products for each region. The report for the Intermountain Region (Forest Service 2015a) reported that total forest ecosystem carbon increased between 2005 and 2013, from 1,069 teragrams (Tg)[7] to 1,084 Tg (Forest Service 2015a). During this period, the Ashley National Forest generally increased in total forest ecosystem carbon, consistent with regional trends.

The amount of carbon stored in the understory, standing dead, down dead, forest floor, and soil organic carbon pools increased between 2005 and 2013, while carbon stored in aboveground and below ground pools decreased. Most of the carbon was concentrated in the aboveground, forest floor, and soil organic carbon pool (Forest Service 2015a). The Intermountain Region report indicates between 2005 and 2013, total forest ecosystem carbon in the region increased from 1,069 Tg (teragrams) to 1,084 Tg, but carbon density (carbon stocks per acre) decreased slightly (Forest Service 2015a).

Carbon stored in harvested wood products contributes to the total forest carbon stocks. In the Intermountain Region, harvested wood product carbon stocks represented roughly 0.82 percent of total forest carbon in 2012 (Forest Service 2015a). The cumulative carbon stored in harvested wood products in the region accelerated around 1955 and increased until 2000, peaking at 9.5 Tg in storage. Since 2000, carbon stocks have been in a slow decline and by 2013 the pool had fallen to approximately 9 Tg (Forest Service 2015a). The net sequestration rate of carbon in the Intermountain Region, including both the forest ecosystem and harvested wood products, was estimated at 1.91 Tg carbon/year for the baseline period, from 2005 to 2013 (Forest Service 2015a).

Birdsey et al. (2019) built off the baseline estimates of carbon stocks prepared for each Forest Service region, incorporating more detailed disturbance, climate, and atmospheric histories of each national forest and incorporating data from two additional forest carbon models. According to their report, forests in the Intermountain Region had a very low rate of increase in carbon stocks between 1990 and 2011.

The main factors affecting carbon stocks have been fire and insects, with harvesting and climate and atmospheric changes having a lesser effect. From 1990 through 2011, fires significantly affected carbon storage in the region, reducing non-soil carbon stocks by about 1.9 percent. Severe bark beetle outbreaks resulted in extensive tree death in parts of the region, contributing to a reduction in non-soil carbon stocks from insects of about 1.8 percent. Annual timber output declined in the early 1990s and has remained low.

A potential general trend for carbon stocks in the Intermountain Region is provided by the Rocky Mountain Research Station assessment. Climate, mainly increasing temperatures, has caused a decline of forest carbon since about 2000. In addition, about half of the forests are greater than 100 years old and undergoing declines in productivity and carbon accumulation. Increasing levels of carbon dioxide and nitrogen deposition have caused forests to accumulate more carbon and helped to counteract the declines from disturbances and stand aging. Accounting for all effects, however, the analysis indicates that the forests in the region may already be switching from a carbon sink to a carbon source (Birdsey et al. 2019).

[7] 1 Tg is equal to a million metric tons. The units used in this section reflect the units in which carbon is reported in the source documents.

Ashley National Forest Carbon Storage and Trends

The Ashley National Forest spans approximately 1.4 million acres of diverse geography in northeastern Utah and southwestern Wyoming. Approximately 1.02 million acres (over 70 percent) of the Ashley National Forest is forest land (Dugan et al. 2020). According to the baseline estimates of carbon stocks in the Intermountain Region (Forest Service 2015a), carbon stocks on the Ashley National Forest increased from 43.5 Tg in 1990 to 48.9 Tg in 2013, a 12 percent increase over this period. Despite some uncertainty in annual carbon stock estimates, there is a high degree of certainty that carbon stocks on the Ashley National Forest are relatively stable and not an obvious sink or source (Forest Service 2015a).

About 29 percent of forest carbon stocks were stored in the aboveground portion of live trees, which includes all live woody vegetation at least 1 inch in diameter. The forest floor and soil carbon stored in organic material to a depth of 3 feet (excluding roots) store a combined 51 percent of total carbon stocks (Dugan et al. 2020). While there is uncertainty in some of these values, notably a potential underestimation of carbon in soils, this breakdown provides an overall picture of how carbon is stored on the forested lands.

In the most recent carbon assessment for the Ashley National Forest, Dugan et al. (2020) synthesize carbon storage and disturbance trends. As described in the summary for their report, forest carbon stocks increased between 1990 and 2013, and negative impacts on carbon stocks caused by disturbances and environmental conditions have been exceeded by forest growth. According to satellite imagery, insects have been the most prevalent disturbance detected on the forest since 1990. Insect epidemics from 1990 to 2011 have been severe, affecting 19.9 percent of the forest and resulting in 5.0 megagrams[8] per hectare[9] of non-soil carbon loss (Dugan et al. 2020).

Past use of the forest for commercial timber, along with fire suppression policies and human-caused wildfires, have altered forest stands on the Ashley National Forest. Stands are now mostly middle to older aged, with 73.5 percent of stands greater than 80 years old (based on 2011 data; Dugan et al. 2020). The rate of carbon uptake and sequestration generally declines as forests age. Accordingly, projections indicate a potential age-related decline in forest carbon stocks on the Ashley National Forest beginning in the 2020s; this potential decline mirrors expected trends in private and public forests in the Intermountain, Rocky Mountain, Northern, and Southwest Forest Service Regions (Dugan et al. 2020).

Stand age distribution on the Ashley National Forest has been altered by insect infestations. Since 2011, spruce beetle infestations have resulted in a 3 to 8 percent shift from older to younger tree age classes, and more stands are expected to shift as the spruce beetle epidemic continues.[10]

Climate and environmental factors, including elevated atmospheric carbon dioxide and nitrogen deposition, have also influenced carbon accumulation on the Ashley National Forest. The effects of future climate conditions are complex and remain uncertain. Climate change has resulted in warmer temperatures and precipitation variability in the Intermountain Region, and these trends will continue to stress forests with potentially negative effects on carbon stocks.

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[8] 1 megagram is equal to one metric ton. The units used in this section reflect the units in which carbon is reported in the source documents.
[9] 1 hectare equals about 2.5 acres.
[10] Colette Webb, Ashley National Forest, personal communication via email with Amy Cordle, EMPSi, on May 13, 2020, regarding stand age distribution changes due to spruce beetle infestation.

Although some forest stands may expand from a prolonged growing season, greater precipitation, and elevated atmospheric carbon dioxide concentrations, in general the stressors of drought, pathogens and insects, and increased wildfires would result in net detrimental effects across the forest and woodland communities. In addition, the increased atmospheric carbon dioxide and nitrogen deposition on forest stands does not appear to offset the loss of carbon due to climate and the disturbance and aging of forest stands. Because public lands do not have the same pressures of land use conversion that occur on private lands, forested areas on the Ashley National Forest will be maintained as forest in the foreseeable future. This will allow for a continuation of carbon uptake and storage over the long term (Dugan et al. 2020).

Non-Forest Carbon Stocks and Trends

In addition to the baseline estimates of carbon stocks in forests and harvested wood products described above, the Forest Service performed baseline estimates of carbon stocks in non-forest soils and vegetation for each Forest Service region. Carbon stocks in non-forest ecosystem soils develop mainly from organic materials in the soil and from decomposition. About 58 percent of soil organic matter is soil organic carbon. Soils vary in how much carbon they can store and at what depths their carbon is stored. Variables depend on the soil parent material, soil physical and chemical properties, the climate, microorganisms in the soil, and the type of vegetation (Reeves et al. 2016).

Soils can store and release carbon at the same time and act as a net sink or source of carbon. The carbon stocks in soils are influenced strongly by climate and vegetation. Soils have the potential to sequester additional carbon if temperatures decrease and moisture increases. Conversely, soils may lose carbon stocks if temperatures warm without additional moisture or under drought conditions. Most soils in the Intermountain Region currently hold their maximum soil organic carbon for the existing climate. Generally, soils in hotter, drier areas contain a near-surface soil organic carbon content (by mass) of 0.5 percent and in cooler, moister areas they contain a near-surface soil organic carbon of 8 percent (Reeves et al. 2016). Shifts in non-forested vegetation communities may affect the amount and depth where most soil carbon is stored. Rangelands degraded by overgrazing or taken over by invasive annuals, like cheatgrass, slowly lose soil carbon, as well as their carbon stock stored in vegetation. Where degraded land areas are improved, more soil carbon may be stored (Reeves et al. 2016).

Aboveground carbon stored in shrubs has been measured for all of the non-forested lands in the Intermountain Region, using vegetation structure, composition, height, and type data. Carbon density of shrubs is highly varied in the region, with the average across three heights ranging from 1.19 to 12.45 megagrams per hectare. The differences in shrub carbon stocks is expected to be related to the diversity of shrub heights and species in the region (Reeves et al. 2016). Standing carbon density of shrubs on the Ashley National Forest ranges from 3.60 to 4.80 megagrams per hectare. Based on a modeled area of 125,121 hectares (309,180 acres), the standing carbon in non-forested vegetation on the Ashley National Forest is between 0.45 and 0.6 Tg (Reeves et al. 2016).

Environmental Consequences for Carbon Storage and Sequestration

Methodology and Analysis Process

The spatial scale of analysis for assessing potential impacts on carbon storage and sequestration corresponds to the forested areas of the Ashley National Forest. A qualitative approach was used to analyze the short-term and long-term impacts of forest management actions on carbon storage and sequestration. This analysis draws on the quantitative analysis of the impacts of past management on forest carbon stocks, as described in the affected environment, and potential future changes in forest management. The analysis compares the estimated acres that would be treated annually for fuels and vegetation management and the acres available for timber harvest and production to assess potential short-term changes in carbon stocks resulting from proposed management actions by alternative.

The analysis also evaluates the effects of forest management on carbon storage and sequestration over the long term. Cumulative effects consider potential changes in future carbon stocks from past and proposed management actions, together with reasonably foreseeable actions that would affect forested areas on the Ashley National Forest. Because both forest management actions and natural and human disturbances affect net carbon stores, this analysis also considers natural and human-caused influences on carbon storage and sequestration based on past and projected trends. Analysis assumptions and uncertainties are described below.

Analysis Assumptions

Analysis assumptions for carbon storage and sequestration are provided below.

- In a global atmospheric context, management levels described by the plan alternatives would have a negligible impact on national and global carbon emissions and carbon stocks.
- Carbon storage in soil and non-forest vegetation is an important component of carbon stores; nevertheless, the analysis focuses on forest vegetation, due to the greater potential for change in carbon storage of forested areas from proposed management actions and because over 70 percent of the Ashley National Forest is forest land (Dugan et al. 2020).
- Carbon stocks on national forests are cyclical; carbon losses are from timber harvest and production, forest treatments, and infestations and wildland fire; carbon gains are from regeneration and growth.
- It is difficult to quantify potential carbon consequences of management alternatives in the future due to potential variability in future conditions and the unknown nature and extent of future natural disturbances, such as insect infestations, wildfires, and drought, and human-caused disturbances, such as fires. As such, small differences in carbon impacts among management alternatives, coupled with high uncertainty in carbon stock estimates, make the detection of statistically meaningful differences among alternatives unlikely.

Indicators

Analysis indicators for carbon sequestration and storage are as follows:

- Acres of annual forested vegetation management treatments
- Acres available for fuels management treatments
- Forested acres available for timber harvest and production
- Outcome of treatments and timber harvest and production on carbon storage and sequestration over the long term
- Outcome of other natural and human-caused influences on carbon storage and sequestration over the long term

Environmental Consequences for Carbon Sequestration and Storage—Alternative A

The existing forest plan contains limited direction for vegetation management to improve ecological sustainability and no plan component related to carbon storage or sequestration. There are no quantitative prescriptions for vegetation treatments, though these treatments would continue to occur. Timber production and harvest would be managed consistent with current guidelines and regulations; 528,000 acres are considered suitable for timber production under the existing plan, though due to policy changes and other considerations, the area managed for timber production is significantly less (see “Timber”).

Removal of forest vegetation for vegetation and fuels management and timber harvest and production would reduce carbon stocks in the short term; carbon would continue to be stored in timber that is harvested for use as wood products.

While the existing plan does not explicitly direct the movement of forest vegetation communities toward desired conditions, individual vegetation and fuels management actions and timber harvest would continue, improving stand health and resiliency in limited areas; however, without forest-wide direction specific to vegetation type, forest vegetation would likely continue to trend toward higher departure across all forest cover types (see “Terrestrial Vegetation”). Trends in disturbance-related conditions, primarily related to insect infestation, would continue to affect forest ecosystems, making them more susceptible to fire and release of stored carbon through decay or combustion over the long term.

Environmental Consequences for Carbon Sequestration and Storage Common to All Action Alternatives

All of the alternatives would manage forest vegetation to improve ecological sustainability and move forest vegetation communities toward desired conditions. While the approaches may differ, as represented by the differing objectives for forest, fire and fuels, and timber management under each alternative, all alternatives would seek to move forest vegetation toward conditions that represent a more natural disturbance regime. This would result in more resilient forest ecosystems. Increasing forest resistance and resilience to insect infestations, fire, drought, and disease slows the release of carbon and retains larger portions in forest carbon pools; carbon typically accumulates in forests and forest soils for decades to centuries until a disturbance releases this stored carbon into the atmosphere (Goward et al. 2008).

The revised plan alternatives all recognize the role of carbon storage and sequestration, establishing a desired condition to maintain carbon stocks by promoting forest stand health and the regeneration of forest stands and by retaining the net acreage of forested communities. As described by the proposed plan, terrestrial ecosystems contain nearly three times the amount of carbon as the atmosphere and remove more carbon from the atmosphere than they emit; this helps regulate climate by modulating greenhouse gas concentrations in the atmosphere (Deal et al. 2017; EPA 2018). The revised plan alternatives provide more clarity and stronger integration of ecological concepts, such as managing forests to enhance ecosystem services, including climate regulation, than the existing plan. This stronger emphasis would promote management actions that indirectly maintain or improve carbon stocks over the long term to a greater extent than under the existing plan.

Under all of the revised plan alternatives, vegetation and fuels management treatments would reduce carbon stocks in the short term by removing forest vegetation. Examples of treatments for different forest cover types are as follows: uneven-aged harvest, even-aged regeneration, thinning, sanitation or salvage, and pre-commercial thinning. All of these treatments would remove biomass mechanically; prescribed fire and managing naturally ignited fires to meet forest objectives would remove biomass through combustion. Products that are not burned immediately would continue to provide carbon storage off-forest for the life of their use, while biomass that is combusted would release its carbon directly to the atmosphere.

The short-term reduction in carbon from these forest management actions would be small, relative to the overall carbon stocks on the forest and in relation to carbon losses that could occur from natural disturbances, such as wildfires or insects and pathogens.

Vegetation and fuels management actions would increase carbon stocks over the long term by the following means:

- Increasing the uptake of carbon dioxide through regeneration and new growth and storage in forest vegetation
- Improving stand health, which decreases carbon loss from mortality and decomposition, as result of insects and pathogens and the stress of climate change
- Reducing wildfire risk, which reduces acres burned from wildfire

As shown in literature, thinning reduces carbon in the short term, but there may be no discernible difference in thinned versus unthinned stands in total aboveground carbon stores several decades after thinning. This is due to the larger trees and to differences in understory and woody material (Schaedel et al. 2017). Managing for younger stands promotes relatively high rates of carbon uptake over time as forests regrow, compared with older stands (Pregitzer and Euskirchen 2004).

Decreasing forest densities and fuel conditions to reduce the risk of large, stand-replacing disturbances from insects, disease, and fires can lower the risk for greater carbon stock losses and emissions in the future (Wiedinmyer and Hurteau 2010). A lower severity of wildfire may occur in the treated stands, resulting in less consumption of live and dead tree biomass, higher tree survival, and shortened recovery times (Hurteau et al. 2008; North and Hurteau 2011; Reinhardt and Holsinger 2010; Wiedinmyer and Hurteau 2010). Research demonstrates that treatments in vegetation types that historically supported frequent surface fires increase the likelihood of maintaining a net carbon sink into the future (Finkral and Evans 2008; Hurteau et al. 2016; Hurteau 2017).

Environmental Consequences for Carbon Sequestration and Storage—Alternative B

Under alternative B, 1,500 acres would receive forest vegetation management treatments annually over the first decade and 1,200 annually in the second decade in areas suitable for timber harvest. Timber harvest and thinning would reduce carbon stocks in the short term, while plantings would contribute to increases in carbon stocks. As described under “Environmental Consequences for Carbon Sequestration and Storage Common to All Action Alternatives,” forest vegetation management treatments would increase carbon stocks through growth and regeneration, improved stand health, and reduced wildfire risk in treated areas.

The Forest Service would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on 6,600 to 32,000 acres per year during the life of the plan. This includes managing naturally ignited fires on at least 10 percent of the ignitions every 10 years. Approximately one-quarter to one-half of the treated acres would likely be through the use of prescribed fire or wildland fire. Wildland fire, including prescribed fire, would reduce carbon stock in the short term through combustion, but it would increase carbon stocks over the long term. This would come from stand regeneration and growth of new trees and a reduction in fire severity and the number of acres burned in treated areas.

Timber harvest and production would be another source of forest carbon loss: 109,800 acres would be suitable for timber production; 3,806 to 3,833 hundred cubic feet (CCF) of timber would meet product utilization standards; and 3,806 to 3,833 CCF of wood product (fuelwood, biomass, and other volumes) would be offered for sale annually.

Harvested wood products that are not combusted would continue to provide carbon storage off-forest for the life of their use. While timber harvest and production would reduce carbon stocks in the short term, these actions would contribute to a carbon gain over the long term from regeneration and improved stand health. Fewer areas would be suitable for timber production than under alternative A.

The combination of vegetation and fuels management would move forest vegetation cover types toward conditions that represent a more natural disturbance regime, increasing forest resistance and resilience to stressors over the long term. Compared with alternative A, forest management under alternative B would slow the release of carbon and maintain or increase carbon stocks over the long term.

Environmental Consequences for Carbon Sequestration and Storage—Alternative C

Under alternative C, short-term carbon losses would be slightly less than described under alternative B. Forest vegetation management treatments would treat 1,000 acres annually in the first decade and 1,200 acres annually in the second decade in areas suitable for timber harvest. While less carbon would be removed in the short term, long-term improvements in carbon stocks would be less than described under alternative B; this is because fewer areas would be treated.

The Forest Service would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on the same number of acres per year as under alternative B; however, with a focus on passive vegetation management, it would manage naturally ignited fires more often (at least 20 percent of the ignitions every 10 years). Approximately one-quarter to one-half of the treated acres would likely be through the use of prescribed fire or wildland fire. Short- and long-term effects would be similar to those described under alternative B.

Carbon loss from timber harvest and production would be less than under alternative B, with half the acres (80,500 acres) suitable for timber production and a third less timber and wood products available for sale (2,822 to 2,842 CCF for each category). Short-term and long-term effects would be less than those described for alternative B. Fewer areas would be suitable for timber production than under alternative A.

The combination of vegetation and fuels management actions would move forest vegetation cover types toward desired conditions in treated areas more than under alternative A; however, with an emphasis on passive vegetation management, alternative C may be less effective in trending vegetation types toward the natural range of variation and improving ecosystem resilience at large scales, compared with alternative B. This would make alternative C less likely than alternative B to achieve the long-term benefits of vegetation and fuels management on carbon storage and sequestration described under Environmental Consequences for "Carbon Sequestration and Storage Common to All Action Alternatives."

Environmental Consequences for Carbon Sequestration and Storage—Alternative D

Under alternative D, short-term carbon losses would be similar to those under alternative B. Forest vegetation management would treat 1,600 acres annually in the first decade and 1,300 acres annually in the second decade in areas suitable for timber harvest; prescribed burning would be used on a similar 884 acres annually. Long-term improvements in carbon storage and sequestration would be similar to those under alternative B.

The Forest Service would use wildland fire and other vegetation treatments to improve or maintain desired vegetation conditions on 10,000 to 40,000 acres per year; it would manage naturally ignited fires on at least 5 percent of the ignitions every 10 years. Approximately one-quarter to one-half of the treated acres would likely be through the use of prescribed fire or wildland fire. Short-term loss of carbon would be greater than described for alternative B because potentially more areas would be treated. Over the long term, alternative D would reduce the extent and severity of wildland fires in treated vegetation communities more than under alternative B because more areas would be treated. This would reduce carbon loss from fire over the long term more than under alternative B.

Carbon loss from timber production would be similar to that under alternative B, with slightly more acres suitable for timber production (109,800 acres) and just slightly more timber and wood product available for sale (3,956 to 3,983 CCF for each category). Short- and long-term effects would be similar to those described under alternative B.

Overall long-term impacts from the combination of vegetation and fuels management actions would be similar to alternative B.

Cumulative Environmental Consequences for Carbon Sequestration and Storage

Past and present management actions and natural events have affected carbon storage and sequestration in the analysis area by altering the condition of vegetation and natural fire regimes. The main factors affecting carbon stocks have been insects and fire (Forest Service 2015a; Dugan et al. 2020) and aging conditions that have reduced productivity and carbon accumulation (Dugan et al. 2020). Increasing levels of carbon dioxide and nitrogen deposition have helped to counteract declines from disturbances and aging (Birdsey et al. 2019).

Carbon stocks on the Ashley National Forest increased by about 12 percent between 1990 and 2013, with forest growth exceeding the negative effects from disturbances and environmental conditions (Dugan et al. 2020). Projected trends indicate that forests in the region have the potential to shift from being a carbon sink to a carbon source (Birdsey et al. 2019). While some forest stands may expand from a prolonged growing season, greater precipitation, and elevated atmospheric carbon dioxide concentrations, in general the stressors of drought, pathogens and insects, and increased wildfires would result in net detrimental effects across the forest and woodland communities (Dugan et al. 2020).

The cumulative effect of the forest plan alternatives and reasonably foreseeable future actions would be a gradual improvement of forest conditions over the life of the plan, helping to counteract the projected trends in stressors that affect carbon storage. Examples of these actions in the near term are the Ashley National Forest Aspen Restoration Project, Little Pond Forest Restoration Project, West Northwest D1 Wildlife Habitat Improvement Project, and the Forest-wide Hazard Tree Removal Project, all of which would improve stand conditions or reduce the potential for wildfire. Similar projects would occur over the life of the plan under all alternatives.

Sustainable management practices and the promotion of healthy, resilient forest ecosystems would increase the ability of the forest to provide long-term carbon storage and sequestering. In addition, forest lands would not be converted to other land uses, and long-term forest services and benefits would be maintained.

The increased risk of uncharacteristic fires, insects, and diseases from warming climatic conditions would continue to be an area of vulnerability to forest resilience and associated carbon sequestration and storage capacity. The net effects have a high degree of uncertainty because of the uncertain magnitude of future climate change and the complex interactions of forests with disturbances, climate, and ecological processes.

Terrestrial and Aquatic Wildlife and Plants

Introduction

Wildlife and plants are highly valued by the public for both consumptive and nonconsumptive use. Many species have healthy populations on the Ashley National Forest and are good indicators of the health and diversity of current habitat conditions. With an ever-increasing human population leading to more national forest users, the demand for wildlife opportunities continues to grow. This growth comes with the potential for habitat disturbance, as well as potential impacts on wildlife. As such, there is an opportunity for management to be aware of these potential disturbances and to manage them to minimize negative impacts on this popular resource on the Ashley National Forest.

Regulatory Framework

Species and habitats are managed in conjunction with other resources according to the Multiple-Use Sustained-Yield Act of 1960 (Public Law 86-517). For federally endangered and threatened species on the Ashley National Forest, habitat management and compatible multiple uses are determined in accordance with section 7 of the Endangered Species Act (ESA), as amended (Public Law 93-205). For SCC, habitat management and compatible multiple uses will be accomplished to ensure that those species persist on the Ashley National Forest, in accordance with the 2012 Planning Rule.

Under the current forest plan, rare wildlife, aquatic, and plant species are managed as sensitive species. The regional forester identifies these as plant and animal species for which population persistence is a concern. The Forest Service sensitive species concept is not carried forward as part of the 2012 Planning Rule. In accordance with the 2012 Planning Rule, the regional forester has identified a list of SCC for the plan area. SCC are those native to, and known to occur in, the plan area and for which there is substantial concern about the species' ability to persist in the plan area. Maintaining these species that are vulnerable to decline on the Ashley National Forest will maintain forest diversity and thus would comply with the National Forest Management Act diversity requirement.

During the evaluation of species that the forest supervisor would recommend to the regional forester as SCC, the Forest Service considered species on the Intermountain Region regional forester's sensitive species lists for the Ashley National Forest. Some sensitive species were carried forward as SCC, but others did not meet the criteria during evaluation. Appendix C provides a list of those species that were recommended as SCC for the Ashley National Forest, as well as the current habitat conditions, trends, and risk factors for those species.

Plant and animal species depend highly on the function of ecosystems with specific conditions, which create areas favorable for particular species. Important drivers of biodiversity loss and ecosystem service changes are habitat changes, long-term trends in climate, invasive species, and overexploitation. The revised forest plan addresses species' persistence by providing guidance to maintain or enhance habitat elements that are important for species found on the Ashley National Forest. The revised plan also addresses threats specific to habitat and provides guidance for species-specific threats. Guidance includes adopting a complementary ecosystem or coarse-filter and species-specific or fine-filter approach to maintaining species diversity. The coarse-filter approach aims to maintain or restore ecological conditions and functions similar to those under which native species evolved to prevent losses of biological diversity and maintain habitats for most species in an area. The fine-filter approach recognizes that for some species, ecological conditions or additional specific habitat features (key ecosystem characteristics) may be required, the reference condition is not achievable, or there are risks to species' persistence not related to habitat; these factors may not be addressed by the coarse-filter approach.

Analysis Area

The analysis area is the Ashley National Forest, which lies within the Duchesne and Upper Green River 4th-order hydrologic units. The Forest Service also considered species distributions in areas adjacent to the Ashley National Forest, as well as regional and global distributions of species. The Forest Service related species distribution to Ashley National Forest vegetation types to better understand and define the relationship between species and their habitat needs.

Description of Affected Environment

Habitat Descriptions

Habitats for wildlife and plants can first be described at the landscape or landtype association scale; there are 24 distinct landtype associations on the Ashley National Forest (table 3-30). On a broader level, habitat can be described by vegetation types. The Forest Service evaluated these using landtype associations to describe ecosystem characteristics that span various landscapes on the Ashley National Forest (table 3-30). The Ashley National Forest is composed of the vegetation types described under "Terrestrial Vegetation" (figure 3-9).

Table 3-30. Landtype Associations on the Ashley National Forest

Landtype Association	Acres
Alpine Moraine	259,100
Antelope Flats	7,400
Anthro Plateau	108,600
Avintaquin Canyon	82,400
Dry Moraine	9,600
Glacial Bottom	14,000
Glacial Canyons	71,800
Green River	62,400
Greendale Plateau	52,400
Limestone Hills	18,500
Limestone Plateau	7,400
Moenkopi Hills	2,100
North Flank	50,200
Parks Plateau	95,800
Red Canyon	28,500
Round Park	10,500
South Face	46,300
Strawberry Highlands	12,400
Stream Canyon	43,400
Stream Pediment	8,100
Structural Grain	21,500
Trout Slope	142,000
Uinta Bollie	174,600
Wolf Plateau	5,900
Total	**1,335,100**

Source: Forest Service GIS 2020
Note: The total differs from the sum of landtype associations due to rounding.

Vegetation is one of the primary factors that influences species diversity and abundance; it is one of the more obvious habitat components influenced by management, land use, and natural disturbance. Species' presence and absence on the Ashley National Forest is, in many cases, directly tied to availability, current ecological condition, and key ecosystem characteristics of vegetation types. Therefore, associating particular vegetation types with species or species groups is critical for assessing future management needs. The acres of major vegetation types and the associated general wildlife groups on the Ashley National Forest are shown in table 3-31, below.

Table 3-31. Vegetation Types on the Ashley National Forest

Vegetation Type	Acres	Percentage of Plan Area	Associated Wildlife Groups
Alpine	168,700	12	Ptarmigans, pikas, elk, moose, deer, mountain goats, and bighorn sheep
Coniferous Forest	621,600	45	Large mammals, small mammals, old-growth dependent , large-tree dependent, cavity nesting birds, and migratory birds
Deciduous Forest	35,300	3	Cavity nesting birds, songbirds, raptors, game birds, big game, predators, beavers, and small mammals, such as mice and voles
Desert Shrub	59,900	4	Large mammals (including game ungulates), small mammals, shrubland-associated birds, and migratory birds
Forb	100	0	Large mammals (including game ungulates), small mammals, shrubland- and grassland-associated birds, and migratory birds
Grassland	14,600	1	Large mammals (including game ungulates), small mammals, shrubland- and grassland-associated birds, and migratory birds
Mountain Brush	43,000	3	Large mammals (including game ungulates), small mammals, shrubland-associated birds, and migratory birds
Riparian	33,300	2	Migratory birds, small mammals, and big game
Seral Deciduous Forest	116,300	8	Cavity nesting birds, songbirds, raptors, game birds, big game, predators, beavers, and small mammals, such as mice and voles
Shrubland	119,100	9	Large mammals (including game ungulates), small mammals, shrubland-associated birds, and migratory birds
Water	44,700	3	Waterfowl, fish (including native trout and non-game fish), aquatic invertebrates, aquatic reptiles, and amphibians
Woodland (Pinyon-Juniper)	120,300	9	Large mammals, small mammals, cavity nesting birds, and migratory birds
Total	1,376,700	100	**N/A**

Source: Forest Service GIS 2020

Habitat Conditions by Ranger District

Flaming Gorge-Vernal Ranger District: Habitat conditions in the Flaming Gorge-Vernal Ranger District can be characterized as generally in good to excellent condition (Forest Service 2017a). Unique to this geographical area, which is located on the north slope of the Uinta Mountains, is the largest ponderosa pine forested area on the Ashley National Forest. This area has been extensively managed over the years and supports a wide array of wildlife species. Similar to other areas on the Ashley National Forest, lodgepole pine is a very common forest vegetation type on both the north and south slopes of the Uinta Mountains. Like the ponderosa pine forest area, lodgepole pine also supports a wide array of wildlife species. Mountain brush communities, such as mountain mahogany, are also found in this area. These communities provide an excellent habitat for many large and small terrestrial wildlife species (Forest Service 2017a).

Duchesne-Roosevelt Ranger District: Overall, habitat conditions in the Duchesne-Roosevelt Ranger District are good to excellent (Forest Service 2017a). Ponderosa and lodgepole pine are common, as well as mixed conifer (Douglass-fir and spruce). These conifer areas provide excellent habitat for various life stages of many wildlife species in the district. The south unit of the Ashley National Forest, an area south of U.S. 40, supports a large pinyon and juniper area, mixed with sagebrush; it supports the majority of sage-grouse in the district (Forest Service 2017a).

Terrestrial Species

Terrestrial plant and animal species are those commonly found species that spend all or most of their time on dry land. These are typically mammals, such as deer and rabbits; birds, such as eagles and jays; reptiles, such as snakes and lizards; and macroinvertebrates, such as beetles and snails. Also included are land-based plants, such as trees and grasses. These animals and plants are native to the forest and are not considered invasive.

Terrestrial wildlife species rely on a variety of habitat features, such as vegetation for food, shelter, nesting, and bedding. General terrestrial species groups and vegetation types that they are associated with are summarized in table 3-31, above. Details on the characteristics and conditions of terrestrial habitat types are provided in the “Terrestrial Vegetation” section. Several species or species groups are given special consideration in this analysis due to public interest, additional stipulations for habitat management habitat, and/or sensitivity; they are described in greater detail below. Of those terrestrial species described below, Rocky Mountain bighorn sheep and greater sage-grouse were recommended as SCC, and the Canada lynx is listed as a federally threatened species. Since federally listed species and SCC together make up the at-risk species on the Ashley National Forest, Rocky Mountain bighorn sheep, greater sage-grouse, and Canada lynx are also at-risk species.

Big Game

Big game species, such as mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), moose (*Alces alces*), and elk (Cervus canadensis) are present throughout the Ashley National Forest; in particular, they rely on sagebrush and grassland communities for quality habitat and forage (Forest Service 2017a). Big game species are known to browse sagebrush and associated shrubs on the herbaceous understory. Some wild ungulates, such as mule deer, prefer mountain big sagebrush communities during the snow-free months of the year; Wyoming big and black sagebrush communities not covered by snow during winter months become important winter habitat for such species. Grasses and forbs are important summer forage, and they are browsed by elk year-round (Collins and Urness 1983). The browsing intensity of these shrubs is subject to shrub preference, winter conditions, availability of other forage, and ungulate population densities.

Elk numbers have increased significantly over the last 30 years. An upward trend in the elk population is predicted for the next plan period (Forest Service 2017a), but ultimately trends for all big game species will depend on big game management by the Utah Division of Wildlife Resources (UDWR). Although populations fluctuate, mule deer and pronghorn antelope numbers have remained relatively constant over the last couple of decades; their populations are expected to follow a similar trend during the next plan period (Forest Service 2017a). Moose numbers, however, on the Ashley National Forest and on a regional scale are trending downward; studies are ongoing to determine the cause (Forest Service 2017a).

Rocky Mountain Bighorn Sheep

Rocky mountain bighorn sheep (*Ovis canadensis canadensis*) are native to the Ashley National Forest, but they were extirpated from the area in the early 1900s. Bighorn sheep were reintroduced on the Ashley National Forest in 1983. Several introductions and augmentations on the Ashley National Forest have occurred since then (Forest Service 2017a). Through the years since reintroduction, bighorn sheep have expanded their range on the Ashley National Forest; all current bighorn sheep populations on the Ashley National Forest are the result of these introductions and augmentations. Bighorn sheep prefer open habitat types (high alpine to lower grasslands) with adjacent steep, rocky areas for escape and safety (UDWR 2018). Bighorn sheep's habitat is characterized by rugged terrain, including canyons, gulches, talus cliffs, steep slopes, mountaintops, and river benches (UDWR 2018).

The current bighorn sheep population on the Ashley National Forest consists of five interconnected herds in the Uinta Mountains, which is primarily the northeast portion of the plan area, and the Avintaquin herd, which is located on the South Unit portion of the plan area (see figure 3-16). The Avintaquin herd estimate is approximately 20 animals; the combined herd estimate for the five interconnected herds of the Uinta Mountains is 147 individuals (Forest Service 2020c). These herds have fluctuated over time and are on a downward trend due primarily to disease. More information on bighorn sheep habitat needs are described in appendix C, table 3-37 and table 3-39. The acres of bighorn sheep habitat on the Ashley National Forest are summarized in table 3-32.

Table 3-32. Rocky Mountain Bighorn Sheep Habitat on the Ashley National Forest

Habitat Type	Area (Acres)
Core Herd Home Range	**307,000**
Avintaquin - Summer	67,000
Uintas - Summer	122,200
Uintas – winter	117,700
General	**442,700**
General - Spring/Fall	18,400
General - Year-long	424,300

Source: Utah Division of Wildlife Resources GIS 2020

Greater Sage-Grouse

Greater sage-grouse (*Centrocercus urophasianus*) is a sagebrush-obligate species and requires sagebrush to breed, nest, raise broods, and winter. Greater sage-grouse uses the major sagebrush communities within the plan area at high and low elevations. Quality greater sage-grouse habitat is defined in terms of plant composition, species richness, shrub and herbaceous cover, and sagebrush seed production. Although there are many locations of greater sage-grouse on the Ashley National Forest, greater sage-grouse occurs at relatively low numbers on the Ashley National Forest when compared with other areas of its range (Forest Service 2017a). Sage-grouse habitats on the Ashley National Forest only support about 10 percent of the sage-grouse population in the Uinta Basin. Sage-grouse are found on Anthro Mountain in the Duchesne-Roosevelt Ranger District, as well as in scattered areas of the Flaming Gorge-Vernal Ranger District (Forest Service 2017a).

Although populations are highly cyclical, the trend appears to be stable for those populations on the plan area (Forest Service 2017a, 2020d). Management concerns related to this species include habitat impacts from invasive plant species, climate change, oil and gas development, predation, and livestock grazing (Forest Service 2017a). The 2015 Greater Sage-Grouse Forest Plan Amendment is intended to decrease these threats and improve habitats through a landscape-level conservation approach involving targeted restoration and habitat improvements (Forest Service 2015b). The 2015 Greater Sage-Grouse Amendment is currently under revision, and conservation measures from the final revision will be considered and adopted in the Ashley National Forest plan, as appropriate.

Sage-grouse management areas represent the highest-priority areas for sage-grouse conservation in Utah and Wyoming (State of Utah 2019). Sage-grouse habitat on the Ashley National Forest is classified as either "priority" or "general." All of the Wyoming portion of the FGNRA (excluding the reservoir itself) is either priority sage-grouse habitat or general sage-grouse habitat. Priority habitat represents areas that have been identified as having the highest conservation value to maintaining sustainable greater sage-grouse populations. General habitat is greater sage-grouse occupied range outside of priority habitat. The acres of greater sage-grouse habitat types on the Ashley National Forest are summarized in table 3-33 and figure 3-14.

More information on greater sage-grouse habitat needs is described in appendix C, table 3-37 and table 3-39.

Table 3-33. Greater Sage-Grouse Range and Habitat on the Ashley National Forest

Habitat Type	Area (Acres)
Utah general	8,800
Utah priority	120,600
Wyoming general	31,000
Wyoming priority	23,600

Source: Forest Service GIS 2020

Canada Lynx

Canada lynx (*Lynx canadensis*), a federally threatened species, inhabits forested areas, particularly areas of dense understory cover and/or thickets of young trees and mature forests with large amounts of coarse, woody debris. Although the Ashley National Forest contains lynx habitat, the 2007 Northern Rockies Lynx Management Direction Record of Decision classified the Ashley National Forest as unoccupied by lynx (Forest Service 2007). Between February 1999 and March 2007, 22 lynx from an experimental release in Colorado were located at least once in Utah, with the primary area of use in the Uinta Mountains. The majority of use was on the Uinta-Wasatch-Cache National Forest and to a somewhat lesser degree on the Ashley National Forest. These lynx were transient and did not take up residency in the Uinta Mountains (Forest Service 2017a).

In the 2013 Lynx Conservation Assessment Strategy, the Interagency Lynx Biology Team identified the Ashley National Forest as a peripheral area for Canada lynx that is incapable of supporting self-sustaining populations of lynx (Interagency Lynx Biology Team 2013). Peripheral habitat is intended to provide a mosaic of forest structure within the landscape to support snowshoe hare prey resources for individual lynx that could infrequently move through or reside temporarily in the area (Interagency Lynx Biology Team 2013).

Core or primary areas are those where there was strong evidence of long-term persistence of lynx populations, including both historical records of lynx occurrence over time and recent (within the past 20 years) evidence of presence and reproduction. Secondary areas are those where there were historical records of lynx presence—but fewer than in core areas—and no recent documentation of presence or reproduction, or where there were historical records of lynx, but the current status is unknown due to a lack of recent surveys (Interagency Lynx Biology Team 2013). However, the Ashley National Forest contains only peripheral habitat for lynx, as discussed above.

The acres of lynx habitat on the Ashley National Forest are summarized in table 3-34, below. More information on lynx habitat needs is described in tables C-1 and C-3 in appendix C and in appendix D.

Table 3-34. Lynx Habitat on the Ashley National Forest

Habitat Type	Area (Acres)
Peripheral habitat	613,200

Source: Forest Service GIS 2020

Aquatic Species

Aquatic plant and animal species are those commonly found species that spend all or most of their lives in water features in forest streams, springs, and pools. These species are usually represented by fish, such as trout and chubs; amphibians, such as frogs and salamanders; and macroinvertebrates, such as aquatic insects and clams. Aquatic plants, such as hydrillas and lilies, are also included.

Habitat for aquatic species generally consists of streams, lakes, wetlands, springs, and riparian corridors, which are associated with the riparian and water vegetation types on the Ashley National Forest (table 3-35).

One measure of riparian habitat quality is the biotic condition index. The biotic condition index is an index of stream habitat quality that incorporates stream habitat (gradient and substrate composition), water quality (alkalinity and sulfate), and environmental tolerances of aquatic macroinvertebrate species (Platts et al. 1983). It reflects species' diversity and abundance, which correlates to water quality. Values range from 2 to slightly greater than 100, with the larger values indicating greater tolerance (Platts et al. 1983). Most streams on the Ashley National Forest have average biotic condition index (from 2010 to 2020) values of 75 or greater (Abeyta 2020). Further details on the characteristics and condition of aquatic habitat types, including the watershed condition, are provided in the "Watersheds, Aquatic, and Riparian Ecosystems" section.

Table 3-35. Aquatic Habitats on the Ashley National Forest

Aquatic Habitat Type	Total
Perennial streams (miles)	1,100
Intermittent streams (miles)	2,100
Lakes and reservoirs (acres)	55,400
Swamps and marshes (acres)	4,400
Seeps and springs (count)	474
Riparian vegetation type (acres)	33,200

Sources: Forest Service GIS 2020; NHD GIS 2020

Aquatic Species on the Ashley National Forest

Colorado River Cutthroat Trout

The Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) is a SCC found in many Ashley National Forest streams; there are 350 miles of Colorado River cutthroat trout streams (classified as the current population) on the Ashley National Forest (Forest Service GIS 2020; figure 3-15). One of its primary threats is the existence of nonnative trout. The Colorado River cutthroat trout requires cool, clear water, deep pools and boulders, and well-vegetated streambanks for cover. Although most of its habitat is in good condition, there are areas where erosion caused by overgrazing and unauthorized OHV use have affected its habitat by adding sediment to streams. The potential for climate change to cause warming temperatures and the resulting effects on seasonal stream flows could affect this trout's habitat in the long term.

Sport Fish

The Flaming Gorge Reservoir is renowned for outstanding fishing opportunities. Species present in the reservoir include rainbow (*Oncorhynchus mykiss*), cutthroat (*Oncorhynchus clarkii*), brown (*Salmo trutta*), and lake trout (*Salvelinus namaycush*); kokanee salmon (*Oncorhynchus nerka*); smallmouth bass (*Micropterus dolomieu*); channel catfish (*Ictalurus punctatus*); mountain whitefish (*Prosopium williamsoni*); and most recently, burbot (*Lota lota*). Since completion of the Flaming Gorge Dam in 1962, the Green River below the dam has become a premier trout fishery. Species present in the river are rainbow, brown, brook (*Salvelinus fontinalis*), and cutthroat trout (Forest Service 2017d, 2020e).

In addition to the Flaming Gorge Reservoir and the Green River, the Uinta Mountains offer outstanding stream and lake fishing for many of the species listed above. Hundreds of lakes in the Uinta Mountains, including in the High Uinta Wilderness Area, offer fishing opportunities; fishing opportunities are also available in rivers such as the North Fork of Duchesne, Lake Fork, Uinta, and Whiterocks Rivers. Sport fish typically caught in these rivers are rainbow, brook, brown, and cutthroat trout (Forest Service 2017d).

Non-Game Native Fish

In addition to sport fish, many non-game native fish occur in the plan area. The speckled dace (*Rhinichthys osculus*) is a small minnow that occurs in many of Utah's major streams and in numerous desert springs. This species has adapted to many different types of habitat, ranging from cold, swift-flowing mountain headwaters to warm, intermittent desert streams and springs (UDWR 2020e). The longnose dace (*Rhinichthys cataractae*) is native to northern Utah, where it is found in swift, cold creeks and occasionally lakes. Longnose dace is consumed by sport fish, especially trout, and is an important forage fish in some parts of its range (UDWR 2020d).

The mountain sucker (*Catostomus platyrhynchus*) is also common in Utah; it prefers the clear, cold water of streams with gravel substrate. This native Utah species can be found in Utah's Bonneville Basin and in the Colorado River system (UDWR 2020a). Mottled sculpin (*Cottus bairdii*) can be found in many of Utah's cold-water streams. It is a bottom-dwelling species that is important as a forage fish for stream-dwelling trout. Because trout predation can devastate mottled sculpin populations if sculpin do not have adequate hiding places, the species does best in areas where plenty of cover exists (UDWR 2020b).

Amphibians and Reptiles

The western chorus frog (*Pseudacris triseriata*) is a small frog commonly found throughout much of central and northeastern Utah. It can be found in a variety of habitats, including marshes, grasslands, agricultural lands, and forests, provided that water can be found nearby (UDWR 2020e). The northern leopard frog (*Rana pipiens*) is fairly common in Utah, but some reports indicate that its numbers may be declining. This frog occurs in a variety of aquatic habitats, particularly near cattails and other aquatic vegetation; however, it may be found foraging relatively far from water. During cold winter months, it is inactive, and it takes cover underwater or in damp burrows (UDWR 2020f).

The tiger salamander (*Ambystoma tigrinum*), a common species throughout Utah, is the only salamander species that occurs in the state. Within its range, the tiger salamander can thrive in almost any habitat type, as long as water is found nearby. Water is necessary for two reasons: 1) the larval stage of the salamander life cycle is aquatic, and 2) the terrestrial adults return to water to breed. Due to predation, tiger salamanders often disappear from previously fishless areas once fish are introduced (UDWR 2020g).

The Great Basin spadefoot (*Spea intermontana*) is a small toad found throughout the Great Basin, in a variety of habitats, ranging from dry sagebrush areas to spruce-fir forests. Predicted habitat occurs throughout much of Utah and much of the plan area (UDWR 2020h).

Reptile species native to the planning unit include the midget faded rattlesnake (*Crotalus oreganus concolor*), terrestrial garter snake (*Thamnophis elegans*), smooth green snake (*Opheodrys vernalis*), and rubber boa (*Charina bottae*). The terrestrial garter snake, smooth green snake, and rubber boa may be found in or near aquatic areas, such as moist meadows and along streams (UDWR 2020i, 2020j, 2020k).

At-Risk Species

Together, federally threatened, endangered, proposed, and candidate species and SCC make up the at-risk species on the Ashley National Forest. The United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) page was queried for endangered, threatened, proposed, or candidate species whose range overlaps the plan area; these species are listed in table C-1 in appendix C (USFWS 2020a and 2020b). As described in the table, not all of these species occur or have suitable habitat on the Ashley National Forest. Table C-2 in appendix C presents the list of SCC for the Ashley National Forest.

Table C-3 in appendix C lists current habitat conditions, trends, and risk factors for threatened, endangered, proposed, and candidate animal and plant species. Table C-4 in appendix C lists current habitat conditions, trends, and risk factors for plant and wildlife SCC. (The information regarding current habitat conditions, ecological and human-related stressors, and habitat sustainability for plants was derived from plant assessments found in Huber 2016b.)

Summary of Trends and Conditions

Generally, current habitat conditions for fish, wildlife, and plant species on the Ashley National Forest are suitable for all, or most, life history needs. Some wildlife species migrate or have seasonal movements off the Ashley National Forest to adapt to seasonal changes; others spend their entire life on the Ashley National Forest. Conifer tree encroachment continues to threaten sagebrush and grassland communities. However, habitat improvement projects in these areas are helping offset this invasion. Even with large-scale beetle epidemics, drought, fire, wind events, invasive plants, and other natural drivers, habitat is still supporting a wide array of species on the Ashley National Forest.

Species present on the Ashley National Forest today are essentially the same species prior to European settlement. Some species have declined in numbers while others have remained stable or increased. Overall, there has been an increase in the knowledge base of species distribution and numbers on the Ashley National Forest. This increased knowledge is due to an increased focus on species inventory, monitoring, and management from both the State wildlife management agencies and the Forest Service.

The current distribution of at-risk species on the Ashley National Forest ranges widely. Some species, such as the pygmy rabbit, are currently found in just one area or landtype association on the Ashley National Forest; others, such as the fringed myotis, are found in several landtype associations. Trends for some at-risk species are stable or increasing due to relatively low stressors and drivers (e.g., black-rosy finch). Other species of concern (sage-grouse) have potentially high levels of risk and uncertainty.

Nonnative, Invasive Species

Description

Invasive plants can damage wildlife habitat, alter disturbance dynamics, and degrade soil and water quality (Vitousek et al. 1996; Smith and Finch 2014). Invasive, nonnative woody and herbaceous plants have been introduced to the Ashley National Forest or have spread through natural pathways. Encroaching species (typically coniferous trees) are native to the Ashley National Forest. However, in recent decades, these species have increased in cover and abundance along the mesic fringes of wetland meadows and in uplands (sagebrush/mountainbrush and grass/forb meadows). These increases have the potential to displace riparian plants and animals that specialize in grassland, shrubland, or deciduous tree-dominated vegetation types (Marlow et al. 2006).

Portions of the Ashley National Forest contain aquatic nuisance species, including whirling disease, New Zealand mud snail, chytrid fungus, didymo, and curly leaf and clasping leaf pondweed (Forest Service 2017d). Aquatic invasive species can alter the productivity, species diversity, water chemistry, and habitat value of waterbodies. They can alter habitat by outcompeting the native flora and fauna (examples are nonnative sport fish and crayfish), changing the nutrient content of the water (quagga and zebra mussels), and impairing habitat structure (quagga and zebra mussels and didymo, an invasive algae), which affect the survivability and life cycles of desired organisms (for example, the whirling disease effects on fish and the chytrid fungus effects on amphibians).

Influence of Drivers and Stressors

Drivers and stressors of invasive species include:

- temperature and precipitation patterns;
- atmospheric carbon dioxide concentration;
- evolutionary adjustments;
- human trade activities causing direct and indirect introductions; and
- indirect effects from altered wildfire regimes (Halofsky et al. 2018a, 2018b).

Terrestrial invasive species often establish after soil disturbance. Natural disturbances that expose bare soil due to wildfire, prolonged drought, and changes in the timing of precipitation can benefit the advancement of invasive species. Human-caused soil disturbance can be a pathway for the establishment of invasive species. Examples of human-caused disturbances include livestock grazing, burning slash piles, road construction, vehicle traffic, and reservoir operations that produce fluctuating water levels and a shoreline zone of exposed soil, lacking stable vegetation cover (Forest Service 2017d; Rice et al. 2017).

Predicted effects from climate change include an increasing temperature, decreasing summer streamflow, increased vegetation stress, and increases in wildfire intensity and frequency. Added effects from these stresses would help establish and spread invasive species (Halofsky et al. 2018a, 2018b).

Drivers of aquatic invasive species include the presence of suitable aquatic conditions for the species (temperature, water chemistry, seasonality of flow, and channel properties). Modes of introduction and spread between waterbodies are often related to human transit and aquatic recreation, such as through bait, fishing gear, or watercraft.

Status and Trends

Since the 2009 Ecosystem Diversity Evaluation Report and the 2011 WCF, there has been a marked expansion of terrestrial invasive species in lower elevations of the Ashley National Forest. This expansion has occurred subsequent to drought years in 2012 and 2013 (Forest Service 2017d).

Whirling disease has been documented in portions of the North Fork Duchesne River, South Fork Rock Creek, Beaver Creek, Carter Creek, Lake Fork River, South Brownie Creek, and Sheep Creek drainages, as well as the Flaming Gorge Reservoir (Forest Service 2017d). New Zealand mud snail is present in the Green River below the Flaming Gorge Reservoir. Curly leaf and clasping leaf pondweed are present in the Flaming Gorge Reservoir, Sheep Creek Lake, and Browne Lake. Chytrid fungus has been documented in the Goose Lakes in the Ashley Creek drainage.

Repeat photography in mid- and high-elevation meadows and shrub communities on the Ashley National Forest has documented an increase in young conifer species. The encroachment of conifer is primarily on the wet and dry periphery of these meadows. In some areas, the conversion is significant and may require management actions if these dry meadow areas are to be maintained (Forest Service 2017d).

There is localized incidence of aquatic and terrestrial invasive and encroaching species at many portions of the Ashley National Forest. A majority of landtype associations were determined as trending toward the natural range of variation. This is because invasions were either being treated or did not have a dominant influence on the riparian areas (Dwire and Smith 2016). Of the 165 level 1 groundwater-dependent ecosystems surveys considered, 92 percent of sites were within the natural range of variation with no invasive species documented.

Environmental Consequences for Wildlife

This section focuses on at-risk species identified by the Forest Service and the ecosystem-level and species-specific plan components that would contribute to their persistence on the Ashley National Forest. The Forest Service expects ecosystem-level plan components to provide for the broad ecological conditions that support native species' persistence, including other native wildlife that are not included as at-risk species.

Methodology and Analysis Process

For the forest plan revision, management direction that may alleviate or exacerbate threats to ecological conditions is evaluated at a programmatic level. The forest plan does not authorize site-specific projects or activities; therefore, there are no direct effects from adopting the forest plan. Direct and indirect site-specific effects will be analyzed when future projects are proposed. Although potential short-term consequences may be described, where appropriate, from implementing the programmatic approach, this evaluation focuses on longer-term indirect and cumulative effects that may occur over the 10- to 15-year life of the forest plan.

The Forest Service identified potential effects of decisions and management actions on species, populations, and habitats by reviewing the best available science and using qualitative and quantitative data related to impact indicators. To best reflect the scale and magnitude of these effects, the Forest Service used acres or miles whenever possible. It also used a GIS dataset and overlays of resources and resource uses to quantify effects when available.

Analysis Assumptions

- Design features, such as seasonal and spatial restrictions, will limit direct impacts on some species.

- Impacts on at-risk species are directly related to impacts on specific habitat types or on general habitat types, as identified by vegetation types identified in table 3-31. If a specific habitat layer for an at-risk species was available, impacts were related to this habitat. Otherwise, general habitat types were used.
- Approaching desired conditions for vegetation types will provide optimal habitat for at-risk species. This means the habitat should contain the necessary ecological conditions for the contribution to the species' persistence.
- Ecosystem-level plan components will provide for the broad ecological conditions that support at-risk species' persistence.
- The natural range of variation reflects ecosystem conditions that have sustained the current complement of at-risk species' populations and habitats on the Ashley National Forest and provides the context for understanding natural diversity of ecosystems and processes.
- The effects of permanent changes to habitat are more impactful than those that temporarily alter habitat conditions but do not result in permanent habitat loss. Permanent habitat loss includes construction of buildings, paved roads, dams, and some aquatic alterations. Temporary impacts result from changes to habitat that will recover through time. Examples of these types of impacts include forestry, fuels treatments, and wildfire. These impacts do not result in a permanent loss of habitat.
- As long as small or endemic populations are not destroyed, temporary adverse impacts on at-risk species from short-lived ground disturbance activities, such as thinning projects or prescribed fire, will be outweighed by long-term benefits from overall improved ecological conditions.
- The forest plan's desired conditions, objectives, standards, guidelines, management area allocations, and suitability will be followed when planning or implementing new site-specific projects and activities.

Indicators

- Changes in terrestrial and aquatic wildlife and at-risk species habitat quantity or quality as indicated by:
    - Acres of at-risk species-specific habitat types and general habitat types (as identified in table 3-13) that overlap with recreation management areas
    - Acres of at-risk species-specific habitat types and general habitat types (as identified in table 3-13) within wild and scenic rivers, RNAs, or wilderness areas
    - Acres/miles of restored or enhanced habitat (terrestrial, aquatic, riparian, or wetlands)
    - Acres of at-risk species-specific habitat types and general habitat types (as identified in table 3-13) suitable for timber production
    - Habitat (vegetation type) trends toward desired conditions
    - Potential for injury, mortality, or disturbance of at-risk species

Environmental Consequences for Wildlife Common to All Alternatives

Management actions under specific alternatives affect overall ecological conditions and move ecological conditions toward the desired state at different rates. Specific areas open to activities would vary between alternatives; even so, actions under all alternatives would have common impacts on wildlife and at-risk species. The actions are associated with the four major themes: recreation, vegetation and fire and fuels management, livestock grazing, and designated areas. Effects from actions related to these themes are described below.

Effects from Vegetation Management and Fire and Fuels Management

All alternatives would incorporate natural resource management to varying degrees in upland and riparian vegetation types. Categories of treatments broadly include timber harvest, prescribed fire, and riparian restoration. The goal of vegetation and fuels management is to achieve desired conditions, which are common across all alternatives and described in detail in the proposed forest plan. Moving vegetation toward desired conditions would improve the ecological condition, abundance, and distribution for species that depend on those vegetation communities. Differences in acres or miles treated under the alternatives would affect movement of ecological conditions toward the desired state at different rates. This is described under the environmental consequences for each alternative.

Achieving desired conditions for vegetation types would generally improve habitat for wildlife and at-risk species over the long term. However, such treatments as timber harvest and prescribed fire would have short-term direct and indirect impacts on some wildlife and at-risk species. Treatments would affect wildlife and at-risk species through localized and temporary habitat alterations due to surface disturbance and vegetation removal. The latter could clear discrete areas of vegetation or remove specific wildlife habitat elements; these areas would no longer function as habitat for at-risk species until treated sites recover. Some species may benefit from habitat alterations that occur immediately after treatments, which may be the intent of the project. For example, greater sage-grouse would immediately benefit from treatments that remove encroaching conifers, which would reduce perch sites for predators; big game species would immediately benefit from the creation of openings in large, dense timber stands.

Large areas of vegetation removal could fragment surrounding habitats. Habitat fragmentation would interfere with wildlife species' movement and migration ability and could limit gene flow. Removing woody debris for such activities as fuelwood collection would reduce fine-scale habitats, such as nesting and refuge sites. The acres of vegetation treated would be spread out across the forest and over the life of the plan; impacts also would be dispersed, which would limit their intensity. For a detailed description of the effects of vegetation treatments on vegetation and riparian communities, see "Terrestrial Vegetation" and "Riparian and Wetland Ecosystems" sections.

Vegetation and fuels treatments could have short-term impacts on nontarget vegetation, including at-risk plant species. Impacts could come about due to mechanical damage, such as from crushing and uprooting vegetation; unintentional herbicide drift; and burning nontarget vegetation. The use of tools to carry out vegetation treatments would also disturb local areas and may injure or kill at-risk plant species and less mobile wildlife species. These threats would be considered lower with the use of manual treatment options and greater with the use of mechanical treatments and prescribed fire. Some wildlife species could also be disturbed by noise associated with treatments, which could lead to such impacts as stress, displacement, or habitat avoidance. Impacts would last from the time of treatment until the vegetation community recovers. Vegetation likely would be treated intermittently and dispersed spatially over the life of the plan and based on necessity.

Vegetation and fire and fuels management under all alternatives is intended to move ecological conditions closer to desired conditions. This would result in a diversity of forest structure, from dense to more open areas, by creating openings in the forest structure while retaining some dense forests, removing insect-affected trees, and reducing fuel density. This would improve suitable ecological conditions for general wildlife and at-risk species by increasing the amount of habitat in the desired seral states or properly functioning condition. Retained trees would generally be older and larger (see "Fire and Fuels") and would provide breeding, roosting, and foraging habitat for many wildlife species. Moving vegetation toward desired conditions with natural fire regimes would also increase the resilience of vegetation communities to uncharacteristic disturbances and climate change. More resilient vegetation communities would reduce the potential for habitat loss, and therefore improve the likelihood of long-term species' persistence. Vegetation initially removed by the treatment methods would ideally come back as healthy, diverse, and resilient communities with no or few nonnative, invasive plants.

All alternatives would include some measure of treatments to restore or enhance wetland and riparian function. Similar to treatments in terrestrial habitats, in achieving long-term improvements to aquatic habitats, riparian restoration projects would have short-term negative impacts on aquatic species. These would mainly be through short-term changes in habitat and disturbance, injury, or mortality of individuals. Habitat alterations would primarily include changes to the water quality and flow, such as from the use of large equipment within or near stream channels, vegetation removal, and controlled burns. These types of activities may also cause soil disturbance and sedimentation, which may temporarily reduce the water quality, alter fish behavior patterns, and potentially interfere with spawning and egg development.

Over the long term, riparian restoration treatments would increase the extent and condition of riparian and wetland vegetation types, which are important habitats for many aquatic at-risk species, such as the Colorado River cutthroat trout. Instream restoration would enhance aquatic habitat by increasing stream cover, improving watershed conditions, reducing sedimentation, increasing habitat connectivity, and improving hydrological characteristics, such as pools and riffles, which are important habitat features.

Effects from Recreation

Each alternative would allow for some measure of recreation, with different management areas to support different recreation opportunities. Various forms of recreation may result in effects on wildlife and at-risk species; these types of effects are described below. The magnitude of effects would generally correspond to the area of wildlife and at-risk species habitat within different recreation management areas; these would vary by alternative and are described in the alternatives sections below.

Human presence would have local disturbances that would degrade the surrounding habitat for some species. Trampling of vegetation and soil from humans and vehicles would cause cover loss, soil compaction, decreased soil porosity, and increased erosion. It may also facilitate the spread of nonnative plants, which may alter vegetation communities by replacing native species, including at-risk plant species. These effects could lead to the loss or modification of species' habitat or key ecological elements (Leung and Marion 2000).

Development and use of roads, trails, and recreational facilities may also perpetuate habitat fragmentation for wildlife species, such as the Canada lynx. This would come about by creating bare ground that may otherwise provide forest cover or by causing individuals to avoid human presence and vehicles. Habitat fragmentation may reduce habitat functionality for species such as the Canada lynx by potentially impeding an individual's ability to make necessary daily, seasonal, or dispersal movements. Fragmentation of habitat for less mobile wildlife species, such as the pygmy rabbit, may have greater effects on their ability to perform daily movement and migration.

Trampling from such recreation as hiking, mountain biking, and OHV use could injure or kill at-risk plant species and less mobile wildlife species. Noise and human presence can also disturb wildlife species and cause such impacts as changes in behavior, masking of sounds important to survival and reproduction, stress and associated physiological responses, startling and flight responses, interference with mating or foraging, and displacement or habitat avoidance (Slabbekoorn and Ripmeester 2008; Barber et al. 2009;

Blickley and Patricelli 2010). Chronic and frequent noise (e.g., from vehicle use) inhibits the ability of wildlife to detect important sounds, whereas intermittent and unpredictable noise (e.g., from hunting) is often perceived as a threat (Francis and Barber 2013). The former would result from such activities as motorized vehicle use and would continue as long as motorized routes are in use; the latter would be caused by recreation facility construction, until construction is complete.

Depending on their tolerance of humans, some species would be affected by disturbances more than others and would experience decreases in vigor, productivity, or survival. These effects would ultimately affect abundance, distribution, and population persistence (Barber et al. 2009). In some cases, recreation can lead to habitat loss or reduced habitat quality, with individuals or populations sometimes shifting geographically into areas of lower quality habitat to avoid areas affected by human activity (Miller 2020). Effects from noise would vary by activity and species. Some wildlife species are particularly sensitive to noise disturbance, and unsuitable noise levels may cause habitat or nest abandonment or reproductive failure. The level of noise disturbance would be related to the type of activity and decibels produced, the distance to a species, and the level of noise attenuation from the landscape (Shannon et al. 2016). Other species, such as the Canada lynx, may be able to tolerate moderate levels of human presence. Individual responses to disturbance, such as indifference, temporary avoidance, or long-term displacement, may depend on the season, intensity, and frequency of human presence and activities, as well as the availability of nearby secure habitats.

In general, activities allowed in dispersed recreation areas would cause less noise and disturbance to wildlife, whereas activities permitted in developed recreation areas, such as increased motorized use and developed campgrounds, would cause relatively higher levels of disturbance to wildlife. Dispersed camping, which is allowed on most areas of the Ashley National Forest within 300 feet of roads, is a popular form of dispersed recreational use on the Ashley National Forest. Visitors engaged in dispersed camping often park trucks, OHVs, and campers within 300 feet of National Forest System roads to set up camp. This could cause disturbance, displacement, or injury of less mobile species and degrade wildlife habitat. There are no developed toilets or other facilities in these areas, and trash and human waste can attract predators, degrade the water quality, and remove special habitat elements such as downed logs and snags. Impacts from high-intensity use are especially evident in areas of higher recreation preference, such as wetlands, meadows, and streams. Species that inhabit aquatic habitat types may experience disproportionately higher effects due to concentrated use in their habitat.

Trampling of vegetation from vehicle and foot traffic associated with recreation may remove riparian vegetation, which shades streams and lowers water temperatures. Roads and trails near streams and stream crossings can also contribute to bank destabilization and alter hydrologic connectivity by causing road surface runoff and increased overland flow velocity (Kastridis 2020). This could lead to an increase in erosion, sedimentation, and turbidity, which may alter the water quality of a given watershed. Increased sediment from trails can fill pools that serve as overwintering habitat for resident fish species. In addition, erosion materials may form a new substratum that is inconsistent with that required for spawning by trout, and they may smother redds (Behnke 1992).

These recreation effects may reduce habitat conditions for aquatic species such as Colorado River cutthroat trout, which requires cool, clear water, deep pools and boulders, and well-vegetated streambanks for cover. Vehicles and humans can also spread invasive weeds that can outcompete native species and degrade the quality of riparian habitat; aquatic nuisance species, such as the New Zealand mud snail, that can displace native prey; and whirling disease, which can affect young trout. Additionally, stream crossings that are not properly designed can reduce habitat connectivity for aquatic species by physically impeding passage, resulting in habitat fragmentation, population isolation, and reduced population resilience to environmental disturbance. Properly designed culverts can reduce these risks (Hoffman et al. 2012).

Effects from Designated Areas

Under all alternatives, the existing designated areas described in chapter 2 would remain. These include the Sheep Creek Canyon Geologic Area; the Ashley Gorge, Gates of Birch Creek, Lance Canyon, Pollen Lake, Sims Peak Potholes, Timber-Cow Ridge, and Uinta Shale Creek RNAs; the designated High Uintas Wilderness Area (276,175 acres); IRAs (637,700 acres); and two suitable wild and scenic river segments.

The effects of management for designated areas on wildlife and at-risk species would generally correspond to the acres of general wildlife habitat (as indicated by vegetation types), aquatic habitat types, and at-risk species habitat types that are within designated areas. The overlap of existing RNAs and SMAs with general, aquatic, and at-risk species habitat types are shown in table 3-36, table 3-37, and table 3-38, below.

Table 3-36. Acres of General Wildlife Species' Habitat (as Indicated by Vegetation Types) in Existing RNAs, SMAs, and Designated Wilderness

Habitat	RNAs Alternatives A–D	SMAs Alternatives A–D	Designated Wilderness Alternatives A–D
Alpine	2,600	1,300	113,900
Coniferous Forest	3,600	0	149,500
Deciduous Forest	0	1,100	0
Desert Shrub	0	0	0
Forb	0	0	0
Grassland	0	0	0
Mountain Brush	0	100	0
Riparian	100	500	7,600
Seral Deciduous Forest	600	200	2,600
Shrubland	0	500	0
Water	0	0	0
Woodland (Pinyon-Juniper)	700	1,300	0

Source: Forest Service GIS 2020

Table 3-37. Aquatic Habitat Types in Existing RNAs, SMAs, and Designated Wilderness (Acres, Miles, or Count)

Habitat	RNAs Alternatives A–D	SMAs Alternatives A–D	Designated Wilderness Alternatives A–D
NWI wetlands (acres)	350	50	14,900
Springs (count)	1	2	3
Fens (acres)	240	0	7,100
Riparian vegetation (acres)	7,700	3,630	7,617
NHD waterbodies (acres)	210	0	6,961
NHD flow lines (miles)	17.4	14.5	586.9

Table 3-38. At-Risk Species' Habitat in Existing RNAs, SMAs, and Designated Wilderness (Acres or Miles)

Habitat	RNAs Alternatives A–D	SMAs Alternatives A–D	Designated Wilderness Alternatives A–D
Rocky Mountain bighorn sheep (general habitat [acres])[1]	5,600	3,300	129,600
Rocky Mountain bighorn sheep (core herd home range [CHHR] [acres])[1]	1,600	6,500	24,400
Greater sage-grouse (all habitat types [acres])	0	0	0
Lynx (peripheral [acres])	2,800	100	150,300
Colorado River cutthroat trout (current population [miles])	2.6	0.1	101
Peregrine falcon (acres)	1,900	200	73,200
Black rosy-finch (acres)	2,600	0	113,900
Pygmy rabbit (acres)	0	0	0
Fringed myotis (acres)	1,000	2,300	1,900

[1]There is overlap between the core herd home range and general habitat types.
Source: Forest Service GIS 2020

Management guidelines for designated areas would generally reduce impacts on wildlife and at-risk species and their habitats. This would be due to reduced surface-disturbing activities, access, and recreation in these areas. At-risk species associated with coniferous forest and alpine habitat (e.g., lynx, bighorn sheep, and black rosy-finch) may benefit from lower levels of disturbance and habitat alterations (e.g., fragmentation) due to reduced land-use activities in areas where their habitats fall within designated areas (see table 3-38). This is because a large portion of the High Uintas Wilderness Area occurs within coniferous forest and alpine habitat (see table 3-35), and thus overlaps habitat for these species. Additionally, 73,200 acres of designated wilderness overlaps habitat for the peregrine falcon, which includes cliffs associated with riparian and open lands. Falcons and other cliff-nesting raptors may benefit from reduced disturbance during nesting, which may decrease the chance of nest abandonment or interference with foraging. Bats may also benefit from reduced disturbance in areas where RNA's, SMA's, and designated wilderness overlap fringed myotis habitat, particularly where these areas overlap roost sites (hibernacula).

At-risk species associated with shrubland habitat, such as the pygmy rabbit and greater sage-grouse, would be impacted to a lesser extent from management for designated areas; this is because fewer acres of shrubland would be classified as a designated area (see table 3-35), and no greater sage-grouse or pygmy rabbit habitat would be classified as a designated area (table 3-37). However, ecosystem resilience may decline in designated areas over time due to the lack of habitat restoration and enhancement management (for example, a lack of mechanical vegetation management to minimize the possibility of beetle epidemics and large-scale, uncharacteristic fire). Shrubland habitat would also experience this impact to a lesser extent.

All alternatives would manage 6 miles of the Green River and 42 miles of the Uinta River as suitable wild and scenic river segments. Management guidelines for eligible river segments for inclusion in the National Wild and Scenic Rivers System (NWSRS) would help protection of river and stream habitats by preventing degradation of shorelines, the water quality, and the free-flowing nature of the eligible stream segments. Maintaining their eligibility for designation could have beneficial impacts by providing habitat connectivity for aquatic species. Although the suitable segments are not mapped as Colorado River cutthroat trout streams, management could improve conditions for other fish and aquatic species, such as sport fish, non-game native fish, aquatic reptiles, and amphibians. However, adverse impacts on habitat could also occur. This is because designated areas would not receive active natural resource management, and the Forest Service would be unable to purse activities such as habitat restoration and enhancement.

Effects from Livestock Grazing Management

Under all alternatives, livestock grazing would have direct impacts on the quality of at-risk species' habitat by causing changes in the vegetation structure. The extent of changes would depend on the level of grazing; by ensuring grazing meets desired conditions, including for wildlife habitat, grazing would not alter vegetation structure in a way that would adversely affect wildlife habitat conditions. However, if not managed properly, overgrazing could occur and reduce herbaceous vegetation, which provides cover and forage for a variety of birds, mammals, and other at-risk wildlife. Therefore, species adapted to open habitats may experience increased habitat availability from grazing that reduces vegetation cover, whereas species that require denser cover may see a decrease in habitat (Schieltz and Rubenstein 2016; Dettenmaier et al. 2017).

Livestock can also spread nonnative, invasive plants, which may reduce habitat effectiveness and competition with at-risk plant species (Gross 2013). Additionally, cattle trampling at-risk plants and less mobile wildlife species would cause injury or mortality (Dettenmaier et al. 2017).

At-risk species that are associated with riparian habitat types could be affected the most by livestock overgrazing. This is because livestock disproportionately use these areas for forage, water, and shade. Excessive grazing can alter streambank stability, channel structure, and riparian composition, leading to degraded stream functionality. For example, trampling streambanks can widen streams, cause undercut banks to collapse, reduce riparian vegetation, increase surface runoff, and erode soil. These changes could ultimately degrade the water quality due to excess nutrients and sedimentation, and could elevate instream temperatures due to reduced vegetation cover (Belsky et al. 1999).

In addition, overgrazing in riparian zones can negatively affect vegetation vigor, community structure, and species composition, which would reduce the quality of habitat for riparian-dependent at-risk plant species, such as Ute ladies'-tresses. Heavily grazed areas have fewer native and stabilizing plant species and instead support invasive vegetation (Gross 2013), which may compete with native plant species for resources.

Livestock overgrazing can directly affect fish, such as the Colorado River cutthroat trout, native non-game fish, and other aquatic species, such as amphibians, mollusks, and aquatic macroinvertebrates. Effects would be the result of trampling individuals and eggs; causing erosion and sedimentation; causing loss of wetland and riparian vegetation and backwater pools, which provide nursery habitat for fish; spreading disease; trampling springs; and reducing the water quality (Belsky et al. 1999; Forest Service 2015c).

Migratory birds would experience habitat loss or degradation from livestock overgrazing riparian areas, which many migrating birds use as stopovers on their migration routes. Reduced vegetation and its diversity, altered vegetation, and reduced habitat connectivity would limit the availability of nesting areas, forage, and cover for many bird species.

Livestock overgrazing can affect mammalian habitat if it reduces herbaceous plant cover and density, decreases plant litter, and alters the plant species composition and structure of riparian habitats. These changes would reduce forage or prey availability, cover, and breeding habitat for some species. Areas surrounded by livestock watering facilities would be devoid of vegetation and would not provide habitat for wildlife, while forage around livestock watering facilities would be reduced. Also of concern is direct competition between native ungulates and cattle for browse and forbs, particularly during droughts (Ockenfels et al. 1991). Deer may avoid sites with high cattle utilization (Collins and Urness 1983), and reproductive success may be lower in areas with high cattle stocking rates (Smith 1984). In addition to habitat alterations, domestic livestock grazing can have adverse effects on bighorn sheep populations by increasing competition for space and forage. Domestic sheep and goats can also transfer viruses, parasites, and bacteria, which can cause bighorn sheep to contract diseases (UDWR 2018).

The extent of grazing impacts would correspond to the acres with active grazing or closed to grazing under each alternative. Differences in livestock management may lead to differences in the magnitude of impacts; these are described in the alternatives sections below.

Environmental Consequences for Wildlife—Alternative A

Effects from Vegetation Management and Fire and Fuels Management

Under alternative A, the Forest Service would continue to manage timber production and harvest consistent with current guidelines and regulations; 528,000 acres are currently considered suitable for timber production. Where these acres overlap wildlife and at-risk species habitats, species may experience short-term effects from the use of equipment to conduct treatments, as described under "Environmental Consequences for Wildlife Common to All Alternatives."

Because the focus of the 1986 forest plan was for timber production and not to trend departed vegetation types toward the natural range of variation or desired conditions, wildlife and at-risk species' habitats may not experience the full range of benefits from long-term habitat alterations that move ecological conditions closer to desired conditions. As described in "Terrestrial Vegetation," ecological conditions would likely continue to trend toward higher departure across all vegetation types. This may result in more homogenous conditions, which may support a lower diversity of wildlife species relative to the natural range of variation. Habitats may be less resilient to disturbances and stressors such as climate effects, uncharacteristic wildfire (increased intensity and frequency), and disease and insect outbreaks; therefore, they may be less able to contribute to the persistence of at-risk species on the Ashley National Forest.

Fire and fuels management would continue to follow the direction in the 2001 Utah Fire Amendment to the 1986 forest plan. This plan may support some movement toward desired conditions through vegetation management and management of fires over the short term. However, the pace of treatments would not be sufficient to reach desired conditions over the long term. Over the long term, an increase in the likelihood for more frequent, severe, and intense wildland fires would continue, and wildlife habitats would be at an increased risk from large-scale, high-intensity wildfires. Wildlife habitats may support a lower diversity of wildlife species relative to the natural range of variation and have a reduced ability to contribute to the persistence of at-risk species on the Ashley National Forest.

Though restoration treatments could be implemented on a case-by-case basis. alternative A does not set a specific goal for the number of stream miles to be improved with riparian restoration treatments. Where these treatments occur, impacts from implementing the treatments and from restoring habitat would occur as described under "Environmental Consequences for Wildlife Common to All Alternatives."

Effects from Recreation

Under alternative A, the Forest Service would continue to use the recreation opportunity spectrum and management practices outlined in the 1986 forest plan. Under this management, over 53 percent of the Ashley National Forest would remain in the rural, semiprimitive motorized, and roaded natural classes, while 47 percent would remain in the semiprimitive nonmotorized and primitive classes. Impacts on wildlife and at-risk species from recreation, as described under "Environmental Consequences for Wildlife Common to All Alternatives," would continue at their current level; impacts on wildlife and at-risk species from recreation in motorized and roaded natural classes would be greater than impacts from activities in nonmotorized and primitive classes.

Effects from Livestock Grazing Management

Alternative A would continue to have approximately 1,000,700 acres of active allotments. Impacts on wildlife and at-risk species due to livestock grazing would continue at their current level; these types of impacts are described under "Environmental Consequences for Wildlife Common to All Alternatives."

Under alternative A, there would be no guidance in the plan for forage utilization levels or stubble height; utilization and stubble height would be determined in allotment management plans and other site specific guidance. The absence of forest -wide forage utilization guidelines could result in relatively higher levels of impacts (for example, from reduced vegetation cover) on wildlife and at-risk species, as described under "Environmental Consequences for Wildlife Common to All Alternatives."

Lower stubble height and higher forage utilization would cause plant communities to shift toward non-palatable or grazing-tolerant species, which would reduce forage for native ungulates such as bighorn sheep. It would also reduce the vegetation cover and species richness, which would alter habitat conditions for wildlife and at-risk species, as described under "Environmental Consequences for Wildlife Common to All Alternatives." Impacts would be less for big game species. This is because current management would limit forage utilization by livestock of key browse species on big game winter range to 20 percent.

Under current management, desired future conditions for grazing/range are described as maintaining a quality range program, managed to optimize production. Current allotment management plans include "benchmark indicators" that address terrestrial and riparian utilization limitations. These include utilization of key forage species no greater than 50 percent of the current year's growth and leaving a 4-inch or greater stubble height of herbaceous species at the end of the grazing season between the green line and bank full of stream systems. These indicators may help to reduce the potential for overgrazing.

Effects from Designated Areas

Under alternative A, existing designated areas would remain, but no new management areas would be recommended (no recommended wilderness and no additional wild and scenic river segments). Impacts on wildlife and at-risk species from management of existing designated areas would be the same as described under "Environmental Consequences for Wildlife Common to All Alternatives."

Environmental Consequences for Wildlife Common to Alternatives B, C, and D

All action alternatives provide habitat to contribute to recovery of federally listed endangered and threatened species and to maintain a viable population of each SCC within the plan area. The action alternatives would support the maintenance and improvement of resilient ecosystems and watersheds to support wildlife diversity, and they would provide for the maintenance of viable populations of each SCC within the plan area (appendix D). Habitat management would be based on a complementary ecosystem and species-specific approach (known as a coarse-filter/fine-filter approach), which is intended to contribute to the diversity of plant and animal communities and the long-term persistence of native species. The coarse-filter plan components are designed to maintain or restore ecological conditions for ecosystem integrity and biological diversity on the Ashley National Forest. Fine-filter plan components are designed to provide for additional, specific habitat needs for native animal species when those needs are not met through the coarse-filter plan components.

Desired conditions for wildlife and at-risk species are common across all action alternatives. Along with plan components for terrestrial vegetation (see “Environmental Consequences for Terrestrial Vegetation Common to Alternatives B, C, and D”), they would help maintain at-risk species’ persistence on the Ashley National Forest by providing feeding, breeding, and sheltering habitat for native species (FW-DC-WL 01); providing habitat connectivity for native species, which in turn promotes daily and seasonal movement of species to facilitate maintenance of genetic diversity (FW-DC-WL 02); contributing to the habitat needs (feeding, breeding, and sheltering) and the long-term persistence of at-risk species (FW-DC-WL 03); and ensuring ecological processes are present and functioning in a manner that sustains long-term persistence and supports recovery of at-risk plant species (FW-DC-TVAR 01).

Terrestrial vegetation desired conditions would also help maintain habitat for wildlife and at-risk species. Desired conditions for all vegetation types common to alternatives B, C, and D are maintaining essential ecosystem components, processes, and functions. This would result in ecosystems that are resilient or adaptive to disturbances, such as fire, insects, pathogens, and climate variability, and that provide a diversity of habitat types across the Ashley National Forest (see “Environmental Consequences for Terrestrial Vegetation Common to Alternatives B, C, and D”; appendix D; and appendix E).

Guidelines for wildlife and at-risk species primarily focus on addressing threats to species and their habitat that are not addressed in the other resource areas (FW-GL-WL 01–11). These threats include habitat loss, fragmentation, and manipulation; human disturbance; spread of disease; and fire (appendix E, attachment E, species crosswalk). For example, maintaining a mosaic of forest structures with dense early successional coniferous and mixed-coniferous-deciduous stands and mature multistory conifer stands would help maintain peripheral habitat for possible dispersal of the Canada lynx onto the Ashley National Forest (FW-GL-WL 11). This would help alleviate threats to the lynx, such as habitat fragmentation or degradation (appendix E, attachment E, species crosswalk). A guideline to reduce tree susceptibility to bark beetle attack (FW-GL-FVC 01) would reduce threats to at-risk species, such as the lynx and fringed myotis, which are threatened by habitat loss due to beetle kill. For a detailed discussion on how plan components would alleviate threats to at-risk species and maintain their persistence on the Ashley National Forest, see appendix D.

The course-filter habitat forest plan component crosswalk (see appendix E, attachment E, species crosswalk) lists those plan components that would maintain habitat types for general wildlife species shown in table 3-30 and the crosswalk. These include plan components for other resources, such as terrestrial vegetation and soils, in addition to those for wildlife. Components for resource uses such as livestock grazing and energy and minerals ensure that these uses are compatible with ecological sustainability (for example, FW-DC-LGR 02) and protect ecosystem integrity (for example, FW-DC-EM 02).

For species associated with alpine habitats (table 3-30), maintaining species richness and a mosaic of plant communities (FW-DC-NFVA 01) would help maintain habitable niches that continue to provide breeding, foraging, and wintering habitat for alpine species. Plan components for forested vegetation (FW-DC-TV-01 through 09; FW-DC-FVC 01 and 02; FW-GO-TV 01 and 02; FW-OB-FVC 01; FW-GL-TV 01 through 04; FW-GL-FVC 01; FW-DC-FVA 01 and 02; FW-GL-FVA 01 through 04; FW-DC-FVPJ 01; FW-GL-FVPJ 01; FW-GL-TI 02 through 04; FW-GL-WL 11) would maintain habitat for species associated with deciduous and coniferous forests and woodlands (table 3-30) by emphasizing resilient, connected forests containing complex structural attributes. Vegetation treatments, chosen based on best available science, would help move vegetation toward desired conditions for specific vegetation types.

Prescribed fire and naturally ignited fire treatments would be used to move vegetation types toward more natural fire patterns (FW-DC-FI 02 and 03; FW-GL-FI 03). Such treatments would help to maintain habitat for wildlife species associated with the habitats treated.

Plan components for non-forested vegetation (FW-DC-TV 01 through 09; FW-DC-NFV 01; FW-DC-NFVA 01; FW-GO-TV-01 through 03; FW-GL-TV 01 through 04; FW-DC-NFS 01 and 02; and FW-DC-NFDS 01) would maintain habitat for species associated with grasslands and shrublands (table 3-30) by maintaining essential ecosystem components, processes, and functions. Additional components, such as for livestock grazing (FW-DC-LGR 02 and FW-GL-LGR 01), soils (FW-GL-SO 03 and 05), and rare and unique habitats (FW-ST-RUH 01) would help maintain habitat sustainability by ensuring sustainability and resiliency of forage resources; protecting soils from compaction, displacement, and erosion; and avoiding or mitigating management activities that would disrupt ecological processes or compromise the overall ecological integrity of rare ecosystems. Objectives to restore ecological function, integrity, and resilience of non-forest vegetation (FW-OB-NFV 01) would improve habitat conditions in areas that have been previously impaired, thereby maintaining or increasing habitat for grassland and shrubland wildlife species. Plan components would help alleviate ecological stressors through restoration that reduces conifer encroachment, increases heterogeneity of terrestrial vegetation, and moves terrestrial vegetation composition and structure toward the natural range of variation (FW-GO-TV 01 through 04; FW-GL-TV-01 through 04; FW-DC-NFV 01; and FW-OB-NFV 01).

Plan components for watersheds, aquatic ecosystems, and riparian ecosystems would maintain or improve overall watershed conditions and habitat for riparian-associated and aquatic species (table 3-30) by ensuring watersheds and aquatic and riparian ecosystems are resilient to disturbance and support healthy, vigorous, and self-perpetuating plant communities (FW-DC-WA 01 through 10; FW-DC-RMZ 01, 02, and 03; and FW-DC-FIS 01 through 07) and associated wildlife species. Managing riparian management zones to maintain, protect, or enhance aquatic and riparian resource values (FW-GL-RMZ 01) would help riparian-associated species by protecting habitat from future degradation and improving previously impaired conditions.

See the course-filter habitat forest plan component crosswalk (appendix E, attachment E, habitat crosswalk) for a full list of plan components that would maintain each of the habitat types discussed above (table 3-30).

Actions under specific action alternatives affect overall ecological conditions and move ecological conditions toward the desired state at different rates. Specific forest plan components and areas open to activities would vary between alternatives, as described below.

Effects from Vegetation and Fire and Fuels Management

All action alternatives would use vegetation and fuels management to provide necessary ecological conditions to support at-risk species in the plan area (forest plan, appendic E, attachment E, species crosswalk). As described in “Terrestrial Vegetation,” vegetation treatments under all action alternatives would occur over every decade following plan implementation to move vegetation toward desired conditions. The acres proposed for treatment in each general wildlife habitat type, as indicated by vegetation type, would vary by action alternative (see “Terrestrial Vegetation”). Where management practices overlap species habitat types, the species would experience impacts resulting from temporary disturbance and short- and long-term habitat alterations, as described under “Environmental Consequences for Wildlife Common to All Alternatives.”

Differences in acres or miles treated under specific alternatives would affect the movement of ecological conditions toward the desired state at different rates; this is described under the analysis for each alternative. For all action alternatives, movement toward desired conditions would be greater than under alternative A. This is because treatment techniques would be chosen based on best available science depending on the specific vegetation type in which treatments were proposed.

Overall, vegetation and fire and fuels treatments would help achieve desired conditions for vegetation resources (appendix E, attachment E, species crosswalk). This would benefit wildlife and at-risk species by providing ecosystems consisting of healthy and diverse native plant communities that are resilient or adaptive to stressors, such as fire, insects, pathogens, and climate variability (FW-DC-TV 01 to 09). Vegetation desired conditions and guidelines also address the threat of invasive species, conifer encroachment, and beetle epidemics that threaten these species.

Plan components would also guide vegetation and fuels treatments to benefit specific at-risk species. For example, treatments in the sagebrush vegetation type would alter canopy cover to enhance habitat for greater sage-grouse (FW-DC-NFS 02; FW-OB-NFV 02). This would help alleviate threats to the greater sage-grouse, such as habitat degradation from conifer encroachment and noxious weeds. All action alternatives would include a standard that total tree and shrub canopy cover in semi-barren habitat should not exceed 10 percent within Evert's wafer-parsnip's habitat (FW-ST-TVAR 01). Using vegetation treatments to achieve this standard would help maintain persistence of Evert's wafer-parsnip by alleviating the treat of conifer encroachment (Huber 2016b).

Further, under all action alternatives, vegetation management activities should avoid or mitigate removal of known raptor nests (FW-GL-WL 03); maintain snags and other habitat features for cavity nesters (FW-GL-WL 03); avoid, minimize, or mitigate negative impacts on known Eureka Mountain snail sites (FW-GL-WL 06); and maintain pygmy rabbit habitat (FW-GL-WL 07). Guidelines such as these would help reduce threats to at-risk species, improve ecological conditions, and ultimately contribute to maintaining at-risk species' persistence on the Ashley National Forest. See appendix D for a detailed discussion on how plan components would alleviate threats to at-risk species and maintain their persistence on the Ashley National Forest.

Timber Harvest

Under all action alternatives, timber harvest projects would affect wildlife and at-risk species that inhabit the vegetation types in which the projects were carried out; these types of effects are described in "Environmental Consequences for Wildlife Common to All Alternatives." The magnitude of these effects would generally correlate to the number of acres of treatments carried out in wildlife habitat. The acres of general wildlife habitat (as indicated by vegetation types) suitable for timber production, and thus where timber harvest treatments would potentially occur, would vary by action alternative. This is shown in table 3-18 in "Terrestrial Vegetation." The acres of at-risk species habitat suitable for timber production would also vary by action alternative, as shown in table 3-39, below.

At-risk species, such as Rocky Mountain bighorn sheep, whose habitat is threatened by conifer encroachment, may benefit from timber harvest within their habitat types. The area of bighorn sheep CHHR that encompasses timbered stands is not typical bighorn sheep habitat (typically open, alpine areas); however, timber harvest within these atypical areas of CHHR may benefit bighorn sheep by facilitating migration through the timber stands as bighorn sheep move between summer and winter ranges. Tree removal may also benefit bighorn sheep by increasing visibility and predator detection.

The lynx, which requires dense early successional coniferous stands to support snowshoe hare populations and cover for stalking prey as well as mature multistory conifer stands for denning areas, could lose some of these habitat features in areas where trees are harvested within peripheral habitat.

Table 3-39. Acres or Miles of At-Risk Species' Habitat Suitable for Timber Production

Habitat	Alternative B	Alternative C	Alternative D
Rocky Mountain bighorn sheep (all habitat types [acres])[1]	7,300	4,700	7,500
Rocky Mountain bighorn sheep (CHHR [acres])[1]	29,700	9,200	30,700
Greater sage-grouse (all habitat types [acres])[1]	5,100	3,900	5,200
Lynx (peripheral [acres])	79,200	63,200	82,600
Colorado River cutthroat trout (current population [miles])	0	0	10
Peregrine falcon (acres)	0	0	0
Black rosy-finch (acres)	0	0	0
Pygmy rabbit (acres)	0	0	0
Fringed myotis (acres)	13,300	6,900	13,900

[1]There is overlap between the core herd home range and general habitat types.
Source: Forest Service GIS 2020

However, forest plan components would require some of these features be retained and maintain habitat for lynx (appendix D). Species that primarily use alpine or cliff habitats (peregrine falcon, black rosy-finch) would not be affected by timber harvest, because none of their habitat would be suitable for timber production (table 3-38). Plan components would require vegetation treatments to avoid, minimize, or mitigate negative impacts on known eureka mountainsnail sites (FW-GL-WL 06); thus, this species would be protected from adverse effects from timber harvest. See appendix D for a discussion of how plan components would alleviate this threat and maintain eureka mountainsnails' persistence on the Ashley National Forest.

Effects on specific vegetation types, and thus general plant and wildlife habitats, are described in detail in "Terrestrial Vegetation." As described above, achieving desired conditions for all vegetation types would ultimately improve habitat conditions for species associated with these habitat types, such as large mammals, small mammals, old-growth-dependent species, large-tree-dependent species, cavity nesting birds, and migratory birds (table 3-13). This would come about by reducing the risk of habitat loss from wildlife and other disturbances and by increasing vegetation structure and diversity; this would, thus, increase the availability of habitat features such as cover and nest sites. Plan components for timber under all action alternatives would promote conditions that support wildlife habitat by managing timber production to promote ecosystem health and sustainability and to meet long-term vegetation conditions (FW-DC-TI 01 to 07).

Fire and Fuels Management
All action alternatives would manage natural ignitions to meet resource objectives for the associated vegetation type, though the percent objective would vary by alternative (see table 3-16 and table 3-17 in "Terrestrial Vegetation"). In general, managing naturally ignited fires would allow fire management greater flexibility to meet desired vegetation conditions relative to alternative A.

Fire and fuels treatments would have short-term impacts on wildlife and at-risk species that inhabit the vegetation types in which the treatments were carried out, as described in "Environmental Consequences for Wildlife Common to All Alternatives." Over the long term, prescribed fire and wildfire management would move wildlife and at-risk species' habitat toward desired conditions where burned acres occur. Habitat characteristics, such as plant community composition, cover, and structure, would trend toward the natural range of variation over the long term where burned acres occur. In general, alternatives that treat more acres would reach desired conditions more quickly. Plan components for fire across all action alternatives would help achieve natural fire regimes that sustain ecosystem sustainability and ecological resilience (FW-DC-FI 01 to 05); this would benefit wildlife and at-risk species by reducing the loss of habitat or ecosystem function due to uncharacteristic wildfire.

Riparian Restoration
All action alternatives would include riparian restoration treatments, but the number of stream miles improved for riparian restoration treatments would vary by alternative. Under the action alternatives, effects on riparian and aquatic species habitats from restoration treatments would occur, as described under "Environmental Consequences for Wildlife Common to All Alternatives." The rate of improvements to riparian habitats, as well as the extent of short-term disturbances due to construction activities, would generally correlate to the number of stream miles improved, which would vary by alternative.

Using riparian restoration to achieve desired conditions for watersheds, aquatic, and riparian ecosystems would promote conditions for riparian and aquatic species. This would be done by improving the health and resilience of aquatic and riparian ecosystems to provide migration, breeding, feeding, and sheltering opportunities for a wide range of terrestrial, amphibian, and avian wildlife (FW-DC-WA 01 to 10). Further, riparian restoration treatments would help achieve desired conditions for fisheries and aquatics that provide habitat conditions to support the long-term persistence of aquatic species such as Colorado cutthroat trout. These include habitat connectivity; stream channels characterized by riffles, runs, pools, and woody material; low levels or an absence of aquatic invasive species; substrate with low levels of fine substrate (e.g., sand and silt); and high water quality (FW-DC-FIS 01 to 07).

Effects from Recreation

The types of effects of various recreation on wildlife and at-risk species are described under "Environmental Consequences for Wildlife Common to All Alternatives." The magnitude of these effects would generally correspond to the area of overlap between recreation management areas and general wildlife or at-risk species habitat (table 3-18 in "Terrestrial Vegetation" and table 3-40, below). Effects on wildlife, such as disturbance and habitat degradation, would be more concentrated in high-use recreation areas (destination recreation MAs and general recreation MAs) and lower in more dispersed/lower-use areas (backcountry recreation MAs and the High Uintas Wilderness). Specifically, destination recreation MAs, which emphasize developed recreation experiences in high-use areas with motorized access and support facilities, would have the greatest level of impacts on wildlife and at-risk species. Impacts from backcountry recreation MAs focused on dispersed recreation outside wilderness areas (with limited infrastructure) would be the least intense. It should be noted, however, that some of the potential impacts form recreational use may be partially offset by opportunities for long term habitat improvements in destination and general recreation MAs, which would allow for initiation of habitat improvement projects.

Alternative A (current forest plan) does not include recreation management areas; therefore, it is not included in table 3-40, below.

Table 3-40. Acres or Miles of At-Risk Species' Habitat in Recreation Management Areas

Habitat	Alternative B	Alternative C	Alternative D
Rocky Mountain Bighorn Sheep (All Habitat Types [acres])[1]			
Backcountry recreation MA	185,700	265,500	137,500
Destination recreation MA	9,000	6,100	10,900
General recreation MA	118,300	41,300	164,600
High Uintas Wilderness	129,300	129,300	129,300

Habitat	Alternative B	Alternative C	Alternative D
Rocky Mountain Bighorn Sheep (CHHR [acres])[1]			
Backcountry recreation MA	115,000	174,900	71,200
Destination recreation MA	17,500	13,700	17,500
General recreation MA	149,500	93,500	193,300
High Uintas Wilderness	24,400	24,400	24,400
Greater Sage-Grouse (All Habitat Types [acres])			
Backcountry recreation MA	21,700	124,300	13,200
Destination recreation MA	3,000	2,400	3,700
General recreation MA	159,100	57,200	166,900
High Uintas Wilderness	N/A	N/A	N/A
Lynx (Peripheral Habitat [acres])			
Backcountry recreation MA	237,100	374,200	171,600
Destination recreation MA	9,100	6,300	12,700
General recreation MA	291,000	156,600	352,900
High Uintas Wilderness	150,300	150,300	150,300
Colorado River Cutthroat Trout (current population [miles])			
Backcountry recreation MA	135.9	192.2	100.9
Destination recreation MA	7.5	6.4	11.1
General recreation MA	104.5	49.4	135.8
High Uintas Wilderness	101.0	101.0	101.0
Peregrine falcon (acres)			
Backcountry recreation MA	45,900	58,300	37,000
Destination recreation MA	3,200	2,900	3,700
General recreation MA	28,500	16,400	37,000
High Uintas Wilderness	73,200	73,200	73,200
Black rosy-finch (acres)			
Backcountry recreation MA	48,900	51,100	44,000
Destination recreation MA	0	0	0
General recreation MA	5,900	3,600	10,800
High Uintas Wilderness	113,900	113,900	113,900
Pygmy rabbit (acres)			
Backcountry recreation MA	0	2,500	0
Destination recreation MA	600	600	600
General recreation MA	7,100	4,600	7,100
High Uintas Wilderness	0	0	0
Fringed myotis (acres)			
Backcountry recreation MA	63,200	182,300	42,800
Destination recreation MA	10,000	8,100	11,500
General recreation MA	211,200	94,100	230,000
High Uintas Wilderness	1,900	1,900	1,900

[1]There is overlap between the core herd home range and general habitat types.
Source: Forest Service GIS 2020

Under all action alternatives, desired conditions for recreation would help ensure that recreation reflects healthy, resilient landscapes and provides opportunities for sustainable recreational use (FW-DC-ROS). Desired conditions for fisheries would alleviate threats from recreation in aquatic habitats (e.g., fishing) by removing aquatic invasive species and by providing aquatic habitats with features to support sustainable populations of native species, such as the Colorado River cutthroat trout (FW-DC-FIS 01 to 07). Additionally, multiple plan components would reduce potential for habitat degradation by emphasizing maintenance of key ecological and habitat conditions that provide essential habitat characteristics for native species, habitat connectivity, vegetation diversity, and ecological integrity and resilience (appendix D).

Effects from Livestock Grazing Management

Under the action alternatives, impacts on wildlife and at-risk species from livestock grazing would be similar to those described for alternative A. However, because the action alternatives would emphasize maintenance or improvement of wildlife habitat and protections to riparian resources, the intensity of grazing impacts would be reduced. Achieving desired conditions for grazing (FW-DC-LGR 01 and 02) would ensure sustainable use of rangelands. Desired conditions for terrestrial vegetation, and aquatic and riparian areas would ensure aquatic, riparian, upland, and wetland ecosystems support native plants and animals. This would result in improved habitat conditions that support the persistence of wildlife and at-risk species, including pollinators. Under alternative A, habitat support for these species would be determined at the site-specific level rather than based on Forest level direction.

Effects from Designated Areas

Under the action alternatives, all existing designated areas would remain. Effects on wildlife and at-risk species from managing these areas would be the same as described under alternative A. Some action alternatives would include additional recommended wilderness or wild and scenic river segments. The acres of general wildlife, aquatic habitat, and at-risk species' habitat that would overlap recommended wilderness are shown in table 3-41, table 3-42, and table 3-43, below. Impacts from managing additional designated areas are described under the specific action alternatives, below.

Table 3-41. Acres of General Wildlife Species' Habitat (as Indicated by Vegetation Types) in Recommended Wilderness

Habitat	Alternative B	Alternative C	Alternative D
Recommended Wilderness			
Alpine	3,300	20,600	0
Coniferous Forest	6,700	27,400	0
Deciduous Forest	0	0	0
Desert Shrub	0	0	0
Forb	0	0	0
Grassland	0	0	0
Mountain Brush	0	0	0
Riparian	200	1,800	0
Seral Deciduous Forest	100	100	0
Shrubland	0	0	0
Water	0	200	0
Woodland (Pinyon-Juniper)	0	0	0
Total	**10,300**	**50,100**	**0**

Source: Forest Service GIS 2020

Table 3-42. Acres, Miles, or Count of Aquatic Habitat Types in Recommended Wilderness

Habitat	Alternative B	Alternative C	Alternative D
NWI wetlands (acres)	230	2,550	0
Springs (count)	0	1	0
Fens (acres)	90	1,410	0
Riparian vegetation (acres)	10,340	50,150	0
NHD waterbodies (acres)	0	0	0
NHD flow lines (miles)	9.4	83	0

Source: Forest Service GIS 2020

Table 3-43. Acres or Miles of At-Risk Species' Habitat in Recommended Wilderness

Habitat	Alternative B	Alternative C	Alternative D
Rocky Mountain bighorn sheep (all habitat types [acres])[1]	4,200	25,700	0
Rocky Mountain bighorn sheep (CHHR [acres])[1]	0	0	0
Greater sage-grouse (all habitat types [acres])	0	0	0
Lynx (peripheral [acres])	6,700	28,200	0
Colorado River cutthroat trout (current population [miles])	0.6	12.8	0
Peregrine falcon (acres)	200	9,500	0
Black rosy-finch (acres)	3,300	20,600	0
Pygmy rabbit (acres)	0	0	0
Fringed myotis (acres)	0	0	0

[1]There is overlap between the core herd home range and general habitat types.
Source: Forest Service GIS 2020

Under all action alternatives, desired conditions for designated areas would benefit wildlife and at-risk species by preserving ecological and wilderness characteristics (wilderness 01 to 04) and maintaining ecological conditions that support sustainability and resiliency (DA-DC-RNA 01, 02). Standards to prohibit timber harvest in recommended wilderness would maintain habitat characteristics for species such as migratory birds that rely on trees for shelter and nesting sites (WI guideline 03). Prohibiting new roads, motorized trails, recreation developments, and energy utility corridors (WI guideline 02, 04, 05, 06) would decrease the potential for disturbance, injury, or mortality; habitat loss; and habitat alterations.

Environmental Consequences for Wildlife—Alternative B

Effects from Vegetation Management and Fire and Fuels Management

Alternative B would promote vegetation management for resource objectives by aiming to treat 1,500 acres annually in the first decade and 1,200 acres annually in the second decade of vegetation management in areas suitable for timber harvest. Where treatments overlap wildlife species' habitats (table 3-16, table 3-17, and table 3-18 in "Terrestrial Vegetation" and table 3-39, above), species would experience short- and long-term impacts from implementing treatments and achieving desired conditions, as described under "Environmental Consequences for Wildlife Common to All Alternatives." Where these treatments occur, wildlife and at-risk species' habitat would move toward desired conditions over the long term.

Because more acres of Rocky Mountain bighorn sheep, lynx, and fringed myotis habitat would be suitable for timber production relative to alternative A, these species would experience increased impacts from tree removal. As described under "Environmental Consequences for Wildlife Common to Alternatives B, C, and D," at-risk species, whose habitat is threatened by conifer encroachment (Rocky Mountain bighorn sheep), may benefit from increased timber harvest within their habitat types, whereas species requiring forest cover, such as lynx and fringed myotis, may experience habitat loss or degradation. All species may benefit from movement of habitat towards desired conditions, and forest plan guidelines would help reduce negative impacts from the implementation of vegetation treatments ("Environmental Consequences for Wildlife Common to Alternatives B, C, and D"; appendix D).

Under this alternative, openings created by timber harvest treatments would not exceed 40 acres unless determined necessary to achieve desired ecological conditions. This would ensure forest stands where treatments occur are structural diverse, vary across landscapes in time and space, and therefore provide a variety of wildlife habitat types across the forest. Relative to alternative A, focusing timber harvest to maintain or restore forest and woodland types would improve habitat conditions for wildlife and at-risk species by providing increasing habitat resilience and ecosystem health and by reducing habitat loss from overexploitation. Likewise, emphasizing the use of fire for ecosystem maintenance and restoration would improve habitat conditions and availability for wildlife and at-risk species. This would ultimately contribute to the recovery of federally listed endangered and threatened species and to maintaining a viable population of each SCC within the plan area.

Management of unplanned ignitions on at least 10 percent of ignitions would result in short-term impacts on wildlife and at-risk species, such as temporary habitat loss and the potential for injury or mortality. It also would result in long-term impacts such as improved habitat quantity and quality due to increased flexibility and the ability to reach desired conditions, relative to alternative A. The location of these effects cannot be predicted because the location of future unplanned ignitions are unknown.

Management under alternative B would also support the maintenance and improvement of resilient ecosystems and watersheds to support wildlife diversity. Under alternative B, 10 stream miles of aquatic species habitat would be improved every 5 years. These projects would have design features to restore habitat and populations of aquatic and riparian species. Stream restoration projects would result in improvements to aquatic and riparian species' habitats, as described under "Environmental Consequences for Wildlife Common to All Action Alternatives." Effects from plan components to meet desired conditions for watersheds, aquatic, and riparian ecosystems and fisheries/aquatics would be the same as those described under "Environmental Consequences for Wildlife Common to All Action Alternatives."

Effects from Recreation

The types of effects from various recreation on wildlife and at-risk species are described under "Environmental Consequences for Wildlife Common to All Alternatives." The magnitude of these effects would generally correspond to the area of overlap between recreation management areas and general wildlife or at-risk species habitat (table 3-19 in "Terrestrial Vegetation" and table 3-40).

The acres of at-risk species habitat that would occur in recreation MAs under alternative B are shown in table 3-40. Included are 9,000 acres of general Rocky Mountain bighorn sheep habitat, 17,500 acres of Rocky Mountain bighorn sheep CHHR, 3,000 acres of greater sage-grouse habitat, 9,100 acres of lynx habitat, 8.8 miles of Colorado River cutthroat trout streams, 3,200 acres of peregrine falcon habitat, 600 acres of pygmy rabbit habitat, and 10,000 acres of fringed myotis habitat that would occur in destination recreation MAs (table 3-40). Since destination recreation MAs emphasize developed recreation experiences in high-use areas (with motorized access and support facilities), impacts such as disturbance and habitat alterations would be highest in these areas. Species that are sensitive to disturbance, such as fringed myotis, may be negatively affected from increased human presence in destination recreation MAs that overlap their habitat; however, plan components to reduce disturbance to caves would reduce the threat of disturbance to hibernacula (see appendix D). Additionally, destination areas are typically small, linear in scope, and already have current high human presence and disturbance, so wildlife may already avoid these areas or have become habituated to human presence. Plan components that support ecosystems and habitat conditions that provide essential habitat characteristics for native species would ensure that habitat for all at-risk species is maintained on the Ashley National Forest, despite impacts from recreation (appendix D).

Effects from Livestock Grazing Management

Alternative B would have the same number of acres for active grazing allotments as alternative A (approximately 1,000,700 acres); therefore, impacts on wildlife and at-risk species from livestock grazing would be similar to those described for alternative A. However, management of forage utilization levels (50 percent) as well as 4-inch stubble height guidelines in riparian areas under alternative B, with flexibility to adjust to site-specific conditions, would help meet desired conditions for terrestrial vegetation. Compared with alternative A, this would improve habitat conditions for wildlife and at-risk species within active allotments. This would come about by maintaining or increasing vegetation cover, structure, and diversity, which provide habitat components, such as forage and cover, for a variety of wildlife species. It may also increase forage for big game species, such as bighorn sheep, by reducing the potential for plant species composition to shift toward non-palatable or grazing-tolerant plant species where grazing occurs.

Forest plan components would help to address the threat of pathogen transfer from domestic sheep to bighorn sheep by providing separation when a permit is waived without preference. Where bighorn sheep cannot come in contact with domestic sheep, disease transmission is significantly reduced or eliminated. These components would include a guideline that would provide separation of domestic and bighorn sheep when a permit is waived without preference by 1) providing separation that would mitigate the threat of pathogen transfer from domestic sheep and goats to bighorn sheep, consistent with the most current state big horn sheep management plans; 2) adjusting the time or dates, or both, when domestic sheep are on the allotment; 3) potentially converting the allotment to a cattle and horse allotment; 4) using the allotment as a cattle and horse forage reserve; or 5) potentially closing all or a portion of the allotment to domestic sheep and goats (FW-GL-WL 09). They would also limit authorization of new permitted domestic sheep or goat allotments unless separation from domestic sheep and goats can be demonstrated, or research indicates that the potential for pathogen transfer would be limited (FW-GL-WL 10).

Effects from Designated Areas

Under alternative B, all existing special areas and RNAs would remain. This alternative would include additional designated areas to protect special resources and the management of two recommended wilderness areas (totaling 10,300 acres). Because a greater area of wildlife habitat, aquatic habitat, and at-risk species' habitat would be managed as designated areas and recommended wilderness (table 3-19 and table 3-20, "Terrestrial Vegetation"), wildlife and at-risk species inhabiting these areas would experience lower levels of impacts, such as disturbance and habitat alterations, relative to alternative A. This is because of reduced surface-disturbing activities, access, and recreation.

Management for recommended wilderness areas (including 4,200 acres of Rocky Mountain bighorn sheep year-long habitat, 3,300 acres of black-rosy finch habitat, 6,700 acres of lynx peripheral habitat, 0.6 miles of Colorado River cutthroat trout streams, and 200 acres of peregrine falcon habitat) would improve habitat conditions for many species by reducing disturbance, habitat fragmentation, and habitat degradation. It would also reduce the potential for injury or mortality from vehicle collisions or trampling.

However, as described under "Environmental Consequences for Wildlife Common to All Alternatives," ecosystem resilience may decline in designated wilderness areas over time due to the lack of habitat restoration and enhancement management. This could alter or reduce habitat for wildlife and at-risk species over the long term by increasing the chance of habitat loss due to disturbances such as large-scale, uncharacteristic fire. This effect would be greater relative to alternative A due to the greater area of designated areas.

No additional wild and scenic river segments would be classified as suitable for inclusion in the NWSRS relative to alternative A; impacts from existing suitable segments would be the same as those described for alternative A.

Environmental Consequences for Wildlife—Alternative C

Effects from Vegetation Management and Fire and Fuels Management

Alternative C emphasizes passive rather than active vegetation treatments. Alternative C aims to treat 1,000 acres annually in the first decade and 800 acres annually in the second decade of vegetation management in areas suitable for timber harvest (table 3-16, table 3-17, and table 3-18 in "Terrestrial Vegetation"). Compared with alternative B, this represents a decrease in total acres treated. The acres of general wildlife and at-risk species' habitat that are suitable for timber production would also decrease relative to alternative B (table 3-18 and table 3-39). Short-term impacts (e.g., disturbance) on wildlife and at-risk species resulting from implementing treatments, as described under "Environmental Consequences for Wildlife Common to All Alternatives," would decrease relative to alternative B. Impacts from restricting openings created by timber harvest treatments to 40 acres or less would be similar to those described for alternative B, but habitat protections would be greater. This is because there would be no exceptions to the 40-acre maximum.

Because fewer acres of Rocky Mountain bighorn sheep, lynx, and fringed myotis habitat would be suitable for timber production relative to Alternative A, these species would experience reduced impacts from tree removal. The benefit to at-risk species, whose habitat is threatened by conifer encroachment (Rocky Mountain bighorn sheep), from fewer acres of habitat suitable for timber production, would be less relative to alternative B. Species requiring forest cover, such as lynx and fringed myotis, may experience less habitat loss or degradation relative to alternative B. Forest plan components would reduce negative impacts from the implementation of vegetation treatments (Environmental Consequences for Wildlife Common to Alternatives B, C, and D; appendix D).

All species may benefit from movement of habitat towards desired conditions in areas where vegetation treatments occur, and to a greater extent that Alternative A. However, because fewer acres would be treated overall, alternative C may be less effective in trending vegetation types toward the natural range of variation and improving wildlife habitat. Stressors to at-risk species, such as insect outbreaks, uncharacteristic wildfires, and climate effects, would continue in untreated forest types.

Management of unplanned ignitions on at least 20 percent of ignitions would have impacts similar to those described for alternative B. However, the greater percentage of ignitions managed would increase short-term impacts on wildlife and at-risk species; it would also increase long-term impacts (e.g., improvements in habitat quantity or quality) by increasing the ability or rate at which desired conditions are achieved.

Effects from improving 10 stream miles of aquatic species habitat every 5 years would be the same as those described under alternative B.

Effects from Recreation

Under alternative C, fewer acres of general wildlife and at-risk species habitat would occur in destination and general recreation MAs relative to alternative B; more acres would fall within backcountry MAs (table 3-19 in “Terrestrial Vegetation” and table 3-40). Impacts on wildlife and at-risk species due to recreation would decrease relative to alternative B. This is because with more acres designated as backcountry MAs, overall recreation would be lower intensity with fewer facilities, roads, or other disturbances. At risk species that are sensitive to disturbance, such as fringed myotis, may benefit due to reduced human presence in their habitat; plan components to reduce disturbance to caves would still apply and would reduce the threat of disturbance to hibernacula (see appendix D). Additional plan components that support habitat characteristics for native species would ensure that habitat for all at-risk species is maintained on the Ashley National Forest, despite impacts from recreation (appendix D).

Effects from Livestock Grazing Management

Alternative C would have fewer acres with active grazing (13,400 acres closed) and fewer head months (HMs) available relative to all other alternatives. Compared with alternative A, this would reduce the extent of impacts on wildlife and at-risk species from livestock grazing.

Management of forage utilization levels (40 percent) as well as 4-inch stubble height guidelines in riparian areas under alternative C would help meet desired conditions for terrestrial vegetation. As described under alternative B, this would improve habitat conditions for wildlife and at-risk species within active allotments, relative to alternative A. Compared with alternative B, improvements would be of a greater magnitude because forage utilization levels would be lower; thus, wildlife habitat features, such as cover and forage, would be increased. Reduced acres of livestock grazing in the more arid parts of the Ashley National Forest, however, could reduce the amount of water developments that some wildlife may depend on.

Relative to the other action alternatives, this alternative would include additional and more stringent plan direction for separation of bighorn sheep from domestic sheep. Components would include a guideline that would close allotments where permits are voluntarily waived without preference if the allotment does not provide separation between domestic sheep and goats and bighorn sheep (FW-GL-WL 09). Additionally, new domestic sheep or goat allotments would not be permitted unless separation from wild bighorn sheep is demonstrated (FW-GL-WL 10), and domestic sheep and goat allotments that overlap a bighorn sheep core herd home range would be closed when opportunities arise (FW-GL-WL 11).

Effects from Designated Areas

Under alternative C, the acres of wildlife, aquatic, and at-risk species’ habitat that would overlap recommended wilderness would increase relative to alternative B (table 3-41, table 3-42, and table 3-43). Additionally, 1,400 acres of the proposed Gilbert Bench RNA would overlap the alpine vegetation type, corresponding to 1,400 acres of the following habitat types: Rocky Mountain bighorn sheep general year-long habitat, Rocky Mountain bighorn sheep CHHR Uintas summer habitat, Rocky Mountain bighorn sheep CHHR Uintas Winter habitat, and black-rosy finch habitat. RNA management in these habitat types would likely decrease impacts, such as disturbance and habitat fragmentation, on bighorn sheep, black-rosy finch, and other alpine species due to fewer surface-disturbing activities and other limited uses. Management to emphasize habitat connectivity and maintenance of a natural setting would generally increase habitat quality for all wildlife.

Similar to Alternative B, management for recommended wilderness areas (including 25,700 acres of Rocky Mountain bighorn sheep year-long habitat, 20,600 acres of black-rosy finch habitat, 28,200 acres of lynx peripheral habitat, 12.8 miles of Colorado River cutthroat trout streams, and 9,500 acres of peregrine falcon habitat) would improve habitat conditions for these species by reducing disturbance, habitat fragmentation, habitat degradation, and potential for injury or mortality from vehicle collisions or trampling. These types of habitat improvements would occur over a greater extent relative to Alternative B.

Under alternative C, there would be four additional segments brought forward as suitable for inclusion in the NWSRS, including 11.4 miles of fish-bearing streams. This is the only alternative in which streams used by Colorado River cutthroat trout would be included in the system. Management guidelines for the NWSRS would generally improve habitat for fish by preventing habitat degradation, as described under "Environmental Consequences for Wildlife Common to All Alternatives."

Environmental Consequences for Wildlife—Alternative D

Effects from Vegetation Management and Fire and Fuels Management

Alternative D aims to treat 1,600 acres annually in the first decade and 1,300 acres annually in the second decade of vegetation management in areas suitable for timber harvest (table 3-16, table 3-17, and table 3-18 in "Terrestrial Vegetation"). Compared with alternative B, this represents an increase in total acres treated. The acres of general and at-risk species habitat that are suitable for timber production would also increase relative to alternative B (table 3-18 and table 3-39). Short-term and long-term impacts resulting from disturbance and habitat alterations would be as described under "Environmental Consequences for Wildlife Common to All Alternatives." Effects from plan components to meet desired conditions for vegetation, timber, and fire would be similar to those described under "Environmental Consequences for Wildlife Common to All Action Alternatives."

At-risk species whose habitat is threatened by conifer encroachment (Rocky Mountain bighorn sheep) would benefit from an increase in acres of habitat suitable for timber production relative to Alternative B; whereas, species requiring forest cover, such as lynx and fringed myotis, may experience a greater amount of habitat loss or degradation relative to alternative B. Under this alternative, 10 miles of Colorado River cutthroat trout streams would be suitable for timber production. This could degrade habitat for the Colorado River cutthroat trout and other aquatic species because tree removal near streams could cause increased streambank erosion, runoff, sedimentation, and elevated water temperatures. However, forest plan components would reduce negative impacts from the implementation of vegetation treatments (Environmental Consequences for Wildlife Common to Alternatives B, C, and D; appendix D), and all species would benefit from movement of habitat towards desired conditions in areas where vegetation treatments occur.

Impacts from restricting openings created by timber harvest treatments to 40 acres or less would be similar to those described for alternative B; however, openings could exceed this threshold when determined necessary to achieve desired ecological conditions. This could fragment wildlife habitat by creating open areas that may provide appropriate habitat features, such as cover for elk and deer, or foraging habitat for forest hawks and small mammals.

Management of unplanned ignitions would have similar impacts as described for alternative B. However, the reduced proportion of ignitions that would be managed under alternative D (at least 5 percent of ignitions) and the increased focus on fire suppression would decrease short-term impacts on wildlife and at-risk species, such as the likelihood for disturbance, injury, or mortality. It would also reduce improvements in habitat quantity or quality by reducing the ability or rate at which desired conditions are achieved.

Under alternative D, 15 stream miles of aquatic species habitat would be improved every 5 years. Stream restoration projects would result in improvements to aquatic and riparian species' habitats, as described under "Environmental Consequences for Wildlife Common to All Action Alternatives." Compared with alternative B, the amount of aquatic and riparian habitat improved would be greater because more stream miles would be improved. This would improve habitat conditions for aquatic species to a greater extent than under alternative B; however, short-term impacts, such as temporary sedimentation and the potential for injury or mortality, from carrying out construction activities would also increase.

Effects from Recreation

Under alternative D, more acres of general and at-risk species habitat would occur in destination and general recreation MAs relative to alternative B; fewer acres would fall within backcountry MAs (table 3-19 in "Terrestrial Vegetation" and table 3-40). Compared with alternative B, impacts on wildlife and at-risk species due to recreation would increase. This is because overall recreation would be higher intensity with more facilities, roads, and other disturbances. . At risk species that are sensitive to disturbance, such as fringed myotis, may experience increased disturbance due to increased human presence in their habitat. However, plan components to reduce disturbance to caves would reduce the threat of disturbance to hibernacula (see appendix D). Additional plan components that support habitat characteristics for native species would ensure that habitat for all at-risk species is maintained on the Ashley National Forest, despite impacts from recreation (appendix D).

Effects from Livestock Grazing Management

Alternative D would have the same number of acres for active grazing allotments as alternative A; therefore, impacts on wildlife and at-risk species from livestock grazing would be similar to those described for alternative A. Unlike the other action alternatives, limits to forage utilization and stubble height would not be predetermined, but they would be based on land health standards. This could limit habitat improvements for wildlife and at-risk species if greater forage utilization and lower stubble height were generally used; this would translate to reduced habitat features such as forage and cover.

Relative to the other action alternatives, this alternative would include less stringent plan direction for separation of bighorn sheep from domestic sheep. Components would include a guideline that would provide separation of domestic and bighorn sheep or mitigate the threat of pathogen transfer when permits are waived without preference (FW-GL-WL 09), but it does not specify how it is to be done. This leaves the option open on how to achieve separation or mitigation.

Effects from Designated Areas

Alternative D does not include any additional designated areas, recommended wilderness areas, or wild and scenic river segments classified as suitable for inclusion in the NWSRS. Impacts from managing existing areas would be the same as those described for alternative A.

Cumulative Environmental Consequences for Wildlife, Fish, and Plants

Past, present, and reasonably foreseeable actions that would contribute to cumulative impacts on wildlife and at-risk species on the Ashley National Forest are discussed below. Activities such as recreation and mineral development projects on or near the Ashley National Forest could cumulatively contribute to adverse impacts on wildlife and at-risk species, such as the potential for injury or mortality and habitat loss or alteration. Vegetation management, riparian restoration, and wildlife enhancement projects, such as the High Uintas Wilderness Colorado River Cutthroat Trout (CRCT) Habitat Enhancement project would contribute to beneficial impacts, such as increased habitat quality and quantity. Fuels reduction and conifer reduction projects, such as the Lake Fork Hazardous Fuels Reduction and Wildlife Habitat Improvement Project and the Mill Park Forest Restoration Project, would also improve wildlife habitat by reducing potential threats from catastrophic wildfire and improving wildlife habitat and ecological conditions in the plan area.

Fishing and hunting, which the UDWR and WGFD manage, are other popular recreational activities on the Ashley National Forest. These activities would increase human presence in wildlife and at-risk species' habitat, which may cause disturbance or habitat alterations, as described above. In particular, gun shots would produce sudden, loud noises that could temporarily disturb wildlife and cause fleeing or habitat avoidance or abandonment. Fishing can lead to the spread of aquatic invasive species, such as whirling disease and New Zealand mud snails. Fishing can also contribute to degradation of riparian and aquatic habitat from human presence in these areas.

When combined with the impacts of other surface-disturbing (e.g., recreation and mineral development) projects, restoration and construction (e.g., for vegetation treatments or riparian restoration) projects under all alternatives would contribute to adverse impacts on wildlife and at-risk species, such as the potential for injury or mortality and habitat degradation. The cumulative contribution would likely be greatest under alternatives A and D, which provide fewer protections for wildlife and at-risk species. However, the contribution to such adverse effects would be outweighed by the countervailing positive effects from managing wildlife to alleviate threats to at-risk species and to support their persistence on the Ashley National Forest in the long-term.

When combined with the impacts of other vegetation, riparian restoration, and wildlife habitat enhancement projects, the proposed management efforts would contribute to the movement of habitats for wildlife and at-risk species toward desired conditions. Achieving desired conditions (common to all alternatives), combined with habitat improvements from the vegetation, riparian restoration, and wildlife habitat enhancement projects, would contribute to habitat alterations on a large scale. Habitat improvements may include a decrease in nonnative species, increased availability of habitat features (for example, vegetation cover, structure, and diversity), and increased habitat resilience to disturbances.

The cumulative contribution to habitat improvements would likely be greatest under the action alternatives. This is because they would rely on an ecosystem-level and species-specific approach to habitat management that would contribute to the diversity and long-term persistence of native wildlife and at-risk species. Habitat improvements would ultimately contribute to the recovery of federally listed endangered and threatened species and to maintaining a viable population of each SCC within the plan area and the larger landscape scale.

Social and Economic Sustainability and Multiple Uses

Social and Economic Sustainability and Environmental Justice

Introduction

Local communities, particularly those adjacent to National Forest System lands, benefit from a multitude of goods and services provided by the Ashley National Forest; changes to the management of these resources has the potential to affect these communities. The 2012 Planning Rule states that plans are to guide management so that forests and grasslands contribute to social and economic sustainability, providing communities with ecosystem services and multiple uses that deliver a range of social, economic, and ecological benefits in the present and into the future. This section, therefore, describes the social and economic conditions of the affected environment using key indicators of social and economic sustainability; describes how the Ashley National Forest currently contributes to social and economic sustainability of beneficiaries, both locally and at a broader scale; and evaluates the impacts of the proposed forest plan and alternatives on the benefits the national forest provides to local beneficiaries and the general public. For this analysis, social values are discussed within the context of the ecosystem services section. Additional details for baseline social and economic conditions and contributions from the Ashley National Forest are provided in the socioeconomic assessment completed in advance of this planning effort (Forest Service 2017g).

Regulatory Framework

National Forest Revenue Act (amended 1908)—This act requires 25 percent of revenues generated by National Forest System lands to be paid to the States for use by the counties in which the lands are situated for the benefit of public schools and roads.

Multiple-Use Sustained-Yield Act of 1960—This act identifies principles for managing the resources of the National Forest System. The direction to manage these resources for the greatest good over time includes the use of an economic and social analysis to determine management of the National Forest System.

Forest and Rangeland Renewable Resources Planning Act of 1974 (as amended by the National Forest Management Act of 1976)—This requires consideration of potential economic consequences of land management planning.

Secure Rural Schools and Community Self-Determination Act of 2000 and the subsequent reauthorizations of this act—This act was designed to stabilize annual payments to States and counties containing National Forest System lands and public domain lands managed by the Bureau of Land Management. Funds distributed under the provisions of this act are for the benefit of public schools, roads, and related purposes. Payments are allocated to counties for use in different types of programs or projects, including schools and roads (Title I), projects to benefit forest lands (Title II), and search, rescue, and firewise community efforts (Title III).

Executive Order No. 12898 on Environmental Justice—This EO directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Analysis Area

The socioeconomic area of analysis is defined by both geography and social ties. The analysis area is comprised of Daggett, Duchesne, and Uintah Counties in Utah, and Sweetwater County in Wyoming. These counties represent the functional economy for people living and working around the plan area. Although some effects may occur outside this area, the majority of the effects will likely occur within the four counties, which contain almost the entire plan area. Detailed information related to current social and economic conditions in these counties is included throughout this report.

Additional counties that have social and economic connections to the Ashley National Forest include Uinta County, Wyoming, which is in close proximity and has close economic ties to the Ashley National Forest; Utah and Wasatch Counties, Utah, which contain small portions of the Ashley National Forest; and Summit County, Utah, which shares a boundary with the Ashley National Forest's northern border.

Where relevant, details for these counties are included. The temporal scope of the analysis is the anticipated life of the plan, which is 15 years.

Description of Affected Environment

Social and Economic Conditions

Age

Population age is an important factor of analysis when considering management actions within the Ashley National Forest. Different age groups have different needs, values, and attitudes concerning National Forest management. A younger-than-average population age can indicate the need for family-friendly activities and uses, such as a trail system with ranging degrees of difficulty; an older-than-average population with extra mobility requirements might increase the demand for easily accessible trailheads and camping.

Table 3-44, below, shows the median age and age distribution for each county. For comparison, Utah, Wyoming, and the United States are also included. At 46.1, Daggett County has a median age well above average for both the United States and Utah. In addition, 16.3 percent of its population is over the age of 65. The median age for the other three counties mirrors those of their respective states and are much lower than the United States average (37.9). With the exception of Daggett County, plan area counties also have a smaller over 65 population and a higher population of children and young adults, compared with the national average.

Table 3-44. Analysis Area Percentage of the Population by Age Group (2018)

Location	Median Age	% Population Age 0–5	% Population Age 5–9	% Population Age 10–14	% Population Age 15–19	% Population Age 20–64	% Population Age 65+
State of Utah	**30.7**	**7.7**	**8.0**	**8.3**	**8.0**	**56.5**	**11.3**
Daggett County	46.1	4.1	5.2	8.2	5.9	60.2	16.3
Duchesne County	31.0	9.9	9.2	9.8	7.5	52.5	11.1
Uintah County	30.3	9.4	10.6	8.9	7.2	54.2	9.8
State of Wyoming	**37.3**	**6.8**	**6.7**	**6.5**	**6.5**	**60.4**	**13.1**
Sweetwater County	34.6	7.2	8.1	7.3	7.2	64.3	10.7
United States	**37.9**	**6.1**	**6.3**	**6.4**	**6.6**	**52.6**	**12.6**

Source: Census Bureau 2018

Population Size

Table 3-45, below, provides an overview of the population totals and change by specific towns, cities, and counties in the socioeconomic plan area. Populations for Utah and Wyoming are included for comparison. In the socioeconomic plan area, Daggett County has the smallest population with only 950 residents. Compared with the other Utah counties, Daggett County has also experienced less growth since 1990. Sweetwater County has the highest population of the four counties, followed by Uintah and Duchesne Counties. Duchesne and Uintah Counties had the highest population growth in the socioeconomic plan area, both of which had growth rates above 50 percent. However, they remained below the Utah state growth rate of 77 percent.

Table 3-45. Population in the Socioeconomic Analysis Area (1990–2018)

Location	1990	2000	2010	2015	2018	% Change 1990–2018
Utah	**1,722,850**	**2,233,169**	**2,763,885**	**2,858,111**	**3,045,350**	**76.8**
Daggett County	**690**	**921**	**1,059**	**1,107**	**950**	**37.7**
Dutch John	N/A	N/A	145	103	133	N/A
Manila	207	308	310	193	175	-15.5
Duchesne County	**12,645**	**14,371**	**18,607**	**19,378**	**20,219**	**59.9**
Roosevelt	3,915	4,299	6,046	6,390	6,955	77.7
Duchesne	1,308	1,408	1,690	2,007	1,949	49.0
Uintah County	**22,211**	**25,224**	**32,588**	**34,576**	**36,323**	**63.5**
Vernal City	6,644	7,714	9,089	9,882	10,653	60.3
Wyoming	**453,588**	**493,782**	**563,626**	**575,251**	**581,836**	**28.3**
Sweetwater County	**38,823**	**37,613**	**43,806**	**44,595**	**44,117**	**13.6**
Green River	12,711	11,808	12,515	12,600	12,278	-3.4
Rock Springs	19,050	18,708	23,036	23,684	23,633	24.1

Sources: Census Bureau 1990, 2000, 2010, 2015, 2018

Employment

The employment distribution for the four-county socioeconomic analysis area is shown in table 3-46. The largest employment sector is government (17 percent of total jobs in the analysis area), followed by mining (15 percent), information (12 percent), and retail trade (10 percent). Forest Service management that affects government spending, mining, and recreation could affect the jobs these sectors contribute to the area. Retail spending includes spending associated with recreational visitors to the forest who spend money on supplies and equipment.

The next largest sector is construction (7 percent), followed by a variety of service industries that have an employment distribution ranging from 1 to 7 percent. Agriculture is a relatively small piece of the economy (5 percent).

Table 3-47 provides county-level employment by industry. In 2017, Daggett County's largest employment industry was government (44 percent), followed by agriculture (11 percent), and accommodation and food services (10 percent). Duchesne County's main employment industry was government (18 percent), followed by mining (17 percent), and retail trade (9 percent); agriculture was 9 percent. Uintah County's main employment industry was government (18 percent), followed by mining (12 percent) and retail trade (11 percent); agriculture was 7 percent. Sweetwater County's largest industry was mining (17 percent), followed by government (16 percent) and retail trade (9 percent); agriculture was only 1.4 percent (Table 3-47).

Table 3-46. Analysis Area Employment Distribution by Industry (2017)

Industry	Employment	Percent Employment
Total	**57,330**	**-**
Agriculture, forestry, fish & hunting	2,736	4.8
Mining	8,786	15.3
Utilities	848	1.5
Construction	4,178	7.3
Manufacturing	1,717	3.0
Wholesale trade	1,843	3.2

Industry	Employment	Percent Employment
Retail trade	5,525	9.6
Transportation & warehousing	3,191	5.6
Information	388	12.1
Finance & insurance	1,343	2.3
Real estate & rental	2,772	4.8
Professional—scientific & technology services	1,788	3.1
Management of companies	311	0.5
Administrative & waste services	1,192	2.1
Educational services	383	0.7
Health & social services	3,401	5.9
Arts, entertainment & recreation	592	1.0
Accommodation & food services	4,128	7.2
Other services	2,280	4.0
Government	9,928	17.3

Source: Forest Service data modeled with IMPLAN 2017 and Forest Economic Analysis Spreadsheet Tool

Table 3-47. County-Level Employment by Industry (2017)

Industry	County (%)			
	Daggett	Duchesne	Uintah	Sweetwater
Agriculture, forestry, fish & hunting	11.2	8.7	7.2	1.4
Mining	0.9	16.7	11.7	17.4
Utilities	0.2	0.4	1.4	2.0
Construction	3.8	6.3	7.0	7.9
Manufacturing	2.5	1.7	1.6	4.4
Wholesale trade	1.4	1.9	2.8	4.1
Retail trade	4.4	8.7	11.2	9.2
Transportation & warehousing	6.0	6.9	5.1	5.3
Information	0.0	0.6	0.9	0.6
Finance & insurance	0.4	2.0	2.2	2.7
Real estate & rental	0.7	5.2	5.4	4.4
Professional—scientific & technology services	5.1	2.6	3.1	3.3
Management of companies	0.6	1.2	0.1	0.5
Administrative & waste services	1.0	1.4	2.0	2.5
Educational services	0.0	1.0	1.1	0.3
Health & social services	1.9	7.7	6.3	5.1
Arts, entertainment & recreation	4.7	0.9	0.8	1.1
Accommodation & food services	9.6	4.1	6.8	8.7
Other services	1.7	3.8	5.8	3.0
Government	43.9	18.3	17.5	16.0

Source: Forest Service data modeled with IMPLAN 2017 and Forest Economic Analysis Spreadsheet Tool

Personal Income

Among counties in the four-county analysis area, per capita income in 2018 was highest in Sweetwater County ($53,145) and lowest in Uintah County ($31,563). All area counties were below the state averages (see table 3-48). Average earnings were also highest in Sweetwater County ($74,369) but lowest in Daggett County ($32,980).

The cost to access recreation opportunities on Federal lands is one key factor influencing outdoor recreation use (Cho et al. 2014; Stevens et al. 2014). Personal income levels can, therefore, affect the ability to adapt to an increase in recreation fees (Burns and Graefe 2006), as well as the likelihood of participation in outdoor recreation. Income levels may also affect the level of importance of forest resources (i.e., personal use fuelwood) for individuals and communities.

Table 3-48. Average Earnings and Per Capita Income (2018)

Location	Average Earnings Per Job ($)	Per Capita Income ($)
Utah	52,364	46,320
Daggett County	32,980	41,157
Duchesne County	44,498	36,709
Uintah County	45,392	31,563
Wyoming	55,122	60,361
Sweetwater County	74,369	53,145

Source: BEA 2019

Unemployment

Table 3-49 shows the unemployment within the study area in 2108. Uintah County had the highest rate of unemployment in 2018 (4.7 percent). Unemployment was lowest in Sweetwater County (4.2 percent). The unemployment rate is an indicator of the general economic condition of an area. All counties were slightly above the unemployment rate of the United States as a whole, as well as their respective state unemployment rates.

Table 3-49. Unemployment (2018)

Location	Unemployment Rate (%)
Utah	3.1
Daggett County	4.4
Duchesne County	4.6
Uintah County	4.7
Wyoming	4.1
Sweetwater County	4.2
United States	3.9

Source: BLS 2019

Ashley National Forest Economic Contributions

Overview of Market Contributions

The Ashley National Forest contributes economically to the surrounding region. The contributions are both directly through Forest Service employment, commodity revenues, and tax subsidies, and indirectly through resource development, tourism, and recreational spending. The quantitative economic contributions are assumed to occur in the four-county socioeconomic analysis area. A summary of contributions is provided in table 3-50 and in the text below.

Table 3-50. Estimated Annual Employment and Labor Income Contributions from the Ashley National Forest by Resource Program (2017)

Ashley National Forest Contribution	Employment (Full- and Part-Time Jobs)	Labor Income (Thousands of 2020 Dollars)
Recreation (non-wildlife and fish-related)	53	$1,639*
Wildlife and fish-related recreation	58	$1,865
Grazing	124	$2,100
Timber	28	$1,406
Minerals	8	$841
Payments to states/counties	69	$3,793
Forest Service expenditures	225	$12,763
Total Forest Management	565	$24,407

Source: Forest Service data modeled with IMPLAN 2017 and Forest Economic Analysis Spreadsheet Tool
* Recreation includes local and nonlocal visitor spending.

Direct Expenditures by the Forest Service

The Ashley National Forest's annual budget (including expenditures and salaries, and excluding fire expenditures) was approximately $15.5 million in fiscal year 2017. Approximately 60 percent of the budget was spent on salaries in fiscal year 2017. The remainder was spent on equipment and other non-salary expenditures that contribute to land management. The Ashley National Forest's operational expenditures contribute to economic activity in the communities that surround the lands. Forest Service employees live in these communities and spend their income on housing, food, and a variety of other local goods and services. The Ashley National Forest's non-salary expenditures generate economic activity in businesses that supply goods and services to support Forest Service programs.

Forest budgets may fluctuate over the life of the management plan but are not dictated by the management plan or alternatives. Forest budgets are distributed by an act of Congress; therefore, no variation across alternatives is modeled. Based on the current level of spending, Forest Service expenditures are estimated to contribute 225 jobs and approximately $12.8 million dollars to the regional economy.

Payments to Local Governments

This section discusses payments to local governments associated with payments in lieu of taxes (PILT) and the Secure Rural Schools and Community Self Determination Act of 2000 (SRSCS).

PILT are annual Federal payments made to local governments to offset property tax revenue losses from nontaxable Federal lands held within their boundaries. PILT are meant to subsidize taxes that would otherwise fund government services such as schools, road improvements, and fire suppression. PILT awarded to Uintah and Sweetwater Counties exceeded $3.5 million each in 2015. Duchesne County received nearly $2.8 million in PILT, and Daggett County received less than $400,000 in PILT in fiscal year 2019 (U.S. Department of the Interior 2020). The portion of PILT attributed to National Forest System lands represents a fraction of the total PILT payments to area counties. Total payments for Forest Service acres in study area counties were estimated at $2,287,035 in 2019 (see table 3-51, below).

Table 3-51. Payments to States and Counties due to the Ashley National Forest

Year	PILT*	SRSCS	Mineral Payments
2014	$2,079,154	$948,344	$747,460
2015	$2,121,575	$881,652	$422,000
2016	$2,162,777	No SRS reauthorized by Congress	$173,710
2017	$2,275,446	$1,474,521	$135,810
2018	$2,288,291	$1,376,761	$203,010
2019	$2,287,035	$1,247,617	$123,300

Source: Forest Service 2020g; U.S. Department of the Interior 2020
*Portion of total PILT attributable to National Forest System acres. Additional payments to the analysis area are made as a result of other Federal land management (for example, the BLM).

Counties containing Federal lands have historically received a percentage of the revenues generated by the sale or use of natural resources on these lands. Traditionally, this has been 25 percent of the value of public land receipts, such as revenue from Federal timber sales. A steep decline in Federal timber sales on national forests during the 1990s significantly decreased revenues to local counties. The SRSCS, reauthorized in March 2018, was enacted in part to address this decline by stabilizing payments to counties dependent on revenues from Federal timber sales. Counties are eligible to receive either the 25 percent of the value of public land receipts or the SRSCS funds.

All counties in the Ashley National Forest study area have chosen to receive the SRSCS funds. Total SRS payments to socioeconomic plan area counties are shown is table 3-51, above. The analysis uses an average of the payments in 2014, 2015, 2017, 2018, and 2019. Congress did not authorize the SRSCS Act, and no payments were made in 2016. Because SRSCS payments are not responsive to changes in Forest Service receipts, no variation in these payments occurs across alternatives.

Revenue received under the terms of the mineral leasing laws (lease rentals, bid bonuses, and royalties) are paid into the U.S. Treasury. The Treasury returns 49 percent of that revenue to the state where mineral activities occurred. Some states distribute a percentage of this revenue directly to the counties of origin while others retain the entire amount at the state level (for example, state general fund). These distributions to counties are made, and differed, by state governments, and statistics are not reported back to the U.S. Department of the Interior, Office of Natural Resource Revenue. Because this analysis spans two states with different county distribution methods, the economic impact analysis assumes a 50 percent return from states to counties. This estimated annual county-level return is reported below, and a 5-year average is used in the impact model. While oil and gas production and associated revenues will fluctuate based on global market conditions, this is outside the control of forest management and no variation across alternatives is included in economic modeling.

Revenue sharing payments accounted for 69 jobs and $3.7 million of labor income to the local area economies, based on IMPLAN modeling (table 3-50).

Tourism and Recreation

A national forest visit is defined by the National Visitor Use Monitoring (NVUM) survey as the entry of one person to participate in recreational activities. The NVUM survey estimated 471,000 visits to the Ashley National Forest in 2017. The average group size was 2.8 persons (Forest Service 2017h).

Visits included both nonlocal visitors (those with residences more than 50 miles away) as well as local visitors. Based on 2017 data, nonlocal overnight visitors totaled approximately 27 percent, and nonlocal day visitors totaled 13 percent. Local day-use visitors, from Duchesne, Sweetwater, and Uintah Counties, made up the largest proportion of visitors at 34 percent. An additional 9 percent of local visitors stayed on the Ashley National Forest or surrounding area overnight (White 2017).

Based on national averages, the expenditure per party per trip to the Ashley National Forest is estimated to range from $38 by local day visitors to $355 by nonlocal overnight visitors (in 2019 dollars). The single biggest expense for day visitors was gasoline, followed by food. For nonlocal overnight visitors, the largest expenditure was lodging, followed by food and then gas (White 2017).

Recreation on the Ashley National Forest by nonresidents provides an estimated 108 jobs. In 2017, it accounted for $3.3 million in labor income to the region's economy (table 3-50).

Recreation of particular interest occurring on the Ashley National Forest takes place on the Green River and the Flaming Gorge Reservoir. Popular activities include floating, rafting, and fly-fishing on the Green River and motorized water-based recreation on the Flaming Gorge Reservoir. These activities have created a thriving economic community of outfitters and guides in the northeastern portion of the Ashley National Forest along the Utah-Wyoming border. This area is in Daggett County, in and around Dutch John and Red Canyon, Utah. These activities have seen significant growth in recent years, based on the number of shuttles and number of launches by private companies supporting the Ashley National Forest visitors. Between 2019 and 2020, increased visitation was particularly notable, presumably due to the COVID-19 pandemic and increased demand for local recreation opportunities. From 2019 to 2020, the number of launches by guides and outfitters on the green river increased by 15 percent. Boat ramp sales passes on the Green river also increased by more than 100 percent over the same period.

As a whole, this activity is captured in the 2017 NVUM Program visitor number data that are used to complete the IMPLAN economic and market analysis for recreational use. However, the analysis cannot provide specific market valuations related to these two specific recreational activities. While exact market valuations are not possible, it is clearly a growing and important industry for visitors and private outfitters alike.

The type of recreation on the Ashley National Forest may influence the level of economic contributions. For example, the national average spending per day for nonresident motorized users was estimated to be 41 percent higher than daily spending by hikers or bikers (White and Stynes 2008). Therefore, management decisions that affect the type of recreational use permitted, such as those that restrict motorized use, may affect the level of economic contributions.

NVUM data also include measures of satisfaction reported for recreational users. In general, satisfaction on the Ashley National Forest was reported to be highest for recreationists in designated wilderness. Undeveloped areas had the lowest level of reported satisfaction; however, all visitors reported satisfaction levels above 70 percent for the elements surveyed for all areas. See table 3-52, below, for details.

Table 3-52. Visitor Satisfaction

Satisfaction Element	Developed Site	Undeveloped Areas	Designated Wilderness
Developed facilities	87.7	80.2	96.6
Access	92.6	85.0	88.2
Services	85.3	72.8	85.0

Source: Forest Service 2017h

Mineral and Energy Development

As discussed in "Energy and Minerals," minerals extracted from National Forest System lands on the Ashley National Forest fall into three main categories: locatable, leasable, and salable. On the Ashley National Forest, minerals extraction is largely focused on leasable minerals (oil and gas), with lesser development and production of locatable and salable minerals.

In 2017, mineral extraction on the Ashley National Forest provided an estimated eight jobs and over $841 thousand in labor income to the region's economy (table 3-50). This represents less than 1 percent of regional jobs in the energy and mineral sector. The level of future employment supported would be affected by the level of mineral extraction and market prices.

Forest Products

Timber harvesting on the Ashley National Forest peaked in the late 1980s at approximately 27,000 thousand board feet (MBF) and has averaged between 4,000 and 6,000 MBF since 2001 (see "Timber" for additional details). Utah's commercial timber harvest in 2016 was 24,900 MBF, 80 percent (19,800) of which was harvested from national forests (Hayes et al. 2018). The Ashley National Forest supplied 4,300 MBF in 2016, which is approximately 22 percent of the national forest timber harvested in Utah (Forest Service 2018c). Duchesne County had approximately 5.2 percent of total harvest in 2016, and Uintah County had 2.2 percent, although only a portion of this was from National Forest System land (Hayes et al. 2018). There are seven local mills or potential large-scale bidders in the Uintah Basin, including two in Duchesne, two in LaPoint, one in Tridell, one in Neola, and one in Vernal.

Based on economic modeling of 2017 data, the Ashley National Forest timber harvesting program contributed 24 jobs and $1.4 million in labor income to the region's economy (table 3-50). Labor income estimates include saw timber and removal of poles, posts, and fuelwood harvested for nonpersonal use.

The trend in demand for Ashley National Forest wood products, particularly for non-saw timber material, is declining. Supply for non-saw timber material is currently exceeding demand. The offering of this material in recent years has exceeded the local purchasers' capacity due to a backlog of prior wood sales. Demand for sawtimber material, especially green sawtimber, has remained relatively constant in recent years. Fuelwood consistently represents the bulk of forest products sold from the Ashley National Forest.

A history of fire suppression, other human uses, and vegetation management direction have resulted in a departure from historical vegetation conditions on much of the Ashley National Forest. An increased density of vegetation and encroachment of conifers into shrub communities further increase the chance of high-intensity wildfire, particularly in the wildland-urban interface where the chance of human-caused ignition is increased. Should fire occur, timber resources would be affected, and the social, economic, and ecological contributions would be affected. An additional discussion of fire management and current conditions is discussed in "Fire and Fuels."

Livestock Grazing

Agriculture plays an important economic and social role in some parts of the socioeconomic plan area. According to the 2017 Census of Agriculture, Daggett, Duchesne, and Uintah Counties ranked twenty-five, fifth, and tenth, respectively, of all counties in Utah's cattle production (NASS 2017). Of Wyoming's 23 counties, Sweetwater County ranks twenty-first and Uinta County ranks eighteenth in cattle production (NASS 2017).

The Forest Service authorizes grazing permits through payment of a grazing fee that is based on HMs, defined as 1 month's use and occupancy of the range by one weaned or adult cow with or without a calf, a bull, steer, heifer, horse, burro, or mule, or five sheep or goats. Current permitted use on the Ashley National Forest authorizes 76,922 HMs. This includes approximately 3,000 animal unit months (AUMs) administered by the BLM. The BLM bills based on AUMs, an AUMs is defined as the amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month. The forest plan will not make management decisions for these AUMs. Authorized use varies by year based on forage or other resource conditions or permittee modifications, but it has historically been close to the permitted use level.

There are currently 99 permittees holding permits for grazing on the Ashley National Forest; most are in Duchesne (44.6 percent) and Uintah (32.6 percent) Counties. Sweetwater County has 5.6 percent of grazing permittees, while Daggett County has only 4 permittees. There are 39 permittees on the BLM-administered Ashley National Forest grazing allotments in Wyoming. Most typical ranches depend only partially on Federal land grazing for forage. However, economic studies have shown that this forage source can represent a critical part of their livestock operation, particularly as a summer forage source. Federal livestock grazing affects livestock production and the viability of individual agricultural operations (Taylor et al. 2004). Grazing is likely to continue to represent an important economic sector for some communities and will help to maintain a traditional cultural setting.

Additional details of baseline conditions for livestock grazing are discussed in "Livestock Grazing." Up to 124 jobs and $2.1 million in labor income would be directly or indirectly supported by grazing on the Ashley National Forest (table 3-50). Grazing and timber jobs combined represent approximately 4.3 percent of regional jobs in the agricultural sector.

Ecosystem Services

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling (MEA 2005). The Ashley National Forest's ecosystem services contribute to social and economic sustainability. Local economies benefit from the availability of ecosystem goods and services, such as recreation and grazing lands, as well as other natural resources. Individuals in local communities have benefited from a host of services such as recreation, scenery, employment, and opportunities to connect with nature. Key ecosystem services identified for the socioeconomic plan area were identified based on the 2017 assessment (Forest Service 2017g), project scoping, and a project in partnership with Duke University's Nicholas Institute for Environmental Policy Solutions (Olander et al. 2021).

Provisioning Services

Provisioning services are broadly described as products derived from ecosystems. These products can include a broad spectrum of products from raw materials, minerals and energy products, water, and medicinal resources. On the Ashley National Forest, the key provisioning services are those products discussed in detail under "Ashley National Forest Economic Contributions," above. These contributions include, but are not limited to, wood products, forage, and minerals and energy products (i.e., oil and gas, as described below). Harvest and extraction of these resources—and maintenance of the habitat to support long-term use of these resources—contribute to food sources, recreation, jobs, and spending of tourism dollars in the local area. These contributions represent not only direct economic contributions but support for maintained social and cultural values in the socioeconomic analysis area. Key services of minerals and energy, wood products, and livestock forage are discussed further below.

In addition, National Forest System land contributes to the livelihoods of area residents through subsistence uses. Public lands provide products of value to households at no or low cost (permit fees). Subsistence uses are fuelwood, boughs and Christmas trees, and additional products, such as fish, game, plants, berries, and seeds. Use of these products is often part of tradition and sustains local culture; these uses have importance for certain groups, such as the Ute Indian Tribe. Krannich (2008) found that Daggett, Duchesne, and Uintah Counties have a high level of participation in non-commodity materials and resources collected from public lands. Nearly 26 percent of survey respondents in the study cut firewood for home use on public lands, 30 percent cut Christmas trees, and 32 percent gather rocks for home landscaping. Additionally, pinyon nut gathering, fossil collecting, and wild berry and herb collecting for food are popular activities. The importance of wood products for general public use is discussed under “Forest Products,” below. Resources of specific importance for local tribes are discussed under “Tribal Resources,” below, and in “Areas of Tribal Importance.”

Forest Products

Timber is an example of a resource that represents a provisioning service with both market and nonmarket value. Timber harvesting represents a traditional source of employment in the socioeconomic planning area, as discussed under the “Ashley National Forest Economic Contributions” section. Timber products from the Ashley National Forest are not currently a major economic driver in the regional economy due to the small area suitable for harvest and the generally lower commercial value of wood products harvested. Locally, however, wood product sales help support a number of sawmills and smaller business; they also provide an inexpensive source of fuelwood for area residents. In a 2008 survey, 80 percent of respondents in Daggett, Duchesne, and Uintah Counties felt that having forested areas that are available for timber harvesting is moderately or very important to the overall quality of life in their community (Krannich 2008). Commenters in the public scoping period also stated a request to increase timber production to achieve desired vegetation conditions and to stimulate local economies.

Use of fuelwood also represents a traditional source of fuel and a subsistence use for some area residents. In addition, timber enhances the forest scenery, attracting visitors and providing cultural services for visitors and residents. Participants in the 2008 Beliefs and Values study (Russell 2008) describe timber as having aesthetic, as well as economic, value.

Livestock Forage

Vegetation within permitted allotments in the plan area provides a source of forage to support livestock. Availability of forage on the Ashley National Forest can support area ranching operations as an important seasonal source of forage. As such, forage use supports local ranching operations and provides for continuation of this traditional way of life in the region. Commenters in public scoping noted the importance of forage from National Forest System lands for livestock grazing and stated that flexibility in management of forage could benefit local livestock producers, enhance the sustainable multiple-use of forest resources, and support economic activity.

Energy and Minerals

Oil and gas development is recognized as representing an important source of raw materials from the Ashley National Forest and other public lands in the region. In a 2008 survey of public land uses in Utah (Krannich 2008), 76 percent of respondents from Dagget, Duchesne and Uinta Counties rated development of energy resources as “very important” for the quality of life of people living in their communities. In addition, 68.4 percent of respondents from the three-county area wanted mineral exploration or extraction to “stay about the same or moderately increase” on public lands in Utah. Public lands in this survey were defined as Federal lands managed by the Forest Service, the BLM, the National Park Service, and other agencies.

In the 2008 Beliefs and Values study (Russell 2008), participants also noted the contribution of economic benefits to local communities, as well as the benefit provided to national energy reserves. Others, however, noted the impacts of increased development as a result of energy activity and the changes to communities and social structure that result. Participants in the study noted population growth, increased diversity among residents, increased employment, higher wages, increased housing prices, decreases in the availability of affordable housing, increases in substance abuse, increases in traffic, strains on infrastructure, and an overall "busy" pace of life (Russell 2008).

Tribal Resources

The Ashley National Forest contains Ute and Shoshone original homelands, which remain significant for tribal identity and cultural traditions. The Ashley National Forest supports a variety of tribal resources, as discussed in "Areas of Tribal Importance." Key resources with tribal importance include gathering of plants for various purposes (religious, medicinal, consumption, and other applications), as well as hunting and fishing for subsistence use and ceremonial purposes. Key tribal resources and relevant habitat types are identified in table 3-53, in "Areas of Tribal Importance."

Cultural Services

Cultural services are defined as benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences, and cultural heritage values. These can include cultural significance (e.g., use in books and paintings), spiritual and historical use (e.g., sites with religious or historical importance), recreational experiences, and educational or scientific importance (e.g., sites used for education or scientific study). Affiliated tribes, locals, recreationists, and the general public are communities that depend on access to and conditions of resources on the Ashley National Forest.

Some cultural values can be described as nonuse values. Nonuse values are the values that people assign to economic goods if they never have and never will use them. Nonuse values, as a category relevant to the Ashley National Forest, include the following:

- Option value—The value placed on maintaining an asset or resource, even if there is little or no likelihood of the individual ever using it. The option value occurs because of uncertainty about future supply (the continued existence of the asset) and potential future demand (the possibility that it may someday be used). An example of an option value is desiring the maintenance of timber resources due to concern of limited future supply.
- Bequest value—The value placed on maintaining or preserving an asset or resource so that it is available for future generations. An example of a bequest value is preserving species for future generations.
- Existence value—The benefit people receive from knowing that a particular environmental resource exists. An example is the preservation of wilderness areas and undeveloped spaces.

The key cultural services on the Ashley National Forest are cultural heritage values, aesthetic values, and recreation, as described further below.

Cultural Heritage Values and Traditional Uses

Agriculture, including livestock grazing, represents an activity with cultural ties to the plan area. Livestock grazing contributes to cultural services through the preservation of open space and the pastoral scenery, as well as by preserving traditional ways of life. Based on input in the 2008 Beliefs and Values study (Russell 2008), agricultural heritage is of particular importance in the region. Commenters noted that oil and gas have always been up and down, but agriculture has been steady. Sustaining grazing is also perceived to offer benefits to the custom and culture of rural communities. Additionally, hunting and fishing on the Ashley National Forest represent traditional uses that have ties to subsistence, and they may be experienced with multiple generations of a family; therefore, they have value as a cultural service.

Recreation
Values of recreation can be described as use values or nonuse values. Recreational fishing, hunting, boating, hiking, biking, off-roading, and skiing are all nonmarket use values associated with recreation on the Ashley National Forest. Nonuse values associated with recreation include existence values, such as the inherent worth in knowing that the pristine High Uintah Wilderness exists on the Ashley National Forest.

Participation in recreation can support wellness and personal enrichment. In addition, the undeveloped landscapes of the Ashley National Forest support those seeking solitude and a place where people can reconnect with nature to escape the stresses of everyday life. Many people retreat to forests because they foster a sense of oneness with nature, which can stimulate contemplation, exploration of identity, and spirituality. Recreational hunting, fishing, and wildlife viewing also represent important forms of recreational use. Once user traditions are established, many users return to the Ashley National Forest regularly because of the unique opportunities associated with fish and wildlife resources and the local scenic environment associated with the pursuit of these activities.

Landscapes, wildlife, and other features provide scenic resources appreciated by recreationists and other visitors to the Ashley National Forest. While aesthetic value is not a socioeconomic outcome, it supports a variety of uses on the forest. Recreationists, local outfitters, and guides directly benefit from these landscapes and features, while local businesses benefit from spending by Ashley National Forest visitors. Commenters in public scoping noted the importance of continued recreation opportunities for local communities and residents and opportunities for motorized recreation in both summer and winter; infrastructure to support recreation was identified as a management priority for the Ashley National Forest.

It should be noted that the type of recreational use can support different values. For example, motorized access for recreation can support use for participants who may have limitations on mobility. In contrast, limitations on motorized recreation support participants who value solitude and opportunities for quiet recreational experiences.

Regulating Services
Regulating services are defined as benefits obtained from the regulation of ecosystem processes. Examples include carbon sequestration and climate regulation, waste decomposition and detoxification, and purification of water and air. Key services on the Ashley National Forest include climate and water regulation.

Fuels Mitigation/Fire Management
Active and passive forms of fuels management support the return of the forest to historical fire regimes, and can minimize the risk of uncharacteristic fire for local communities; this is described in detail in “Fire and Fuels.” Uncharacteristic fire (i.e., high-intensity, large fires) can affect area residents and visitors through the potential for property damage, closures, evacuations, and health impacts from smoke.

Climate Regulation and Adaptation
Management of forest and timber resources to sustain long-term forest vegetation acts as a carbon sink to support carbon sequestration. Management of fuels and wildfire influence the regional response to fuels and the potential for large-scale wildfire. Additionally, future adaptive management of vegetation and ecosystems will affect the ability of the Forest Service to respond to change based on a changing climate.

Water Regulation

Water regulation represents a key service on the Ashley National Forest, which contains physical, chemical, and biological characteristics that enable vegetation and soil to filter and absorb surface water. This replenishes underground aquifers and moderates runoff during rainstorms. Water filtration services, provided by well-functioning ecosystems, help maintain the integrity of the watersheds. By managing for the health of forest ecosystems, the Ashley National Forest directly contributes to regional water quality and helps reduce financial costs associated with quality of water supplies. Communities that may benefit from regulating services include all local area residents and those recreating on the Ashley National Forest and aquatic habitats.

Supporting Services

Supporting services are the underlying natural processes that sustain ecosystems and enable the production of all other ecosystem services. The Ashley National Forest sustains ecosystems on which plant and animal habitat depends. For example, soil formation, nutrient cycling, the production of oxygen, and evapotranspiration are factors that influence and shape characteristics of ecosystems on the Ashley National Forest. In addition, processes support the diversity and abundance of plants and animals provided by these habitats and ecosystems. For example, reforestation, natural succession, genetic variability, migration, and species interaction are shaped by these forest characteristics.

Support for pollinators and habitat connectivity represents key services on the Ashley National Forest, which help support intact ecosystems for the support of other services. Communities that benefit from these services include recreationists, and researchers and students who benefit from opportunities for interpretation and learning. In addition, these services support communities interested in traditional and cultural uses by supporting specific habitats important for subsistence and other uses. Recreationists, local ranchers, the timber industry, and users of non-timber forest products also benefit from this suite of services.

Habitat Connectivity

The Ashley National Forest supports habitat connectivity across a wide range of ecosystems. This includes support for SCC. Management influencing the location, level, and type of development can influence the degree to which habitat connectivity is supported. The maintenance and enhancement of habitat supports the continued presence of terrestrial and aquatic wildlife for recreation opportunities. In addition, conservation of at-risk fish and wildlife species for the future represents an important nonuse value.

Pollinator Support

Vegetation and ecosystems on the Ashley National Forest provide support for pollinators. In turn, pollinators support both natural ecosystems and agriculture. Management influencing vegetation communities and invasive species control has the potential to influence pollinators.

Environmental Justice

Issued in 1994, EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was established to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of Federal environmental laws, regulations, and policies. Fair treatment means that no specific group of people, including racial, ethnic, or socioeconomically defined communities, should bear a disproportionate share of the negative environmental consequences resulting from the execution of Federal, State, local, and tribal programs and policies.

To the extent practical and appropriate, Federal agencies shall use this information to determine whether their programs, policies, and activities have disproportionately high and adverse human health or environmental effects on minority or low-income populations. The president's Council on Environmental Quality (CEQ) developed guidance on environmental justice terminology and identifying minority populations; it provides the following definitions:

- The minority population of the affected area exceeds 50 percent or is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997). "Meaningfully greater," for the purpose of the analysis in this plan, is defined as more than 5 percent higher than the comparison population at the state level.
- The total minority population is defined as the total population minus that portion that is listed in U.S. Census Bureau data as White, of non-Hispanic origin. This method includes all individuals who identify as a racial or ethnic minority, or both, without double counting these populations.
- Low-income populations are defined relative to the annual statistical poverty thresholds from the U.S. Census Bureau (CEQ 1997). CEQ guidance does not provide criteria for determining low-income populations as specifically as it does for minority populations; therefore, for this analysis, low-income populations are defined as 50 percent or more of the population in the affected area being below the poverty level, or populations with at least 5 percent more people at or below the poverty level, relative to the state average level in poverty.

For the purpose of identifying a minority population concentration, the comparison population used in this report are the states of Utah and Wyoming. For the purpose of this analysis, "meaningfully greater" has been defined as 5 percentage points or more above the reference population (Grinspoon et al. 2014). For low-income populations, all populations with median household incomes below the poverty threshold, or populations with the total percentage of individuals above the state poverty level, are examined for further analysis. In addition to the above, Federally recognized tribes are considered environmental justice populations in and of themselves; when possible, they are included in the analysis as separate minority populations.

Table 3-53 presents percentages for minority populations and populations below the poverty line within the socioeconomic plan area. Populations were examined at the county and community level. Uintah County and the City of Vernal, Utah, were identified as communities for further environmental justice analysis based on the total minority population. It should be noted that local minority populations include members of the Ute Indian Tribe, and that the Forest Service seeks free, prior, and informed consent from the tribe when making decisions that could affect the tribe or its interests.

Table 3-53. Minority and Low-Income Populations within the Socioeconomic Plan Area (2018)

Geography	Racial and/or Ethnic Minority Population as Percentage of Total Population*	Population Below Poverty as Percentage of Total Population	Meets "Meaningfully Greater" Environmental Justice Threshold
State of Utah	21.4	10.3	
Daggett County	5.7	4.7	
Town of Dutch John	0.0	0.0	
Town of Manila	0.0	3.4	
Duchesne County	14.7	13.3	
City of Duchesne	7.5	15.1	
Uintah County	***39.8***	***11.9***	***Yes***

Geography	Racial and/or Ethnic Minority Population as Percentage of Total Population*	Population Below Poverty as Percentage of Total Population	Meets “Meaningfully Greater” Environmental Justice Threshold
City of Vernal	20.4	***20.8***	***Yes***
State of Wyoming	15.9	11.1	
Sweetwater County	20.4	12.0	
City of Green River	23.1	12.4	
Uinta County	12.5	12.5	

Source: Census Bureau 2018
* Minority population calculated based on total population minus those identifying as White of non-Hispanic origin. The remainder of the population identified as one or more racial or ethnic minority groups.

Environmental Consequences for Social and Economic Sustainability

General Methodology and Analysis Process

This section presents the social and economic consequences of implementing the alternatives. A quantitative analysis, in the form of jobs and labor income contributions, is provided for market transactions that result from activities on the Ashley National Forest. A qualitative analysis is provided for values associated with ecosystem services supporting the quality of life for visitors and communities near the Ashley National Forest. The social benefits can be used or valued differently by different groups and communities. The Ashley National Forest assessment, completed in 2017, provided an in-depth study of social and economic conditions and local community values and beliefs; the affected environment, above, provides a summary of the key ecosystem services, including social benefits, that the Ashley National Forest offers.

It should be noted that conditions outside Forest Service management control, including market trends and demographic changes, will continue to affect socioeconomic conditions. Unless otherwise noted, all effects are for the life of the forest plan (15 years). The effects in this section are organized by the applicable indicators of effect identified below.

Analysis Assumptions

- The economic impact analysis area is comprised of Daggett, Duchesne, and Uintah Counties in Utah, and Sweetwater County in Wyoming; these represent the functional economy for people living and working around the plan area. Although some effects may occur outside this area, the majority of the effects will likely occur within the four counties, which contain almost the entire plan area. Quantitative contributions to the local economy, below, are estimated using this economic analysis area.
- Under all alternatives, recreational use, as measured in Ashley National Forest visits, would increase from current conditions over the 15-year planning period due to population growth.
- In most instances, the precise changes in indicators among alternatives are unknown. Therefore, the estimates are based on the professional expertise of the resource specialists and previously done research.
- Oil and gas production and the associated revenues (and, therefore, the actual economic impact) will fluctuate based on global market conditions.

- Forest budgets (that affect expenditures and salaries) are distributed by an act of Congress and may fluctuate over the life of the management plan; they are not dictated by the management plan or alternatives.
- Providing for improved economic and social benefits to communities in and around the Ashley National Forest will continue to be a focus of the Forest Service's management.
- All alternatives in the proposed forest plan are expected to achieve desired conditions that contribute opportunity for local Native American communities.
- When needed, projects implemented on the Ashley National Forest would require a site-specific analysis of their potential impacts on local social and economic impacts and environmental justice.
- The community's ability to participate in the NEPA process would be retained across all alternatives.

Indicators

Changes to the following economic and social indicators are used to discuss the impacts of proposed management:

Economic Indicators

- Regional employment and income

Ecosystem Service Indicators

- Recreational experience
- Cultural heritage values and traditional uses
- Fire and fuels management
- Climate regulation and adaptation
- Intact ecosystems
- Water regulation
- Energy and mineral products

Environmental Justice Indicators

- Disproportionately high or adverse impacts on environmental justice communities
- Exposure pathways for environmental justice communities

Details for the indicators and methodology used to analyze each indicator are included below.

Economic Impacts Analysis Methods

The Forest Service estimated economic effects on the Ashley National Forest economic area of analysis through the use of a regional input-output model (IMPLAN); the Forest Service also evaluated an assessment of impacts on selected industrial sectors of the economy, including recreation, timber, and livestock grazing. IMPLAN is a regional economic impact model that provides a mathematical account of the flow of dollars and commodities through a region's economy. This model provides estimates of how a given amount of an economic activity translates into jobs and income in the region. By using Forest Service expenditure data, resource output data, and other economic information, IMPLAN can describe the jobs and income that are supported by Forest Service management activities. The Forest Economic

Analysis Spreadsheet Tool (Aphelia), a spreadsheet modeling tool developed by the Forest Service, uses a Microsoft Excel workbook as an interface between user inputs and data generated using the IMPLAN input-output modeling system.

Economic impacts are described in terms of direct, indirect, and induced impacts. Direct impacts, such as income and employment, are directly affected by activity on National Forest System land (for example, money spent on accommodations and food by recreational visitors). Indirect impacts occur when related industries gain from purchases by the directly affected businesses (for example, the purchase of supplies by food and accommodation businesses). Induced impacts are the results of spending by employees hired due to the business activity. Together, these are reported as the total impact of the different management alternatives. Together, the direct, indirect, and induced effects comprise the total economic impact on the local economy.

The analysis was conducted for the economic area of analysis, which, as described in the affected environment section, included the four counties. The model for this analysis used the 2017 IMPLAN data, which is the latest available dataset that the Aphelia application supported at the time of the analysis. Unless otherwise noted, results are provided in 2019 dollars.

Details for the methodology used to provide the quantitative analysis for the primary uses on the Ashley National Forest with economic contributions likely to vary based on proposed management (livestock grazing and timber) are provided below. Regional economic contributions are also estimated for contributions that are not likely to vary by alternative, including recreation, mineral development, Forest Service expenditures and salaries, and payments to counties and States. These contributions are detailed in "Environmental Consequences Common to All Alternatives."

Recreation

The two determining factors of economic input for recreation are visitor numbers and how much each visitor spends while in the area.

Total annual recreation visits were obtained from the National Visitor Use Monitoring (NVUM) program most recent data to estimate average annual visitor numbers (Forest Service 2017h). For this analysis, an estimated 470,000 recreational visits annually was assumed. The actual visitation level is likely to vary, based on regional and national economics and other factors. Recreation visits with a primary focus on wildlife-related recreation (including wildlife viewing, hunting, and fishing) are also captured separately. See table 3-54, below.

Table 3-54. Estimated Annual Ashley National Forest Visitors

Visitation Type	2012	2017
Wildlife-related visits	120,655	162,024
Total visits	295,000	471,000

Sources: Forest Service 2017h, 2012b

Note: A national forest visit is defined as the entry of one person upon a national forest to participate in recreation for an unspecified period of time. Wildlife-related visits include those where the primary activity was viewing wildlife, fishing, or hunting.

Generally, the specific recreational activity has a secondary influence on visitor spending when compared with the type of visitation (i.e., day or overnight). The distribution of visitor type (i.e., local or nonlocal visitor) and use type are based on the most recent round of monitoring and are used to estimate visitor spending. Visits are broken out by recreation trip type. The NVUM trip type segments help explain differences in spending of distinct subgroups of visitors. Spending averages for different trip type segments are statistically and practically different for each trip segment (White 2017).

Traditionally, an economic impact analysis for recreation measures only the effects of “new” income in the economic area of analysis, based on spending of nonlocal residents on local recreation. The premise is that spending by local residents does not represent an additional source of economic activity in the area. In the absence of forest recreation opportunities, spending by local residents would continue using local substitute recreation opportunities. Local residents, however, can make considerable recreation-related expenditures (based on spending on such items as gas and food). Therefore, to capture the importance to local communities, this analysis provides a contribution analysis, which captures spending by both local and nonlocal residents (defined here as those who traveled more than 50 miles to the Ashley National Forest).

While the recreation experience and type of activities engaged in may vary based on alternative selected, and overall recreation is anticipated to increase over time, no change to the overall level of visitation or the origin of visitors (i.e., local versus nonlocal) is anticipated by alternatives. As a result, the estimated economic contributions are constant across all alternatives.

Livestock Grazing

Livestock grazing represents a historical use with current contributions to local area economies. The level of use on the Ashley National Forest varies in response to changing forage conditions due to factors such as drought or fire. In some years, full permitted numbers are authorized; in other years, fewer numbers are authorized. The authorization level over the past 5 years has been close to 100 percent; therefore, the analysis assumes 100 percent of permitted HMs are authorized. Current management economic contributions were, therefore, estimated using an average of permitted use over the 5-year period of 2015 through 2019. Changes across alternatives are estimated as changes from this baseline. Actual use is determined annually based on several factors, such as current forage and market conditions.

For consistency, the analysis assumes that current market demand for livestock products would continue over the planning period with a continuing demand for grazing on the National Forest System lands. Economic contributions to the regional economy from permitted use are determined based on National Agricultural Statistical Service employment and farm production expenses for beef cattle ranching and farming and sheep and goat farming. It should be noted that the input for the economic contribution model evaluating grazing use on federal lands using AUMs as a metric for comparison. To stay consistent with other sections, however, this discussion will use HMs.

For changes under alternative C due to exclusion of livestock from destination recreation areas, the Forest Service used a GIS analysis to locate pastures that would be affected by plan components that close specific management acres to livestock grazing. It was assumed the impact on permitted HMs per pasture would be proportional to the affected area. These affected pastures see a 3.3 percent reduction in HMs in alternative C. This is a much smaller 0.14 percent reduction in total HMs forestwide.

Timber and Forest Products

Estimated annual forest product volumes harvest data are used to estimate the economic impact of timber-related activities by alternative (see table 3-55). Alternative A represents a 10-year average of volume sold to lessen the effects of annual fluctuations. Alternatives B and C are estimates of available volumes based on the alternatives. Details of how these estimates were developed may be found in attachment C to the proposed plan and the “Timber” section. These timber volumes are used to estimate the economic impact

Table 3-55. Estimated Annual Forest Product Volume by Product Type

	Current/ Alternative A	Alternative B	Alternative C	Alternative D
Harvested for sawmills (e.g. sawtimber) (CCF)	2,054	5,118	3,440	5,278
Poles and posts (CCF)	1,482	1,440	1,170	1,497
Fuelwood (CCF)	5,816	5,204	5,204	5,204
Total	**9,353**	**11,762**	**9,814**	**11,979**

Source: Forest Service estimates. See proposed plan, attachment C

of timber-related activities on the Ashley National Forest. The direct effects of timber and wood product sales were estimated using direct response coefficients developed from a national timber mill survey conducted by the University of Montana's Bureau of Business and Economic Research (Sorenson et al. 2016). This survey provided more regional-specific information than that in the default IMPLAN model. The indirect and induced effects were generated by the IMPLAN model.

Fuelwood represents the dominant use of wood products on the Ashley National Forest. Historically, over 90 percent of the fuelwood volume removed from the forest has been through individual permits. This provides important value to those who use this wood to heat their homes, but will not contribute to jobs or income estimates presented in the impact analysis. There are numerous commercial fuelwood operations and five sawmills that process timber in the economic analysis area, as detailed in "Timber."

Ecosystem Services Analysis Methods

As discussed in "Description of Affected Environment," above, the Ashley National Forest provides socioeconomic benefits via ecosystem services in the form of market contributions (measured by jobs and income, as discussed above) and in the form of contributions for values that cannot be easily measured in the market, such as impacts on quality of life. As detailed in "Description of Affected Environment," ecosystem services provided by the Ashley National Forest can be broken down into separate categories based on the type of services that they provide. An overview of the types of services analyzed for the categories is provided below.

As insufficient data and resources are available to assign quantitative values to most ecosystem service impacts that may result from changes among alternatives, the analysis considers potential impacts primarily in qualitative terms. This is consistent with direction provided in 40 CFR 1502.23 and the Forest Service's 2012 Planning Rule regulations. Details for the metrics included are provided below for each indicator.

Table 3-56. Key Ecosystem Services and Indicators

Indicators	Type of Ecosystem Service			
	Provisioning Service	Cultural Service	Regulating Service	Supporting Service
Recreation experience and access		X		
Wildfire protection and fuels mitigation			X	X
Water quality and quantity	X		X	
Cultural heritage value and traditional uses*	X	X		
Intact ecosystems				X
Climate regulation and adaptation			X	

Indicators	Type of Ecosystem Service			
	Provisioning Service	Cultural Service	Regulating Service	Supporting Service
Energy and mineral products	X			

* Includes discussion of livestock forage, and timber and forest product availability, as these represent traditional extractive uses on the Ashley National Forest

Provisioning Services

Indicators of key provisioning services identified on the Ashley National Forest include timber and forest products, water quantity and quality for municipal use, energy and mineral products, and livestock forage. The impacts of proposed management on the availability of these resources are discussed at length in other sections of this report. The discussions by alternative will refer to these sections, as appropriate.

In terms of ecosystem services provided by these resources, the level and quality of the available resource can affect the availability of the resource for use by local communities, as well as the jobs, income, and taxes associated with development and use of these resources. The potential for impacts is discussed in terms of the relative importance of these resources in the regional setting.

Cultural Services

Recreation access and experience—Recreation access and experiences, and the value that individuals and communities obtain from these services, vary depending on user groups. The table below (table 3-57) identifies key user groups on the Ashley National Forest and the recreation areas and amenities that have been determined to be most relevant to these user groups based on the type of use prioritized by these groups. Recreation management that results in changes to the size of these recreation areas or the access to, or quality of, the specific amenities would result in a change to the recreation experience. These changes may alter the users' level of satisfaction with forest recreation experiences. The analysis examines the potential changes to visitors' experience and satisfaction level based on changes to the size of recreation areas, the ability to access recreation areas, and the availability and quality of specific amenities based on proposed management changes. Available information on the current satisfaction level and visitation levels for different user groups is provided for context where available and appropriate.

Cultural heritage values and traditional uses—Traditional uses of forest resources include primarily livestock grazing, timber and wood product harvest, and hunting. The analysis includes an assessment of the level to which the continued use of or access to these resources is permitted. It also includes a discussion of how vegetation management would affect these uses. In addition, this analysis examines impacts on forest resources used in traditional cultural practices by Native Americans. Key uses are detailed in the tribal resources crosswalk (table 3-57). The degree to which proposed management would affect relevant habitat types, and in turn the specific resources of importance, is discussed.

Supporting Services

Intact ecosystems—Supporting services, such as pollinators and wildlife habitat, represent the ability of the Ashley National Forest to provide for diverse ecosystems with a variety of plant and animal species, including those with intrinsic or economic importance for people, or both. The discussion of potential impacts on intact ecosystems refers to the analysis in the vegetation and fish and wildlife sections of this report. It also provides an overview of the trends that would be anticipated in the ability of the Ashley National Forest to support these services.

Table 3-57. Recreation Experiences Matrix

User Group	Area Type				Specific Amenities						
	Wilderness Area/Recommended Wilderness	Destination Recreation Areas	Backcountry Recreation Areas	General Recreation Areas	Remote Areas with Low Use	Disability-Accessible Trails, Restrooms, and Parking Areas	Developed Recreation Sites, such as Campgrounds, Picnic Areas, and Interpretive Sites	High-quality game species habitat	High-quality fishable waterways	Trails with mechanized access	Trails with motorized access
Solitude seekers	X	-	X	-	X	-	-	-	-	-	-
Families	-	-	-	-	-	X	X	-	-	-	-
Large groups	-	X	-	X	-	-	X	-	-	-	-
Mobility-impaired visitors[1]	-	X	-	X	-	X	X	-	-	-	X
Hunters	X	-	X	X	-	-	-	X	-	-	X
Anglers	X	-	-	X	-	-	-	-	X	-	X
Commercial outfitters (boat trips)	-	X	-	X	-	-	-	-	X	-	-
Mountain bikers	-	-	-	X	-	-	-	-	-	X	-
OHV users	-	X	-	X	-	-	-	-	-	-	X
Cultural and historic site visitors	-	X	-	X	-	-	X	-	-	-	-
Tribal populations	X	X	X	X	X[2]	-	-	X[2]	X[2]	-	-
Environmental justice populations	-	X	-	X	-	-	X	-	-	X	-

Source: Forest Service 2020f

[1] Includes those with mobility disabilities and elderly visitors

[2] Potential importance for spiritual and cultural significance

Regulating Services

Wildfire protection and fuels mitigation—For communities near the Ashley National Forest, the ability of the Forest Service to support management of wildfire risk in the region is one the of the key services provided. Based on the proposed management for vegetation and fire, and the analysis in those respective sections, the degree of support for community fire protection and fuels mitigation is discussed by alternative.

Climate regulation and adaptation—The discussion of climate regulation and adaption relies on the analysis in the climate section of this report. It provides a qualitative analysis of the relative level of proposed management to provide resilience to change in the face of future climate change.

Water regulation—The discussion of water regulation services includes reference to the analysis in the water resources section. The potential for impacts from development activities and vegetation treatments is discussed in the context of the ability of the Ashley National Forest to support water regulation services for the benefit of local municipal watersheds and for aquatic habitats.

Environmental Justice Analysis Methods

Disproportionately high or adverse impacts on environmental justice communities—Environmental justice involves examining disproportionately high or adverse health impacts resulting from management or other activities that impact the environment proximate to or within a community. The CEQ has interpreted health effects with a broad definition: “Such effects may include ecological, cultural, human health, economic or social impacts on minority communities, low-income communities, or Indian Tribes . . . when those impacts are interrelated to impacts on the natural or physical environment” (CEQ 1997).

Exposure pathways for environmental justice communities—An exposure pathway is how an individual or community is exposed to a particular hazard. Exposures may be cumulative (e.g., low-level exposure over a long period of time leading to a buildup of toxins in the system), or there may be multiple hazards a community is exposed to (e.g., water contamination and smoke inhalation). Identifying major exposure pathways for an environmental justice community can help understand what health effects they may be facing.

Exposure pathways and disproportionately high or adverse impacts on environmental justice communities are discussed by alternative.

Because the proposed plan and alternatives provide a programmatic level of management direction, the environmental consequences section presented here provides an overview of the communities that may be impacted and the types of impacts that could occur. A discussion of disproportionate adverse impacts on communities from site-specific actions would be included in subsequent analyses for implementation-level actions.

Environmental Consequences for Social and Economic Sustainability Common to All Alternatives

Economic Analysis

Regional Employment and Income

Table 3-58 and table 3-59, below, provide a summary of total jobs contributed and labor income supported, respectively. Under all alternatives, employment and labor income supported by activities on the Ashley National Forest would account for less than 1 percent of four-county totals. This analysis considers only the market transactions that result from activities on the Ashley National Forest. The value of ecosystem services, such as clean air and water, are not captured in the economic impact analysis and are discussed separately in "Ecosystem Services Analysis."

Table 3-58. Total Jobs Contributed*

Resource Area	Alternative A	Alternative B	Alternative C	Alternative D
Recreation (non-wildlife and fish related)	53	53	53	53
Recreation (wildlife and fish-related)	58	58	58	58
Grazing	124	124	124	124
Timber	28	48	35	50
Minerals	8	8	8	8
Payments to States and counties	69	69	69	69
Forest Service expenditures	225	225	225	225
Total Forest Management	**565**	**585**	**572**	**587**
Percent Change from Current	**N/A**	3.54%	1.24%	3.89%

Sources: Forest Service data modeled with IMPLAN 2017 and Forest Economic Analysis Spreadsheet Tool
* Jobs represent full- and part-time jobs and include wage and salary jobs, sole proprietorships, and individual general partners.

Table 3-59. Labor Income Contributed ($1,000s of 2020 Dollar)

Resource Area	Alternative A	Alternative B	Alternative C	Alternative D
Recreation	$1,639	$1,639	$1,639	$1,639
Recreation (wildlife and fish-related)	$1,865	$1,865	$1,865	$1,865
Grazing	$2,100	$2,100	$2,096	$2,100
Timber	$1,406	$2,428	$1,759	$2,503
Minerals	$841	$841	$841	$841
Payments to States and counties	$3,793	$3,793	$3,793	$3,793
Forest Service expenditures	$12,763	$12,763	$12,763	$12,763
Total Forest Management	$24,407	$25,429	$24,755	$25,503
Percent Change from Current	—	4.19%	1.43%	4.49%

Sources: Forest Service data modeled with IMPLAN 2017 and Forest Economic Analysis Spreadsheet Tool

Recreation

As discussed in the affected environment section, there are an estimated 470,000 recreation visits to the Ashley National Forest annually based on NVUM data; 41 percent of these visits originate outside the local area. The expenditures of nonlocal visitors to the Ashley National Forest support approximately 78 jobs and $2.4 million in labor income annually. Local visitors contribute an additional 34 jobs and $1.1 million in labor income. The recreation visitors to the national forest contribute to the local economy in terms of jobs and labor income. Recreation contributions reported above are annual averages, but actual contributions are likely to vary on a seasonal basis.

Minerals

Natural gas and oil, as well as stone, sand, and other materials are removed from the Ashley National Forest. The quantities removed are not expected to differ between alternatives. Using average sale values from the years 2015 through 2019, mineral activities on the Ashley National Forest would support approximately eight jobs and $821,000 in labor income, on average annually. The mineral program provides limited economic contributions relative to other Forest Service program areas, but on average these jobs pay relatively well. Locatable and leasable mineral resources, including oil and gas resources, will continue to be managed as required by applicable laws, regulations, and policy. Therefore, the mineral program would contribute jobs, income, and raw materials to the local and national economy under all alternatives.

The mineral extraction industry can see large fluctuations over time as production and prices respond to global markets. This analysis uses a 5-year average to account for some fluctuation. Overall, oil and natural gas prices have dropped significantly since much higher levels seen earlier this decade.

Payments to States and Counties

As discussed in the affected environment section, the Ashley National Forest makes payments to local governments through the PILT, SRSCS, and mineral receipts. Proposed forest plan management is not anticipated to affect these payments. Across all alternatives, these payments would support approximately 69 jobs and $3.8 million in labor income annually across all sectors. In addition, it should be noted that government jobs, which include some of the jobs supported by these payments, typically have higher than average labor income contribution on a per job basis (approximately $55,000 annually) and offer local economic stability in the form of jobs and labor income.

Forest Service Expenditures

Across all alternatives, Forest Service expenditures would include salary and non-salary expenditures (for example, field and office equipment and supplies, trail construction, and range improvements). While the specific categories of expenditures may vary based on the alternative selected, forest plan management decisions are not anticipated to affect the total level of funding; therefore, the economic contributions from these expenditures would be constant across all alternatives.

It is estimated that these expenditures support approximately 225 jobs and $12.8 million in labor income in the local economy annually. This accounts for the largest contribution to the local economy in terms of jobs and labor income relative to other program areas, and offers local economic stability both in number of jobs and total labor income.

The specific categories of expenditures may vary based on the alternative selected. For example, it is anticipated that management focused on increased infrastructure to support developed recreation uses would increase cost of facility construction and management where this use is emphasized, such in as in alternative D. Due to uncertainty in the timing and level of expenditures, no attempt to model these differences has been included in this analysis. Site specific projects would include additional NEPA analysis, as appropriate.

Ecosystem Services Analysis

Recreational Experience

Under all alternatives, the Ashley National Forest would continue to provide a variety of recreation opportunities. The FGNRA and other developed recreation areas, such as those occurring at trail systems, would support developed uses and would be provided under all alternatives. Dispersed recreation and opportunities for solitude and quiet recreation experiences could occur under all alternatives, but particularly in wilderness areas and recommended wilderness areas. The level of access to and quality of the specific amenities would result in a change to the recreation experience and would vary by alternative. Impacts would depend on the type and location of the recreation taking place, as well as the desired experience of a user group or individual. Changes to recreation area access and amenities for identified user groups are explored for each alternative. Refer to “Recreation” for additional details of the analysis.

Cultural Heritage Values and Traditional Uses

Under all alternatives, the Ashley National Forest would continue to support livestock grazing, with only minor direct changes to the level of permitted grazing by alternative. From a cultural standpoint, rangelands are seen to provide the basis for sustaining the custom and culture of the rural lifestyle, provide a connection for future generations to natural resources (Russell 2008), and support social fulfillment experienced by families (Rimbey et. al 2007). In addition, traditional labor statistics may not fully capture the social and economic importance of these industries; this is because they do not include unpaid family labor, which may account for a substantial portion of total labor inputs in the agricultural sector (Kandel 2008).

The Ashley National Forest will continue to support ranching and livestock grazing as traditional cultural values in the rural communities adjacent to the forest. Grazing on public lands represents a lower grazing fee than equivalent forage on private lands. The 2019 fee is $1.35 per HM, while the fee on private lands for cow-calf pairs averaged $20.00 in Utah and $24.50 in Wyoming (NASS 2020). It should be noted, however, that grazing fees do not capture total operational costs to the permittee.

Under all alternatives, grazing on National Forest Service lands will continue to represent only minor contributions to the ability of the traditional use to continue in the area, particularly for cattle grazing. Based on the 2017 cattle and sheep inventory for the four-county region (NASS 2017), it is estimated that grazing on the Ashley National Forest supports approximately 5 percent of the cattle and 25 percent of sheep in the region. Actual percent of livestock supported would vary based on the current use level and the number of months of the year that animals depended on forage on the Ashley National Forest. As previously noted, grazing on National Forest Service lands can represent important seasonal pastures to support larger grazing operations. Refer to “Livestock Grazing” for details of the analysis.

Hunting on the Ashley National Forest is a traditional cultural practice that provides food and is an activity that can be shared across generations. In addition, visitors who come to the Ashley National Forest to hunt wildlife contribute to the overall economy of the area by supporting recreation-related jobs and those directly and indirectly associated with visitor spending.

Timber harvest would also continue under all alternatives at similar to current levels, supporting the availability of products for personal fuel use and traditional wood product use. Harvests would continue to be affected by market conditions, including the cost of extraction, based on a site-specific basis. Refer to the “Timber” section for details of the analysis.

Under all alternatives, the ability to access materials, such as wood, herbs, medicinal plants, and native plant materials, to sustain Native American traditional ways of life and to provide products for traditional cultural practices would be maintained.

Mineral Products

Under all alternatives, leasable and locatable minerals would continue to be available for development, based on past forest and project-level decision documents. No additional discussion is included for this resource by alternative. Contributions from development of these resources would vary based on market conditions, as discussed in the jobs and income analysis. Refer to "Energy and Minerals" for details of the analysis.

Wildfire Management and Fuels Mitigation

Under all alternatives, protection of life and property has the highest priority for fire suppression activities. Overall, fuels treatments would move areas toward natural fire regimes and desired conditions under all alternatives, thereby providing benefit to local communities in terms of fire risk reduction. Alternatives vary in the degree to which treatments would emphasize HVRAs and wildland-urban interface areas, and the degree to which natural processer or active management would be emphasized. Refer to "Fire and Fuels Management" for additional details.

Climate Regulation and Adaptation

Under all alternatives, removal of forest vegetation for vegetation and fuels management and timber harvest and production would reduce carbon stocks in the short term; carbon would continue to be stored in timber that is harvested for use as wood products. Vegetation treatment under all alternatives would improve ecological sustainability and allow for adaptability in the face of climate change. The lack of quantitative objectives for vegetation treatments under alternative A, however, would limit the ability to achieve forestwide changes. See "Carbon Storage and Sequestration" for details of the analysis.

Water Regulation

Under all alternatives, the watershed condition to support municipal watersheds and aquatic habitats would continue to be affected by factors such as road-related erosion, departure from the historical fire regime, forest cover, and forest health issues over the long term. See the "Watershed and Aquatic and Riparian Ecosystems" section for details.

Intact Ecosystems

Under all alternatives, vegetation management actions would include management to limit nonnative and noxious weeds and improve vegetation conditions, supporting pollinators. In addition, all alternatives would incorporate natural resource management to varying degrees in upland and riparian vegetation types. However, such treatments as timber harvest and prescribed fire would have short-term direct and indirect impacts on habitat connectivity for some wildlife and at-risk species. In the long term, moving vegetation toward desired conditions would improve the ecological condition, abundance, and distribution for species that depend on those vegetation communities. These actions would support habitat for wildlife species that have importance for human use (i.e., hunting, fishing, and wildlife viewing), as well as those with intrinsic nonuse value (i.e., special status species that people value for preservation for future generations). See "Terrestrial Vegetation" and "Wildlife and Plants" for additional details.

Environmental Justice Analysis

Disproportionately High or Adverse Impacts on Environmental Justice Communities

As detailed in the affected environment section, communities have been identified in the planning area that meet the criteria for further consideration of environmental justice impacts. These include Uintah County and the city of Vernal. Under all alternatives, the Forest Service will continue to provide opportunities for use of forest resources by area communities, including resources with important cultural or subsistence value for these communities, ensuring they do not face adverse impacts due to a lack of resources.

Access for recreation would also be maintained for all communities. However, the level of access and the recreational experience may be affected by variation in management areas that restrict future motorized access (i.e., recommended wilderness). If the time to reach specific resources or sites is affected due to restrictions on use, the travel cost—that is, the total time and travel cost expenses that people incur to visit a site—could be affected. This may result in impacts on all users, but low-income populations may be disproportionately affected. Management that restricts the size of groups, such as in a wilderness setting, can also affect the social preference of certain groups to use the Ashley National Forest in a large group setting. This is notable for Hispanic populations, which more than other groups have statistically demonstrated a preference for recreation in larger groups and in more developed settings; this is not compatible with a wilderness setting (Kruger et al. 2005).

Exposure Pathways for Environmental Justice Communities

Potential short-term impacts on human health for local communities could occur as a result of wildfire and use of prescribed fire as a management tool. Limited studies have been conducted on the short-term impacts of wildfire smoke on vulnerable populations. Some information suggests that low-income and minority populations may be more susceptible to impacts from smoke due to a higher level of health conditions that smoke may impact, such as asthma (Rappold et al. 2012). Some populations may also experience a higher level of exposure due to disparities in time spent outdoors (i.e., farmworkers) or due to indoor home and work environments with higher infiltration of outdoor pollutants (Burke et al . 2021).

Across all alternatives, there would be no difference in how the use of prescribed fire affects air quality, in terms of protecting human health in the long term. This is because NAAQS are set at levels that are necessary to meet that objective. As a result, no long-term adverse impacts would occur on any populations, including those identified for environmental justice consideration, from this activity.

Vegetation treatments to reduce wildfire risk also would occur under all alternatives. However, variations in vegetation treatments could affect the potential for large-scale fire and the associated impacts on communities. In addition, there is the potential that rural communities with a higher level of minorities or low-income population may be particularly vulnerable due to a historically lower level of public participation in implementation-level management decisions affecting vegetation management (see, for example, Davies et al. 2018). Management approaches to incorporate coordination with local communities during implementation of management actions would reduce the risk of impacts on all communities, including minority and low-income populations.

Environmental Consequences for Social and Economic Sustainability—Alternative A

Regional employment and income—Alternative A would continue Ashley National Forest management according to the existing forest management plan. Management actions under alternative A are expected to support 544 jobs and approximately $24.4 million in labor income in the local economy. The contribution of jobs and labor income in alternative A would be the lowest of all alternatives. Over the last 10 years, the forest products that were sold averaged 9,353 CCFs annually. Assuming the same removal rate would continue under alternative A, alternative A would have the lowest removal rate of all alternatives. In addition, almost 60 percent of total volume is fuelwood removed through personal permits, which provide benefits to people but do not contribute to the estimates of jobs and income in the timber industry. Forest product removal under alternative A would support 28 jobs and approximately

$1.4 million in labor income in the local economy, annually. These estimated economic contributions, in terms of jobs and income, are fairly moderate compared with other Forest Service program areas.

Recreation experience—Under alternative A, no recreation management areas would be established, and management would be focused on site-specific direction. As discussed in the recreation section, users looking for solitude may have limited opportunities in the Ashley National Forest due to high demand and limited ROS classes with these opportunities. Visitors using non-developed areas of the Ashley National Forest reported the lowest level of satisfaction with current management (see the affected environment section). In addition, vegetation management under alternative A may affect the recreation experience. Vegetation management would not support long-term improvement of habitat for hunting, fishing, or traditional tribal uses, and it may affect the experience for these users. Objectives to promote trail and route maintenance and construction would be limited. While opportunities for recreation would remain present for various user groups, current management would continue to fall short of demands.

Cultural heritage and traditional uses—Under alternative A, current levels of traditional uses would continue in the short term. However, a lack of specific objectives for improving vegetation or treating fuels could affect the long-term availability of resources. Should an uncharacteristic wildfire occur as a result of limited movement toward desired conditions for fuels, the ability to access these resources could also be affected. Timber and forest project use would be permitted. However, a lack of vegetation management objectives could result in decreased long-term harvest potential with related impacts on the ability to access resources for uses with traditional or cultural importance.

Access to Ashley National Forest resources with traditional importance for Native Americans, such as plant materials and medicines used by the Shoshone and Ute Indian Tribes, would also be affected by a lack of forestwide vegetation management. Examples of relevant materials are included in table 3-53. The level of impacts would vary based on the habitat in which these resources are located. See "Terrestrial Vegetation" for details of impacts on specific vegetation communities. Alternative A has no forestwide standards or guidelines addressing traditional or cultural uses.

Wildfire management and fuels mitigation—Under alternative A, existing trends, including departure from natural fire regimes, fuel accumulation, and the risk of high-intensity wildfires, would continue to provide a threat for local communities. Management in the current forest plan, federal wildland fire management policy, and the Utah National Forests Fire Amendment would support some movement toward desired conditions; however, the current vegetation trends would result in an associated risk of property damage and public risk.

Climate regulation and adaptation—Under alternative A, there are no quantitative prescriptions for vegetation treatments. Although these treatments would continue to occur, forestwide contributions to climate regulation, and the related benefits to humans, may be limited.

Water regulation—Alternative A is not likely to result in a forestwide ability to address watershed condition indicators, such as water quantity, fire regime, forest cover, and forest health issues, over the long term. This is due to a lack of coordinated treatments at the landscape scale. As a result, municipal watersheds and aquatic habitats would continue to be affected.

Intact ecosystems—Under alternative A, a lack of forestwide objectives for vegetation treatment would limit the ability to support pollinators and habitat for wildlife species with importance for use and nonuse purposes. While site-specific actions would occur to locally improve conditions, the overall ability to move toward desired conditions could be limited.

Disproportionately high or adverse impacts—Under alternative A, dispersed and developed recreation opportunities and access for resource use would be available. The lack of forestwide standards or guidelines to direct recreation use would result in site-specific variation in management dictated by management areas. As a result, the potential for impacts on environmental justice communities' access for forest resources and recreation would vary on a site-specific basis.

Similarly, a lack of objectives for vegetation could result in the potential for long-term impacts on the availability of forest resources with traditional cultural and medical uses for environmental justice communities, such as the Ute and Shoshone Tribes. The level of impacts would vary on a site-specific basis, based on the location of vegetation treatments. Under alternative A, no areas would be managed as recommended wilderness. This would limit any impacts on environmental justice communities related to their ability to use preferred recreation sites; it also would minimize constraints on time and costs to travel to recreation. However, communities valuing solitude and naturalness for cultural uses may have limited options in the long term.

Exposure pathways—Alternative A does not provide a forestwide directive for fuels treatments, such as mechanical thinning or prescribed burning. As a result, while vegetation management actions could move some vegetation communities closer to desired conditions and make them more resilient to wildfire, variations in vegetation treatments may affect the magnitude of fire resilience on the Ashley National Forest as a whole over the long term. This could differentially affect Ashley National Forest beneficiaries and identified environmental justice communities.

Environmental Consequences for Social and Economic Sustainability—Alternative B

Regional employment and income—Management actions under alternative B are expected to support approximately 587 jobs and $25.4 million in labor income in the local economy. The contribution of jobs and labor income to the local economy due to Forest Service management activities in alternative B is the second highest of all alternatives. This is primarily due to alternative B's objectives for mechanical vegetation treatments, which increase the production of sawtimber. This increased production would increase local employment and labor income relative to alternative A; it would support 48 jobs and $2.4 million in labor income annually.

Employment and income contributions from livestock grazing would be as discussed under alternative A. Although no direct changes to HMs would occur as a result of proposed management, specific measures to protect bighorn sheep from disease (i.e., by closing or converting domestic sheep or goat allotments where permits are voluntarily waived without preference) could result in changes to the level of permitted sheep and goat forage at a site-specific basis during plan implementation. Should HMs be reduced, or allotments be closed, this could result in financial impacts to individual operators or to the regional industry, with impacts determined by the level of reduction.

Recreational experience—Under alternative B, forest plan management includes recreation management areas, which would allow for an increased variety of recreation opportunities, compared with alternative A, and would address specific areas where many different recreational activities are concentrated. Compared with alternative A, there is in increase in objectives that would expand both the motorized and nonmotorized trail system on the Ashley National Forest, providing opportunities for access to these experiences. Based on ROS class, there is a slight increase in acres with an emphasis on motorized recreation (i.e. semi-primitive motorized acres and roaded natural areas slightly increased). However, this alternative includes two additional recommended wilderness areas, which would result in a site-specific restriction for user groups that prioritize motorized and mechanized use and a shift of additional acres from semiprimitive nonmotorized into the primitive class. Table 3-60, below, summarizes impacts on identified user groups. Details of the change from current conditions for each recreation area and the attribute identified for specific user groups are included in this table.

Cultural heritage and traditional uses—Under alternative B, vegetation management objectives would support long-term retention or improvement of forage and provisioning of other forest products. As a result, long-term social benefits related to traditional or cultural practices associated with grazing resources and forest products would be supported under this alternative. Site-specific limits would occur for forest product removal, and they may affect livestock management in the additional recommend wilderness areas. Overall, access to forest resources would be maintained or improved in this alternative.

Native Americans who use the Ashley National Forest resources for traditional food sources, medicines, and materials for ceremonial structures would have access maintained for these uses. Over the long term, the condition of resources should improve with forestwide vegetation management objectives.

Table 3-60. Recreation Experiences Matrix—Alternative B

User Group	Alternative B	
	Recreation Area	Recreation Amenities
Solitude seekers	There would be increased opportunities due to two additional recommended wilderness areas and the establishment of backcountry recreation areas.	Remote areas with dispersed use would not be prioritized.
Families	Opportunities in established destination recreation areas would slightly increase.	Disability access would increase. Developed recreation sites would slightly increase, and facilities would improve.
Large groups	Opportunities in established destination recreation areas would slightly increase. Increased wilderness areas may result in site-specific displacement.	Developed recreation sites would slightly increase, and facilities would improve.
Mobility-impaired visitors[1]	Establishment of destination recreation areas would provide areas with management geared toward increased access in specific areas. Increased wilderness areas may result in site-specific displacement.	Disability access would increase. Developed recreation sites would increase, and facilities would improve.
Hunters	Establishment of recreation management areas may reduce conflicts of use.	There would be the potential for long-term improvement to high-quality game habitat. Plan components for route maintenance and construction can improve access.
Anglers	Establishment of recreation management areas may reduce conflicts of use.	There would be the potential for long-term improvement to high-quality fish species habitat. Plan components for route maintenance and construction can improve access.

User Group	Alternative B	
	Recreation Area	Recreation Amenities
Commercial outfitters (boat trips)	Establishment of destination recreation areas and general recreation areas would provide areas suited for use.	There would be the potential for long-term improvement to high-quality fish species habitat. Plan components for route maintenance and construction can improve access.
Mountain bikers	Increased recommended wilderness areas may result in site-specific displacement. Establishment of destination, general, and backcountry areas may reduce conflicts with other recreational uses.	Objectives include improved routes and construction of additional routes for biking, which would enhance the experience.
OHV users	Increased wilderness areas may result in site-specific displacement. Backcountry areas would allow for motorized travel.	Objectives include direction to improve and construct motorized routes, which would enhance the experience.
Cultural and historic site visitors	Establishment of recreation management areas may reduce conflicts of use.	There would be enhanced opportunities for visitation with added plan components for heritage resources.
Tribal populations	Establishment of recreation management areas may reduce conflicts of use	Potential for long term improvement to high quality game and fish species habitat
Environmental justice populations	Establishment of destination and general recreation areas would increase assessable opportunities. Increased wilderness areas may result in site-specific barriers to access.	An increase in developed recreation sites would provide increased opportunities for access.

[1] Includes those with mobility disabilities and elderly visitors

Wildfire management and fuels mitigation—Fuels treatments under this alternative would improve or maintain desired vegetation conditions, in comparison with alternative A. In the long term, this would move the frequency and severity of wildland fire closer to the natural range of variation, and reduce risks to adjacent communities from wildfire. Treatments in HVRAs in particular would assist in the control and management of fires in the wildland-urban interface over the short and long terms, to a greater extent than under alternative A.

Climate regulation and adaptation—Under alternative B and all action alternatives, the Forest Service would establish a desired condition to maintain carbon stocks by promoting forest stand health and the regeneration of forest stands, as well as by retaining the net acreage of forested communities. This would support contributions to climate regulation. In addition, the combination of vegetation and fuels management would move forest vegetation cover types toward conditions that represent a more natural disturbance regime. This would increase forest resistance and resilience to stressors, such as those brought by climate changes, over the long term.

Intact ecosystems—Under alternative B and all action alternatives, plan direction to manage nonnative and noxious weeds would move terrestrial vegetation types toward desired conditions, improve or maintain pollinator habitat, and maintain or improve plant species richness, composition, and native plant diversity, compared with alternative A. Inclusion of additional recommended wilderness areas under this alternative would support habitat connectivity for species with importance to human use and nonuse values.

Disproportionately high or adverse impacts—All action alternatives include plan components to promote collaboration and enhance communication with stakeholders. This would support collaboration with local communities to ensure that plan implementation takes into account relevant issues and considers the needs for these populations, including those identified as environmental justice communities. In addition, plan language provides for increased coordination with local tribes to support continued traditional and cultural uses. This direction would limit the potential for adverse impacts on populations dependent on these resources.

Alternative B would also promote improved access to visitors, compared with alternative A. This would decrease the potential for adverse impacts on environmental justice communities related to the ability to access resources. Additional recommended wilderness areas could result in site-specific impacts on the access for recreation and the type of recreational uses available, which may disproportionately affect environmental justice communities in terms of costs for access. While the ability to use specific sites for preferred recreation may be affected, it is anticipated that under all alternatives a variety of recreational experiences would remain available. In addition, communities valuing solitude for cultural uses would have more opportunities for solitude, when compared with alternative A.

Exposure pathways—Under alternative B and all action alternatives, forestwide vegetation treatment objectives related to prescribed fire would result in emissions and potentially have more short-term impacts for local communities. Smoke can cause health problems in humans and wildlife, and it can adversely affect visibility, all of which can adversely affect the quality of life. In the long term, however, vegetation treatments would move vegetation toward desired conditions and historical fire regimes. This would support a reduction in the risk of high-intensity fires with impacts on air quality and human health for all populations, including environmental justice communities. Treatments would also contribute to the safety of community homes and infrastructure. This would increase the quality of life in communities next to the Ashley National Forest, particularly those on the wildland-urban interface, where fire risk is high. The impacts on specific communities cannot be determined at this time due to a lack of site-specific treatment locations.

Environmental Consequences for Social and Economic Sustainability—Alternative C

Employment and income—Management actions under alternative C are expected to support approximately 573 jobs and $24.8 million in labor income in the local economy. Relative to other action alternatives, this alternative supports the lowest estimated economic impact, in terms of jobs and labor income, in the local economy. Permitted HMs are estimated to be lower under alternative C due to the exclusion of livestock from destination recreation areas, which would affect some pastures. The portions of allotments that would be closed are small, and a reduction in permitted numbers is likely the best way to mitigate impacts. Assuming the reduction in permits is proportional to the pasture area affected, total permitted HMs are estimated to decrease by 3 percent in the affected pastures. This is a much smaller reduction overall (0.14 percent across the forest). This minimal reduction does not result in a meaningful impact on the regional economy, but it may affect individual permittees.

An alternative assumption (that all affected pastures would be closed and not proportionally reduced) would result in a larger reduction of HMs—a loss of 3,318 HMs—and a small, but measurable, impact on the regional economy. Whether the entire pastures would be closed would depend on whether the management areas could be managed to restrict cattle (for example, with fencing, natural barriers, or herding). The closure of these allotments would result in an estimated loss of 7 jobs and $120,000 in labor income on an average annual basis. This would result in the lowest estimated HMs of all alternatives and the lowest level of economic effects, in terms of jobs and income related to livestock grazing.

In addition, **a**lternative C has the lowest level of forest product removal of the action alternatives. This is because of an emphasis on natural processes for vegetation management and an increase in the acres managed as recommended wilderness areas and backcountry recreation areas where timber harvest would be restricted. This alternative would result in the lowest availability and removal of forest products and the associated economic effects related to the timber industry. Economic effects of forest product removal under alternative C would support 35 jobs and $1.8 million in labor income in the local economy, annually.

Recreation experience—As under alternative B, alternative C would include the establishment of recreation management areas. Under alternative C, however, recreation emphasis would focus on expanded backcountry management areas and further restrict motorized use in these areas. This alternative also has the most acres set aside as proposed wilderness, and it includes additional stream segments managed as suitable for inclusion in the NWSRS. Users groups who prioritize developed recreation sites and motorized use may have decreased satisfaction under this alternative, while those who prioritize solitude and a backcountry experience may have enhanced experiences. See table 3-61, below, for a summary of impacts by user group.

Table 3-61. Recreation Experiences Matrix—Alternative C

User Group	Alternative C	
	Recreation Area	**Recreation Amenities**
Solitude seekers	Opportunities would increase due to the most recommended wilderness areas and backcountry recreation areas.	Management direction would emphasize remote areas with low use.
Families	Opportunities would decrease in destination recreation areas.	Motorized routes and developed recreation sites would not be emphasized.
Large groups	Opportunities would decrease in destination recreation areas.	Developed recreation sites would not be emphasized.
Mobility-impaired visitors[1]	Opportunities would decrease in destination recreation areas. Increased wilderness areas may result in site-specific displacement	Motorized routes for disability access and developed recreation sites would not be emphasized.
Hunters	Establishment of recreation management areas may reduce conflicts of use. Limits on motorized use in backcountry recreation areas and recommended wilderness areas may reduce access.	There would be the potential for long-term improvement to high-quality game habitat. Motorized routes would not be prioritized.
Anglers	Establishment of recreation management areas may reduce conflicts of use. Limits on motorized use in backcountry recreation areas and recommended wilderness areas may reduce access.	There would be the potential for long-term improvement to high-quality fish species habitat. Motorized routes would not be emphasized.

User Group	Alternative C	
	Recreation Area	Recreation Amenities
Commercial outfitters (boat trips)	Establishment of destination recreation areas and general recreation areas would provide areas suited for use.	There would be the potential for long-term improvement to high-quality fish species habitat. Motorized routes would not be prioritized.
Mountain bikers	Increased recommended wilderness areas may result in site-specific displacement. Establishment of destination, general, and backcountry recreation management areas may reduce conflicts with other recreational uses.	Mechanized routes would not be prioritized.
OHV users	Limits on motorized use in backcountry recreation areas and recommended wilderness areas may reduce access and result in displacement.	Motorized routes would not be prioritized.
Cultural and historic site visitors	Establishment of recreation management areas may reduce conflicts of use.	There would be enhanced opportunities for visitation with added plan components for heritage resources.
Tribal populations	Establishment of recreation management areas may reduce conflicts of use.	There would be the potential for long-term improvement to high-quality game and fish species habitat.
Environmental justice populations	Establishment of destination and general recreation areas would increase accessible opportunities. Increased wilderness areas may result in site-specific barriers to access.	Decreased emphasis on developed recreation sites may provide barriers to access.

[1] Includes those with mobility disabilities and elderly visitors

Cultural heritage and traditional uses—As described under alternative B, vegetation management objectives under alternative C could result in improved long-term vegetation conditions with related improvement in availability of resources for uses with traditional or cultural importance. Alternative C would, however, place the highest level of restrictions on livestock grazing and timber harvest, which would decrease the support for local community use of resources. Impacts would be limited due to the minor role that the Ashley National Forest plays in the agriculture sector in the region's forestry and ranching sectors.

For Native American-related cultural resources, restrictions on motorized transport may result in site accessibility difficulties for those who require motorized transportation, but could also provide an increased possibility of privacy for ceremonies or sacred sites.

Wildfire management and fuels mitigation—Under alternative C, impacts from fuels treatments would be similar to those described under alternative B. A lack of minimum treatment acres in HVRAs may limit treatment benefits for communities. With an increased use of managed wildland fire, there is some risk that a fire could escape, potentially resulting in impacts on communities in the wildland-urban interface.

Climate regulation and adaptation—As described under alternative B, the combination of vegetation and fuels management actions would move forest vegetation cover types toward desired conditions in treated areas more than under alternative A. Under alternative C, however, an emphasis on passive vegetation management may be less effective in trending vegetation types toward the natural range of variation and improving carbon storage capabilities and ecosystem resilience to climate change at large scales, compared with alternative B.

Water regulation—Alternative C could result in improvement to watershed conditions for municipal watersheds and aquatic habitat as a result of a potential to decrease road-related water quality impacts. This is due to a decreased emphasis on motorized use and a reduction in mechanical vegetation treatments. Prescribed burning would continue to affect watershed conditions. Using wildland fire as a management tool could increase the potential high-intensity fires in some areas, which could affect hydrological processes and water quality. Overall, alternative C would still decrease the potential for uncharacteristic wildfire and subsequent adverse impacts on water quality, as compared with alternative A.

Intact ecosystems—Support for intact ecosystems would occur as described under alternative B. Under alternative C, reduced mechanical treatments and reliance on natural processes would reduce short-term impacts from treatment. In addition, this alternative includes the greatest level of recommended wilderness, supporting habitat connectivity across a broader portion of the Ashley National Forest.

Disproportionately high or adverse impacts—Impacts under alternative C would be similar to those described under alternative B. The highest level of recommended wilderness would occur under this alternative. This would result in an additional potential for site-specific impacts on ability to access recreation areas (in terms of costs for access).

Exposure pathways—Impacts under alternative C would be similar to those described under alternative B. Due to a reliance on natural processes, short-term impacts from use of prescribed fire would be reduced compared with other action alternatives; however, emissions would occur from use of managed wildland fires.

Environmental Consequences for Social and Economic Sustainability—Alternative D

Employment and income—Management actions under alternative D are expected to support approximately 588 jobs and $25.5 million in labor income in the regional economy. This alternative provides the largest economic contribution in terms of jobs and labor income impacts, although the estimated difference is not meaningfully greater than alternative B. Economic contributions from livestock grazing would be as described under alternatives A and B. Contributions from forest product removal would be highest under this alternative, as a result of an emphasis on mechanical treatments to meet resource objectives and the largest number of acres suitable for timber harvest and production. The resulting economic impact is greater than all other alternatives—supporting jobs (50, average annual) and labor income ($2.5 million annually) in the local economy.

Recreation experience—Under alternative D, recreation management areas would be established, as under alternatives B and C. Under this alternative, the emphasis would be on increased destination recreation areas and more developed recreation opportunities and settings. Plan components would include objectives for a greater level of infrastructure development, particularly to support motorized and mechanized use. User groups who prioritize these uses are likely to have enhanced recreation experiences under this alternative, while those who value solitude, primitive recreation, and undeveloped areas may not have experiences enhanced compared with current conditions. Table 3-62, below, displays impacts by user group.

Table 3-62. Recreation Experiences Matrix—Alternative D

User Group	Alternative D	
	Recreation Area	Recreation Amenities
Solitude seekers	Opportunities would decrease due to a lack of additional recommended wilderness and decreased backcountry recreation areas.	Management direction would not emphasize remote areas with low use.
Families	Opportunities would increase in destination recreation areas.	Management direction would emphasize motorized routes and developed recreation sites.
Large groups	Opportunities would increase in destination recreation areas and general recreation areas.	Developed recreation sites would be emphasized.
Mobility-impaired visitors[1]	Opportunities would increase in destination recreation areas.	Motorized routes and developed recreation sites would provide increased access.
Hunters	Establishment of recreation management areas may reduce conflicts of use.	Motorized routes may provide increased access.
Anglers	Establishment of recreation management areas may reduce conflicts of use.	Motorized routes may provide increased access.
Commercial outfitters (boat trips)	Establishment of destination recreation areas and general recreation areas would provide areas suited for use.	Motorized routes and developed sites may provide increased access.
Mountain bikers	Establishment of destination, general, and backcountry recreation management areas may reduce conflicts with other recreational uses.	Mechanized routes may provide increased access.
OHV users	There would be increased destination and general recreation areas and limited restrictions on motorized use in backcountry areas.	Motorized routes and developed sites may provide increased access.
Cultural and historic site visitors	Establishment of recreation management areas may reduce conflicts of use.	There would be enhanced opportunities for visitation with added plan components for heritage resources.
Tribal populations	Establishment of recreation management areas may reduce conflicts of use.	There would be the potential for impacts on tribal resources due to other resource priorities.
Environmental justice populations	Establishment of destination and general recreation areas would increase accessible opportunities.	Increased emphasis on developed recreation sites may facilitate access.

Cultural heritage and traditional uses—Traditional communities that rely on forest resources, such as forage or forest products, would have their values and traditions supported the most under alternative D, in the short term. This is due to this alternative’s emphasis on access and resource output. In the long term, the increased emphasis on treatments in HVRAs may not support the most movement toward desired conditions for forage and forested vegetation.

While access would be improved for Native American cultural resources, this alternative also has the highest potential for conflicts with other users for these resources and locations on the landscape with cultural or spiritual significance.

Wildfire management and fuels mitigation—Impacts from fuels treatments would be similar to those described for alternative B, but increased treatment overall and in the HVRAs would further reduce the extent and severity of wildland fires and the risk for communities. A reduced proportion of ignitions that would be managed and an increased focus on fire suppression would limit impacts on communities. This would result in a greater need for coordinated efforts with communities to cover the costs of treatment.

Climate regulation and adaptation—Over the long term, the combination of vegetation and fuels management actions would improve carbon storage capabilities and ecosystem resilience to climate change, as described under alternative B.

Water regulation—Alternative D would result in the highest potential for impacts from road- and trail-based erosion. Objectives focused on vegetation treatments and prescribed burning in and around HVRAs would support improvement for municipal watershed conditions. These actions would also reduce the long-term risk of high-intensity wildfires and the related impacts on watersheds, compared with alternative A; however, this reduction would be less than under alternative B due to the emphasis on HVRAs rather than locations to benefit resource conditions.

Intact ecosystems—Support for intact ecosystems would occur as described under alternative B. Under alternative D, increased mechanical treatments and reliance on natural processes would increase short-term impacts from treatment. Compared with other action alternatives, a lack of additional areas managed as recommended wilderness and a greater emphasis on developed use would result in decreased support for habitat connectivity.

Disproportionately high or adverse impacts—Impacts under alternative D would be similar to those described under alternative B. However, no additional wilderness areas would be included in this alternative, and developed recreation sites would be emphasized. This would limit impacts on access for environmental justice communities.

Exposure pathways—Impacts under alternative D would be similar to those described under alternative B. Short-term impacts from use of prescribed fire would be increased compared with other action alternatives. This is because of the emphasis on active management, particularly in HVRAs, which may occur near communities and in the wildland-urban interface.

Cumulative Environmental Consequences for Social and Economic Sustainability

The time frame for the economic cumulative effects analysis is the next 15 years. The geographic scope for the economic cumulative effects analysis is the four-county region identified for the direct and indirect impacts analysis. This analysis considers how past, present, and reasonably foreseeable future actions on lands throughout the region may interact with decisions made under the proposed plan to affect the economic environment and ecosystem services.

The social and economic analysis of the proposed plan is unique among the resources and uses. This is because the effects occur primarily off the forest. In this way, the indirect effects described above are cumulative in nature—they evaluate the role of Forest Service decisions under the proposed plan both on and off the Ashley National Forest. However, the indirect effects analysis above does not address how actions taken on adjacent lands will affect the social and economic consequences of the proposed plan. These impacts are discussed below.

Trends and activities that occur off the forest may influence the recreation-related effects identified in the economic environmental consequences section. Under all alternatives, the proposed plan supports diverse and sustainable recreation opportunities on the Ashley National Forest. Increased recreation use on the

Ashley National Forest would lead to a higher economic impact than predicted in the direct and indirect effects discussion. Population growth in the surrounding communities can contribute to increased recreation visitation and can lead to changes in preferences for the types and qualities of recreation supported on the Ashley National Forest. It is anticipated that the level of recreational visitors is likely to continue to increase in line with population increases, with a corresponding increase in economic contributions over the planning period.

Recent events have resulted in even greater demand on forest resources. In 2020, visitation levels increased at unprecedented levels due to increased demand for regional recreation opportunities during the COVID-19 pandemic. For example, based on data from the Vernal and Duchesne-Roosevelt Ranger Districts, occupied nights for developed campgrounds increased by approximately 90 percent between 2019 and 2020. It remains to be seen if this increase in use will continue. Changes to visitation rates on public lands adjacent to the Ashley National Forest may also affect visitation rates on the Ashley National Forest and influence the economic impact on surrounding communities. Finally, Ashley National Forest visitation may also be affected by on-forest projects, including implementation of the Ashley Karst NRGA management and ongoing trail improvement projects. Changes to the recreation level and type would have the potential to affect the visitor experience, with impacts varying by user group, as discussed under impacts by alternative.

An increase in population locally in the region also has the potential to affect the demand on the Ashley National Forest for other resources, including fire protection resources for the wildland-urban interface. Market conditions and general economic trends can also affect forest conditions and demand for forest products. Economic downturns affect the level and type of spending by recreationists in forest communities. In addition, impacts on the market for livestock or timber could have locally important impacts on the economic feasibility of these resources on National Forest System lands.

For forest-dependent communities or those with significant cultural ties to the Ashley National Forest, multiagency and governmental efforts supporting landscape-scale restoration may improve the quality of life through maintaining and restoring ecosystem services on the landscape and increasing forest resiliency to disturbance. This could result in continued support for traditional resources and maintenance of cultural or spiritual traditions.

Climate change has the potential to affect a broad spectrum of resources and resource uses on the Ashley National Forest, and the corresponding economic and social contributions from these resources. Long-term impacts, to which forest management contributes, may occur. These create a cumulative impact on the risk to populations from climate change effects, such as the ability to adapt to increased fire and drought. Similarly, Forest Service management actions affect water regulation, but this is also affected by the actions of other government, nongovernment, and private entities. This applies similarly to all ecosystem services that are provided by cross-boundary resources.

With regard to environmental justice, the potential for cumulative contributions to significant adverse impacts on specific communities would be dictated at the implementation level.

For details on the potential impacts from other management actions, also see the corresponding resource sections, including but not limited to, “Livestock Grazing,” “Timber,” “Recreation,” and “Wildlife and Plants.”

Areas of Tribal Importance

Introduction

This section discusses the unique relationship the U.S. Government and the Forest Service has with federally recognized tribes. For a detailed discussion of the existing and current conditions, trends, and issues related to tribal resources and areas of tribal importance, the reader is directed to the Ashley National Forest Assessment, Tribal Report (Forest Service 2017i). The 1986 forest plan does not mention tribal uses, tribal treaty rights, or the Forest Service's obligation to consult with Indian tribes in a variety of ways. Tribal knowledge and expertise can inform forest planning through consultation to ensure that the Forest Service considers treaty rights, religious concerns, and use areas. Examples of information that may be helpful for forest management, while respecting confidentiality, include:

- Traditional plants, animals, minerals, and other resources of tribal interest
- Traditional hunting, fishing, and gathering areas used by tribal members
- Ensuring protection of sacred sites and traditional use areas
- Perspectives on treaty rights and Federal obligations for the Ute Indian Tribe and Eastern Shoshone Indian Tribe
- Effects of forest projects, permits, and activities on traditional uses of forest plant resources

The Forest Service recognizes the need to improve tribal relationships and partnerships to provide for subsistence and other cultural activities (Forest Service 2017i).

Regulatory Framework

In addition to NEPA, the following are excerpts from some of the most relevant laws and authorities for addressing tribal rights and land uses in the Ashley National Forest:

National Historic Preservation Act of 1966 (NHPA) (54 USC 300101 et seq.), as amended in 1992—This act requires Federal agency officials to consult with Indian tribes concerning the effects of undertakings on historic properties of traditional and cultural importance to the tribes.

American Indian Religious Freedom Act (42 USC 1996)—This act states that ". . . it shall be the policy of the United States to protect and preserve for American Indians their inherent right for freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including, but not limited to access to site, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites."

Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.), amended in 1992—This act addresses the rights of lineal descendants and members of Indian tribes and Alaska Native and native Hawaiian organizations to certain human remains and precisely defined cultural items. The law requires Federal agencies and museums to provide an inventory and summary of human remains and associative funerary objects. The law also provides for criminal penalties in the illegal trafficking in Native American human remains and cultural items.

Executive Order 13175—Consultation and Coordination with Indian Tribes, November 6, 2000—This EO directs Federal agencies to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

Executive Order 13007, Indian Sacred Sites of 1996—This EO directs Federal land management agencies, to the extent permitted by law, and not clearly inconsistent with essential agency functions, to accommodate access to and use of Indian sacred sites, to avoid affecting the physical integrity of such sites wherever possible, and, where appropriate, to maintain the confidentiality of sacred sites. Federal agencies are required to establish a process to assure that affected Indian tribes are provided reasonable notice of proposed Federal actions or policies that may affect Indian sacred sites.

Cultural and Heritage Cooperation Authority (25 USC 3055)—This states the Secretary of Agriculture may provide free of charge to Indian tribes any trees, portions of trees, or forest products from National Forest System land for traditional and cultural purposes, notwithstanding section 472a of title 16. Tree, portions of trees, or forest products provided under subsection (a) may not be used for commercial purposes. This authority also authorizes the Secretary of Agriculture to protect the confidentiality of certain information, including information that is culturally sensitive to Indian tribes, and requires the Forest Service to consult with affected Indian tribes before releasing culturally sensitive information.

In addition to ensuring that obligations to the tribes are met, the forest plan can help the Forest Service look for new ways to make the lands and programs internally managed relevant to the tribes now living adjacent to the Ashley National Forest. The Ute and Eastern Shoshone Indian tribes have an inherent interest in maintaining their access to, and the preservation of, the Uinta Mountains and surrounding areas for cultural and traditional practices; they are also a part of the broader community that appreciates the forest for education, cultural interpretation, recreation, special events, and economic benefits.

Analysis Areas

The analysis area includes the entire Ashley National Forest. In the generalized discussion of context, the analysis extends to the broader cultural and temporal landscape, not wholly administrated by the Forest Service. The temporal scope of this analysis is the anticipated life of the plan.

Description of Affected Environment

The Forest Service manages the natural resources and landscapes that sustain members of the Ute and Eastern Shoshone Indian Tribes and their respective cultures and traditions. Local heritage, culture, traditions, and values have been handed down over generations and predate acquisition of the area by the United States. Long-standing use of the Ashley National Forest and its natural resources are fundamental to the economic, social, and cultural vitality of these two tribes. Some of these important uses (traditional uses) include:

- Gathering of plants for various purposes (religious, medicinal, consumption, and other applications)
- Gathering of minerals for ceremonial use
- Procurement of lodgepole pines
- Hunting and fishing for food and ceremonial purposes
- Religious and ceremonial uses (including pilgrimages, ceremonies, vision quest sites, and sacred burial visits)

Table 3-63, below, displays a summary of resources important to the Ute and Eastern Shoshone Indian Tribes by vegetation type.

Table 3-63. Tribal Resources Crosswalk

Tribal Resource	Traditional Use	Vegetation/Geographic/ Geological Type
Aspen (*Populus tremuloides*)	medicinal	coniferous forest, deciduous forest
Bear root (*Ligusticum porteri*)	medicinal, ceremonial	coniferous forest, deciduous forest
Bitterroot (*Lewisia rediviva*)	medicinal, food	pinyon juniper woodland, coniferous forest
Camas (*Camassia quamash*)	food	shrubland
Cedar (*Juniperus osteosperma*)	medicinal, ceremonial	pinyon juniper woodland
Chokecherries (*Prunus virginiana*)	food, ceremonial	riparian
Dandelion (*Taraxucum*)	medicinal	meadows, shrubland
Death camas (*Zigadenus* sp.)	unknown	riparian
Elderberry (*Sambucus* sp.)	food	riparian
Gooseberries (*Ribes* sp.)	food	riparian
Gum weed (*Grindellia squarrosa)*	medicinal	desert shrubland
Horse mint (*Agastache urticifolia*)	utilitarian, seasoning	riparian
Indian potatoes/spring beauty (*Claytonia lanceolata*)	food	pinyon juniper woodland, shrubland
Mountain Mahogany (*Cercocarpus* sp.)	ceremonial	shrubland
Pinyon pine (*Pinus edulis*)	utilitarian	pinyon juniper woodland
Ponderosa pine (*Pinus ponderosa*)	food, seasoning	coniferous forest
Red willow (*Salix* sp.)	ceremonial, utilitarian	riparian
Sagebrush (*Artemisia tridentata*)	medicinal, ceremonial	shrubland, pinyon juniper woodland, and deciduous forest
Sand bar willow (*Salix exigua*)	utilitarian	riparian
Sap from ponderosa pine, pinyon pine, etc.	utilitarian	pinyon juniper woodland, coniferous forest
Sweet grass (*Hierochloe adorate*)	utilitarian	riparian, wet meadows
Sweetanise/western sweet cicely (O*smorhiza ocidentalis*)	ceremonial, utilitarian	riparian
Tar weed (*Madia glomerata*)	medicinal	shrubland
Tobacco (*Nicotiana attenuate*)	ceremonial, utilitarian	shrubland
Wild garlic	food, seasoning	mountain meadows in deciduous and coniferous forest
Wild onions: Tapertip onion (*Allium acuminatum*), shortstyle onion (*Allium brevistylum*), textile onion (*Allium textile*)	food, seasoning	mountain meadows in deciduous and coniferous forest
Wild peppermint (*Mentha* sp.)	ceremonial, utilitarian	riparian
Wild strawberries (*Fragaria* sp.)	medicinal	deciduous forest, shrubland
Yampa (*Perideridia gairdneri)*	food	mountain meadows in deciduous and coniferous forest
Yarrow (*Achillea milleifolium*)	medicinal	pinyon juniper woodland, shrubland, and deciduous forest
Yucca (*Yucca* sp.)	utilitarian	pinyon juniper woodland, shrubland
Large game habitat	food, ceremonial	all
Eagle hunting blinds	ceremonial	Uinta quartzite, sandstone, and coniferous forest

Tribal Resource	Traditional Use	Vegetation/Geographic/ Geological Type
Vision quest sites	ceremonial	alpine, Uinta quartzite, and sandstone
Feathers	ceremonial	all
Rock shelters	ceremonial	Uinta quartzite and sandstone
Wild horse traps	utilitarian	pinyon juniper woodland

The Ute and Shoshone original homelands remain significant for tribal identity and cultural traditions. The history of the U.S. Government's displacement and relocation of native peoples has made cultural connections to original homelands difficult. Much of the land that was originally occupied and used by the Ute and Eastern Shoshone Indian Tribes was acquired by Euro-American settlers or is currently in private ownership. Tribal members have adapted to the loss of their traditional lands by finding alternate locations to practice cultural traditions or to gather traditional resources on public lands.

The FGNRA along the Green River in Wyoming includes lands that were historically used by the Eastern Shoshone Tribal members, but they were outside of formal treaty or reservation boundaries. These areas still have cultural importance to the Eastern Shoshone Indian Tribe.

The entire Duchesne-Roosevelt Ranger District, and the entire South Unit, are within the bounds of the original Uintah and Ouray Reservation. Numerous sections of the original reservation lands have been removed from tribal ownership through congressional acts, but the Ute Indian Tribe still maintains a cultural and legal connection to these lands. The original reservation lands are an area of tribal importance to the Ute Indian Tribe. The original reservation lands are also within "Indian Country" as defined in 18 USC 1151, and the Ute Indian Tribe maintains rights on those lands as specified by law and Federal court decisions. The original Uintah and Ouray Reservation is defined by the legal survey of the Uintah Special Meridian. Table 3-64, below, is a sampling of documented locations of historic and cultural importance for the Ute Indian Tribe. Because the entire Ashley National Forest is within Ute Tribal ancestral lands, areas of tribal importance are not limited to those lands within the reservation boundary.

Table 3-64. Places Important to the Ute People

Location	Reason for Importance
Paint Mine-Moon Lake	Minerals for ceremonial use
Confluence of Rock Creek and Duchesne River	Former Ute Reservation Agency location; 1860s Ute horse racetrack
Rock Creek Area	Forested area used for hunting and gathering
McAfee Basin	Areas for plant collection (sweetgrass near Lower Stillwater River)
Mouth of Whiterocks Canyon	Former battle area
Uinta Canyon	Major trail to higher elevations
Willow Creek GS	Near a Ute horse racetrack
Pine Springs site in southwest Wyoming	Lithic material source
Red Cloud Loop above Brownie Canyon	Lodgepole pine procurement area
Near Elkhorn Ranger Station	Ceremonial area

Source: Forest Service 2017i

In compliance with laws, regulations, EOs, Forest Service guidance, and plan amendments, the Forest Service has incorporated consultation and consideration of tribal resources and uses in planning and program management. The Forest Service primarily consults with tribes as part of the NHPA section 106 review process with regard to cultural resources and project implementation. In the forest planning process, the Forest Service seeks to improve relationships and partnership with the tribes in ecosystem management; determine the traditional plants, animals, minerals, and other resources that are of interest; and develop a formal protocol to ensure that tribal members can exercise their treaty rights to gather traditional resources (Forest Service 2017i).

Environmental Consequences for Areas of Tribal Importance

This section describes the potential effects of the proposed revised plan and alternatives on areas of tribal importance and tribal uses. The Ute and Eastern Shoshone Tribes continue traditional use of the Ashley National Forest for a variety of purposes, including sustaining their cultural identity. Areas of tribal importance have the ability to provide indigenous communities with an important connection to their ancestors who may have sustained themselves in the same landscapes, places, and sacred sites for a variety of subsistence, cultural, or ceremonial uses.

Methodology and Analysis Process

Effects on tribal interests are known through direct tribal consultation between the Forest Service and affected tribes. The action alternatives represent programmatic decisions; therefore, they would have no direct effects on American Indian rights and interests. Potential effects would be considered indirect effects in that they would occur later in time and at the site-specific level. At the programmatic level of a forest plan, consequences are discussed qualitatively.

The Forest Service is not aware of all sites and interests of tribal importance. The Forest Service relies on its relationship and consultation with the Ute and Eastern Shoshone Tribes to be informed as to where and what interests may be affected by Forest Service actions. The consultation process affords both tribes and the agency opportunities to identify sites, interests, and values of tribal importance as well as to identify mitigations and avoidance and protective measures to preserve tribal interests. Currently, significant gaps in data exist in the loss of cultural memory that is a direct result of forced removal of culturally affiliated tribes from ancestral homelands more than 100 years ago and a history of insufficient tribal consultation between the agency and the tribes (Forest Service 2017i).

Analysis Assumptions

The analysis includes the following assumptions:

- Decisions in the selected alternative (desired conditions, objectives, standards, guidelines, special areas, suitability, and monitoring) will form an outline for planning or implementing site-specific projects and activities. However, the NHPA section 106 process and additional regular consultation methods would be completed for any undertaking that may affect areas of tribal importance.
- At the time implementation-level decisions are being considered, the Forest Service would address analysis and impacts on areas of tribal importance from site-specific actions, and conduct government-to-government consultation.
- Members of federally recognized tribes would continue to access, use, and conduct religious pilgrimages and ceremonies at known and confidential traditional cultural properties and sacred sites, and collect and use Ashley National Forest resources for traditional or tribal uses.
- The Forest Service will follow all applicable laws, policies, and regulations when planning or implementing site-specific projects and activities.
- Various treaties with the Ute Indian Tribe and the Eastern Shoshone Tribe that provide rights for gathering resources in traditional homelands and that provide rights to access and use of sacred or ceremonial areas on public lands will be upheld and respected.

- The tribes may be interested in recovering ownership of lands or specific resource locations that were part of their original land base and, therefore, may be concerned about committing lands to other uses.
- Changes to the transportation system that have the potential to affect the access and use of areas of importance would be analyzed at the project-level planning.
- Unplanned ignitions are analyzed at the time of the start and documented in the Wildland Fire Decision Support System. Management response to a wildfire is based on objectives appropriate to conditions of the fire, fuels, weather, and topography to accomplish specific objectives for the area where the fire is burning. Effects on known tribal areas and cultural resources are considered when determining the objectives and management response to a wildfire.
- Acres treated by fire and mechanical methods are cumulative over the life of the plan.
- Changes in land use, access, or methods of forest treatment could affect opportunities for solitude and privacy for tribal traditional and cultural activities. Increases in wilderness designation could increase the potential for solitude and privacy but also impose limitations on the necessary access for tribes to reach areas of tribal importance and use.

Indicators

Analysis indicators for areas of tribal importance are provided below.

- Extent and intensity of areas managed for recreational use
- Extent of actions or decisions affecting tribal resource access or exercise of treaty rights

Environmental Consequences for Areas of Tribal Importance Common to All Alternatives

Under all alternatives, tribal use of the lands administered by the Forest Service will continue. This is because the tribal use of these lands and the surrounding area by the Ute and Eastern Shoshone Tribes has occurred long before the arrival of Euro-Americans and continues to persist to the present day. Moreover, the use of these areas historically occupied and used by the tribes is protected by multiple treaties, EOs, and congressional acts (Forest Service 2017i). All action alternatives contain objectives that provide for regular meetings with the affected tribes in addition to the usual consultation for project-specific actions. This is a notable change in direction from the 1986 forest plan. All alternatives recognize the value of areas of tribal importance and their relationship to the Ashley National Forest.

Potential threats to areas of tribal importance affected by programmatic planning can be activities not initiated by agency actions: wildfire, looting, vandalism, and dispersed recreation outside established recreation areas. Under all alternatives, the Forest Service would continue to consult with tribes to avoid, minimize, or resolve potential impacts.

Extent and Intensity of Areas Managed for Recreational Use

Changes in public recreation access and intensity of use have the potential to compromise tribal solitude and privacy, and affect areas of traditional resource gathering and tribal use. The Forest Service does not fully understand the exact locations and uses of many areas of tribal importance, which highlights the need for further consultation. Likewise, impacts on areas of tribal importance from varying levels of recreation extent and intensity have not been documented on the forestwide level. The development and maintenance of recreation infrastructure may have the potential to affect certain areas important for tribal use under all alternatives.

Extent of Actions or Decisions Affecting Tribal Resource Access or the Exercise of Treaty Rights

Actions on the Ashley National Forest, including (but not limited to) grazing, fire and fuels management, vegetation treatments, and timber harvest, have the potential to affect treaty reserved rights for traditional tribal use. Applicable Federal and State regulations, Forest Service policies, and current programmatic agreements would apply to any ground-disturbing actions associated with a proposed development. These processes serve to avoid and minimize direct and indirect impacts on areas of tribal importance regardless of alternative. Historically, the Ute Indian Tribe has expressed a strong preference toward natural or passive management of vegetation over mechanical or prescribed treatments; this applies both to vegetation management and fire and fuels management (Forest Service 2017i). The practice of increased mechanical or prescribed treatments on the forest may affect the character and setting of areas of tribal importance. Moreover, the Ute Indian Tribe considers the entire forest sacred and important, and has previously expressed concerns regarding active management across the Ashley National Forest.

Tribal consultation is necessary to identify areas used for traditional cultural activities and to maintain access through system roads, as well as through trail access and designated motorized access. Changes in access may also hinder the ability for tribes to visit and use areas of importance.

All alternatives will provide management direction for areas under protective designations. With proper and thorough tribal consultation, wilderness and special management area designations have the potential to protect areas of tribal importance and use, including areas where traditional plants are gathered under an array of federally guaranteed treaty rights. However, without adequate consultation, wilderness and special management area designations and changes in travel management associated with protective designations may inhibit continued access and tribal uses of National Forest System lands.

Areas of the Ashley National Forest are open to grazing under all alternatives. Tribal consultation is necessary to determine if and where grazing poses impacts on areas of tribal importance, specifically the traditional gathering of culturally significant plants.

Under all alternatives, the Forest Service will continue to consult with tribes as part of the NHPA section 106 review process with regard to areas of tribal importance, cultural resources, and project-specific implementation. All action alternatives include goals to meet with tribal representatives at regular intervals.

Environmental Consequences for Areas of Tribal Importance—Alternative A

The 1986 forest plan included little mention of tribal interests and lacked discussion, analysis, and programmatic direction for areas of tribal importance. The 1986 forest plan does mention that formal and informal contacts were made with the Ute Indian Tribe to determine if there were existing land use plans that would be in conflict with any of the proposed plan alternatives. Through government-to-government consultation, it was determined that there would be no conflicts with existing plans, and implementation-level tribal consultation would continue to take place on project-specific implementation actions (Forest Service 1986). Nonetheless, under the 1986 forest plan and compliance with laws, regulations, EOs, Forest Service guidance, and plan amendments, the Forest Service incorporated consultation and consideration of tribal resources and uses in planning and program management.

Extent and Intensity of Areas Managed for Recreational Use

Recreation planning under alternative A is based on the assumption of moderate to heavy levels of dispersed recreation. Ground and vegetation disturbance as well as a loss of privacy, solitude, setting, or character may occur in conjunction with recreational use and associated facilities. Without diligent tribal consultation, these impacts may adversely affect the integrity of tribally important areas. However, under alternative A consultation requirements are implemented to protect and mitigate such impacts on areas of tribal importance.

Extent of Actions or Decisions Affecting Tribal Resource Access or the Exercise of Treaty Rights

Ground disturbance and impacts on culturally significant plants may occur in conjunction with management activities in the planning area. Disturbance to traditionally gathered plants can result from grazing, fire and fuels treatment, timber harvest, and vegetation management. Under the 1986 forest plan, grazing components are largely excluded, which allowed for greater flexibility in management of grazing. Without proper consultation between affected tribes, ranchers, and the Forest Service, this has resulted in a lack of understanding of how to best protect tribally important locations and plant species, and may continue to do so under the alternative A.

A total of 11,000 acres of lodgepole pine habitat was set as an objective aimed to encourage natural regeneration, a method generally preferred by the Ute Indian Tribe. Section 106 and other consultation requirements are required and implemented under alternative A to protect and mitigate impacts on areas of tribal importance within these areas, and for any significant action on the Ashley National Forest. The lack of programmatic direction in substitution of site-specific planning for the above-mentioned actions may leave gaps for how to best protect areas of tribal importance. Prescribed and mechanical treatments occur under alternative A, along with the production of timber. Historically the Ute Indian Tribe has reiterated their preference for passive management of the forest and less active management wherever possible. Under the 1986 forest plan, the Forest Service and ranchers do not have a complete understanding of what locations and what species of plants the affected tribes consider areas of tribal importance. Under this plan, treaty reserved rights to gather plants of traditional importance and use may be affected due to a lack of understanding of how to best manage these species and areas of importance.

Environmental Consequences for Areas of Tribal Importance—Alternative B

Extent and Intensity of Areas Managed for Recreational Use

Forestwide plan components for access and recreation have similar effects on areas of tribal importance across all action alternatives. The allocation of recreation management areas varies by alternative and may affect the type of recreation intensity and access on specific areas of the Ashley National Forest. Furthermore, the recreation management areas are divided into three differing management areas that vary in intensity of proposed recreation development. Destination recreation areas may have the greatest potential to affect solitude and privacy in tribally important areas, whereas backcountry recreation areas will likely not foster threats to tribal privacy and solitude due to lower visitor density and use. General recreation areas emphasize multiple use and may provide access to areas of tribal importance.

Alternative B aims to develop and maintain infrastructure to support recreation, while also weighing resource values and local uses, including use by the local tribes. Under alternative B, the emphasis on providing a variety of developed and dispersed recreation to support a diverse set of users and local communities recognizes that local communities, including tribal communities, have traditionally used lands managed by the Forest Service; such direction may serve to promote, thorough consultation and effective management, the preservation of the setting, character, and function of areas of tribal importance.

Extent of Actions or Decisions Affecting Tribal Resource Access or the Exercise of Treaty Rights

Impacts on traditionally used resources and areas of tribal importance may be caused by other forest uses, including grazing, fire and fuels treatment, timber harvest, and vegetation management. Further programmatic consultation is needed to determine where tribally important resources exist and which forest activities are potentially impactful to treaty-guaranteed tribal use of such resources. Additional consultation with affected tribes and ranchers is needed to identify these tribally important plant species and to determine if grazing in certain areas poses a threat to traditional resource collection.

To a limited extent, alternative B embraces the natural role of fire in moving Ashley National Forest to desired conditions in addition to prescribed fire and mechanical treatments. The Ute Indian Tribe has historically preferred natural or passive management of the forest over mechanical or prescribed treatments. Alternative B may provide forestwide fire and fuels management direction that is more in line with the Ute Indian Tribe's preference, at least compared with alternative A. Alternative B permits timber harvest, planned ignitions, thinning, and planting on roughly 1,500 acres per year. The Ute Indian Tribe generally does not prefer these active treatments of the forest; however, through sustained and regular tribal consultation, in addition to project-specific consultation, greater understanding of areas of tribal importance and the locations of these areas, and best management practices to protect tribal use of these areas, management that is agreeable to the tribes and the Forest Service may be increasingly possible under alternative B.

Alternative B adds two additional recommended wilderness areas in addition to all existing designated areas. Additional areas under protective designations may significantly reduce ground disturbance and impacts on tribally important plant species. However, the addition of protective designations also may have the potential to restrict motorized or mechanized transport access to the forest, which in turn would limit access to areas of tribal importance (Forest Service 2020h).

Environmental Consequences for Areas of Tribal Importance—Alternative C

Extent and Intensity of Areas Managed for Recreational Use

Under alternative C, the management emphasis for recreation would be in the direction toward a quieter experience and an increased emphasis on backcountry recreation. As compared with alternatives A and B, motorized recreation would be significantly reduced. This direction in managing recreation use may foster more opportunities for solitude and privacy for traditional tribal use. Differing from all other alternatives, under alternative C the Forest Service would manage backcountry recreation areas as not suitable for wheeled motorized travel, which may restrict necessary access to areas of tribal importance. This is because tribal members may use existing forest recreation infrastructure to reach tribally important areas by motorized vehicle. Further tribal consultation is needed to identify what recreation infrastructure, specifically motorized, tribal members depend on to access areas of tribal importance.

Extent of Actions or Decisions Affecting Tribal Resource Access or the Exercise of Treaty Rights

Alternative C is more protective than alternatives A and B in that it emphasizes preservation of the natural setting and implementation of passive management techniques. The Ute Indian Tribe has expressed that natural and passive management of the Ashley National Forest, the entirety of which is important and sacred to them, is their preferred method of forest management (Forest Service 2017i). Alternative C provides slightly more restrictive grazing regulations with 40 percent utilization for livestock and 13,400 fewer acres permitted for grazing across the plan area (table 2-1). Consultation with affected tribes and ranchers, as needed and on a case-by-case basis, may help protect tribally important plant species from potential adverse grazing impacts.

Similar to alternative B, alternative C embraces the natural role of fire in moving the Ashley National Forest to desired conditions. Alternative C may provide forestwide fire and fuels management direction that is more in line with the Ute Indian Tribe's preference of passive management. Under alternative C, vegetation management has an emphasis on the use of natural processes to achieve desired conditions. Similarly, the use of prescribed fire and timber harvest would be significantly reduced. The Ute Indian Tribe generally prefers these passive treatments of the forest.

Environmental Consequences for Areas of Tribal Importance—Alternative D

Extent and Intensity of Areas Managed for Recreational Use

Under alternative D, the management emphasis for recreation would be in the direction toward increased forest access and developed recreation opportunities. Management would emphasize motorized access, developed opportunities, and management controls to support these opportunities. The potential for impacts on areas of tribal importance from recreation would continue under this more intensive recreation approach. This emphasis may increase the potential for impacts on ground disturbance, the setting, and necessary solitude for tribally significant areas. Increased recreation development may also foster increased access to certain areas of tribal importance by preserving and expanding upon motorized use in recreation areas.

Extent of Actions or Decisions Affecting Tribal Resource Access or the Exercise of Treaty Rights

Alternative D is less protective than all other alternatives and emphasizes active forest management techniques. It has the fewest restrictions on timber harvest and vegetation management. Additionally, alternative D embraces active management of wildland fire. Alternative D would not include additional designated areas but would not remove existing areas under alternative A.

Historically, the Ute Indian Tribe has expressed a preference toward natural or passive management of vegetation over mechanical or prescribed treatments. Vegetation management approaches under this alternative may be problematic for the tribe. Livestock grazing allotments and stubble height regulations would be determined based on site-specific conditions. Consultation with affected tribes on site-specific management would continue to help protect tribally important plant species from adverse impacts.

Cumulative Environmental Consequences for Areas of Tribal Importance

The use of resources and places important to the Ute and Eastern Shoshone Tribes began long before the establishment of the Ashley National Forest. As such, the distribution of resources and areas of tribal importance and tribal use in many cases crosses current jurisdictional boundaries. In addition, activities conducted on lands adjacent to the Ashley National Forest can also affect access to resources; the availability, abundance, and sustainability of resources; and the opportunities for tribal use on the Ashley National Forest.

Current and previous Forest Service management activities, public resource procurement, recreational use, and natural processes have affected the access and use of areas of tribal importance. Under all alternatives, effects on these places and features may directly or indirectly affect the tribes' access and use to conduct ceremonial and traditional practices on other sacred sites or areas of tribal importance that are part of their continuing traditions.

Under all alternatives, negative effects, such as the loss or degradation of sacred sites, traditional cultural properties, and other resources that are important to tribes or that provide for tribal use, have happened in the past and probably will happen in the future. As time progresses, this loss results in fewer resources available to future tribal generations to learn about and connect with their cultural, religious, and spiritual practices, values, and identities. As such, it is imperative to work with the tribes that have traditionally used the Ashley National Forest to avoid and mitigate impacts on areas of tribal importance.

All forest plan alternatives would continue the necessary prerequisite of tribal consultation on a government-to-government basis. Implementation of a new forest plan would seek to avoid, or at least significantly reduce, impacts on areas of tribal importance. This could reduce cumulative impacts relative to the no-action alternative. The Forest Service does not anticipate any additional cumulative impacts on areas of tribal importance and tribal uses directly as a result of any proposed alternative.

Cultural and Historic Resources

Introduction

Cultural resources can be defined as physical evidence or places of past human activity. Cultural resources are defined in Forest Service Manual 2360 as “an object or definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence.” This includes prehistoric and historic archaeological sites and districts, historic buildings and structures, ethnographic landscapes, and traditional cultural properties. A traditional cultural property is defined as a cultural resource that is eligible for inclusion in the National Register of Historic Places (NRHP) because of its association with cultural practices or beliefs of a living community that are rooted in that community’s history, and important in maintaining the continuing cultural identity of the community. It must also be a tangible property; that is, it must be a district, site, building, structure, or object.

Cultural resources are important social and economic contributors to the Ashley National Forest, region, and nation. They provide opportunities for cultural tourism, education, and research. They are also necessary for maintaining the cultural identity of the Ute and Eastern Shoshone communities who have traditionally called areas within and adjacent to the Ashley National Forest their home.

Regulatory Framework

The NHPA directs agencies to manage effects on historic properties and protect significant historic resources from destruction, alteration, and neglect. Historic properties are defined under section 101 of the NHPA (54 USC 300–308) as any district, site, building, structure, or object included on, or eligible for inclusion on, the NRHP, based on their importance to local, regional, or national history. The four NRHP criteria for eligibility are the following:

- Criterion A: “Event”—The property must contribute to the major pattern of American history.
- Criterion B: “Person”— The property is associated with significant people of the American past.
- Criterion C: “Design and construction”—This concerns the distinctive characteristics of the building by its architecture and construction, including having great artistic value or being the work of a master.
- Criterion D: “Information potential”—This is satisfied if the property has yielded or may be likely to yield information important to prehistory or history.

If a property is found to be eligible under one or more of the four criteria, it must also maintain most, if not all, aspects of integrity of location, design, setting, materials, workmanship, feeling, and association to be eligible.

Historic properties include archaeological sites, historic buildings, traditional cultural places of significance to communities, cultural landscapes, monuments, and cultural features that might be clustered in districts, individual sites, buildings, structures, and other objects deemed worthy of preservation for their historical significance. In addition to NEPA, the following are excerpts from some of the most relevant laws and authorities for addressing cultural and historic resources in the Ashley National Forest:

National Historic Preservation Act of 1966 (NHPA) (16 USC 470), as amended—NHPA section 106 directs all Federal agencies to take into account the effects of their undertakings (actions, financial support, and authorizations) on properties included in or eligible for the National Register. Advisory Council on Historic Preservation regulations at 36 CFR 800 implement NHPA section 106. NHPA section 110 establishes inventory, nomination, protection, and preservation responsibilities for federally owned historic properties.

National Environmental Policy Act of 1969 (NEPA) (42 USC 4321–4346)—NEPA establishes national policy for the protection and enhancement of the environment. Part of the Federal Government's function in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage." The act is implemented by the CEQ regulations at 40 CFR 15001508.

The Archeological and Historic Preservation Act of 1974 (16 USC 469)—The Archeological and Historic Preservation Act amended and expanded the Reservoir Salvage Act of 1960; it was enacted to complement the Historic Sites Act of 1935 by providing for the preservation of historical and archaeological data, which might be lost or destroyed as the result of the construction of a federally authorized dam or other construction activity. This greatly expanded the number and range of Federal agencies that had to take archeological resources into account when executing, funding, or licensing projects. The Archeological and Historic Preservation Act also allows for any Federal agency responsible for a construction project to appropriate a portion of project funds for archaeological survey, recovery, analysis, and publication of results.

The American Indian Religious Freedom Act of 1978—This act protects American Indian rights to exercise traditional religions, including access to sites and freedom to worship through ceremonials and traditional rights.

Archaeological Resources Protection Act of 1979 (16 USC 47Oaa et seq.), as amended—This act provides criminal penalties and civil penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource found on public lands or Indian lands. The act includes National Forest System lands in its definition of public lands. The act also prohibits the sale, purchase, exchange, transportation, receipt, or offering of any archaeological resource obtained from public lands or Indian lands.

Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001)—This act provides a process for museums and Federal agencies to return certain Native American cultural items (human remains, funerary objects, sacred objects, or objects of cultural patrimony) to lineal descendants and culturally affiliated Indian tribes and Native Hawaiian organizations. The Native American Graves Protection and Repatriation Act includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional excavation, and unanticipated discovery of Native American cultural items on Federal and tribal lands, and penalties for noncompliance and illegal trafficking. The act requires agencies and museums to identify holdings of such remains and objects and to work with appropriate Native American groups toward their repatriation. Permits for the excavation or removal of cultural items protected by the act require tribal consultation, as do discoveries of cultural items made during activities on Federal or tribal lands. The Secretary of the Interior's implementing regulations are at 43 CFR 10.

Executive Order 11593—Protection and Enhancement of the Cultural Environment, issued May 13, 1971—This EO directs Federal agencies to inventory cultural resources under their jurisdiction, nominate all federally owned properties that meet the criteria to the NRHP, use due caution until the inventory and nomination processes are completed, and assure that Federal plans and programs contribute to preservation and enhancement of non-federally owned properties.

Executive Order 13175—Consultation and Coordination with Indian Tribal Governments, issued November 6, 2000—This EO directs Federal agencies to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

Executive Order 13287—Preserve America, issued March 3, 2003—This EO establishes Federal policy to provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of the historic properties owned by the Federal Government. The order encourages agencies to seek partnerships with State, tribal, and local governments, and the private sector to make more efficient and informed use of historic properties for economic development and other recognized public benefits.

Native American Graves Protection and Repatriation Regulations (43 CFR 10(b)— Human Remains, Funerary Objects, Sacred Objects, or Objects of Cultural Patrimony from Federal or Tribal Lands)—The regulations establish a systematic process for determining the rights of lineal descendants and Indian tribes and Native Hawaiian organizations to certain Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony with which they are affiliated. The regulations pertain to these objects whether they are inadvertently discovered or excavated intentionally under a permit issued under the authority of the American Antiquities Act of 1906 (16 USC 431-433) (Antiquities Act) or the Archaeological Resources Protection Act.

Curation of Federally Owned and Administered Archaeological Collections (36 CFR 79)—This establishes definitions, standards, procedures, and guidelines for Federal agencies to preserve collections of prehistoric and historic material remains, and associated records recovered under the authority of the Antiquities Act, Reservoir Salvage Act, NHPA, and the Archaeological Resources Protection Act.

36 CFR 261 Prohibitions in Areas Designated by Order; Closure of National Forest System Lands to Protect Privacy of Tribal Activities (2011)—This "provides regulations regarding special closures to provide for closure of National Forest System lands to protect the privacy of tribal activities for traditional and cultural purposes to ensure access to National Forest System land, to the maximum extent practicable, by Indian and Indian Tribes for traditional and cultural purposes."

Analysis Area

The analysis area is primarily related to the resources on the Ashley National Forest, within the context of the thousands of years of pre-contact history and hundreds of years of post-contact history of the Uinta Mountains and surrounding areas. The temporal scope of the effects analysis is the anticipated life of the plan.

Description of Affected Environment

Ashley National Forest is rich in historically and culturally significant properties. Cultural and historic resources, and uses in the plan area, are important to understanding the social, economic, and ecological sustainability of the plan area. For a detailed discussion of the cultural history, current conditions, trends, and issues related to cultural resources of the Ashley National Forest, the reader is directed to the Ashley National Forest Assessment, Cultural and Historic Resources Report (Forest Service 2017j).

The plan area includes portions of northeastern Utah and southwestern Wyoming in the intermountain region of the United States. As of April 2020, approximately 104,445 acres are considered to have been inventoried to current standards, or 7.5 percent of the total plan area. Inventory has not been conducted evenly across the four districts, or within each district. An additional 129,148 acres, or 9.3 percent of the total plan area, have been surveyed at a reconnaissance level (not current standards).

Currently, there are 2,585 known cultural resources documented in the plan area, including both prehistoric and historic remains. Cultural resource sites on the Ashley National Forest include 2,058 prehistoric sites, 431 historic sites, and 96 multicomponent sites. Of these, 1,140 sites meet eligibility requirements to be listed on the NRHP, and 5 sites have already been listed (see table 3-65 and table 3-66). Ongoing surveys, which are completed as part of section 106 cultural resource compliance requirements, have demonstrated that numerous cultural resources could be present in areas not yet surveyed. The Forest Service also maintains cultural resource sensitivity mapping data, which are incorporated in the impact discussions (figure 3-21). These sensitivity data should not be considered as a predictive model. Currently, 385,000 acres of the Ashley National Forest are mapped as having high sensitivity for the presence of cultural resources, 378,600 acres as moderate probability, and 614,000 acres as low probability (Forest Service GIS 2020).

Traditional cultural properties are those areas of cultural significance identified by extant American Indian tribes and other groups, such as Mormon communities. These properties can include, but are not limited to, mountains, hills, springs, collecting areas, burial grounds, and unique landscape features.

National Register Bulletin 38 provides guidance for documenting and evaluating traditional cultural properties (Parker and King 1998). The Ute Indian Tribe has suggested that traditional plant collecting areas may be considered traditional cultural properties.

Table 3-65. Summary of Cultural Resource Sites by Type on the Ashley National Forest as of April 2020

NRHP Eligibility	Cultural Site Type			Total
	Prehistoric	Historic	Multicomponent	
Eligible	961	121	58	1,140 cultural sites
Listed	0	5	0	5 cultural sites
Not eligible	973	258	31	1,262 cultural sites
Unevaluated	124	47	7	178 cultural sites
Total	**2,058**	**431**	**96**	**2,585 cultural sites**

Source: Forest Service GIS 2020

Table 3-66. National Register-Listed Properties on the Ashley National Forest as of April 2020

Forest Site Number	State Number	Site Name	National Register Status
AS-0095	42DA157	Ute Mountain Fire Lookout Tower	Listed
AS-0147	42DA191	Swett Ranch Historic Homestead	Listed
AS-0151	42DA208/42UN823	Carter Military Road	Listed
AS-0192	42DC347	Stockmore Ranger Station	Listed
AS-0193	42DC348	Indian Canyon Ranger Station	Listed

Source: Forest Service 2017j

Cultural and historic resources within the plan area represent the processes and events important to the identity and history of local communities. Cultural resources contain a wealth of information regarding social and ecological conditions and changes through time. These conditions and changes include human successes and failures in coping with these transformations over the past 10 millennia. This information can be of value to managers making decisions regarding contemporary and future ecological management, and in educating the public about the complex ecological sustainability of the plan area. Preservation of historic properties, traditional cultural properties, and traditional landscapes is important as a reminder of the collective past and a link to the future (Forest Service 2017j).

Environmental Consequences for Cultural and Historic Resources

Methodology and Analysis Process

Potential environmental consequences are evaluated on a programmatic, qualitative basis using past studies and observations, and comparing the areal extent of potential implementation actions. The forest plan does not authorize site-specific projects or activities; therefore, there are no direct effects from adopting the forest plan. In this analysis, impacts are not evaluated on a site- or project-specific basis. Where applicable, cultural resource sensitivity evaluation data prepared by the Ashley National Forest are incorporated in the impact discussions; however, inventories for cultural resources are limited, and many cultural resources could be present in areas not yet surveyed (figure 3-21). Direct and indirect site-specific effects will be analyzed when future projects implementing the plan are proposed. The project-specific analysis and completion of the section 106 process would provide a more in-depth analysis of the impacts on cultural resources.

Indicators for identifying potential impacts on cultural resources are assessed by applying the criteria of adverse effect, as defined in the implementing regulations for section 106 (36 CFR 800). Actions that could alter, degrade, or otherwise affect the integrity and condition of a property have a high potential to adversely affect the values that contribute to the traditional, cultural, scientific, or historical value of the property. Actions that protect, limit, or otherwise avoid impacts on the integrity or condition of the historic property would protect and maintain the values that contribute to its traditional, cultural, scientific, or historical values.

The criteria of adverse effect also provide a general framework for identifying and determining the context and intensity of potential impacts on other cultural resources categories, such as any Native American or other traditional community, cultural, or religious practices or resources. For additional discussion on tribal resources and concerns, see “Areas of Tribal Importance.”

This section is organized by the issue topics identified during scoping and subsequent alternatives development that are most applicable to cultural resources. The analysis area is typically forestwide with some targeted areas. The cumulative effects analysis includes the potential impacts that could occur from a reasonably foreseeable management scenario combined with other reasonably foreseeable activities or projects in the Ashley National Forest’s vicinity. This evaluation focuses on longer-term indirect and cumulative effects that may occur over the 10- to 15-year life of the forest plan.

Analysis Assumptions

- For implementation of site-specific actions proposed in this plan, the Forest Service will comply with section 106 of the NHPA.
- All laws, requirements, and Forest Service guidance pertinent to determining the impacts on cultural resources are included in determining the potential impacts.

- Cultural resources are generally considered to be nonrenewable; for example, adverse effects that impact the physical integrity of the historic property are irreversible, long-term impacts. Some impacts, such as changes to the setting, may be adverse effects in the short term
- Avoidance of significant resources would be preferred rather than other methods of resolving any adverse effects that may be anticipated.
- The Forest Service is continually compiling cultural resource baseline information for areas that may be under consideration for future activities. This work will result in a greater understanding of the presence and condition of known resources and will identify potential conflicts.
- Ongoing consultation with contemporary tribal representatives would continue using a qualitative assessment of the potential for impacts on sites, landscapes, and other plant, animal, mineral, or other resources that may be important to those groups for traditional or religious uses.

Indicators

Analysis indicators for cultural and historic resources are provided below.

- The acres or areal extent of potential ground-disturbing activities and the potential for directly affecting cultural resources or exposing cultural resources to changes in setting, access, or erosion
- The timeline and acres of non-project-related survey, number of NRHP nomination studies proposed, and timeline for implementing qualitative assessment of cooperative planning and protective measures
- Change in acres of designations or restrictions, qualitative consideration of known areas of sensitive resources, and qualitative consideration of dispersed versus developed sites
- Acres of special management areas and qualitative assessment of management

Environmental Consequences for Cultural and Historic Resources Common to All Alternatives

The potential impacts on cultural resources associated with all alternatives are similar in nature and type. The alternatives are broad in scope and do not indicate specific project-level impacts that would be addressed through the subsequent section 106 processes. Management actions associated with the key issues all have the potential for affecting cultural resources, primarily through ground disturbance, changes to the setting, and incidental and proactive protection measures.

Some of the greatest potential threats to cultural resources are those activities not initiated by agency actions: wildfire, erosion, looting, vandalism, trespass, and unmonitored dispersed recreation.

Effects from Recreation, Recreational Access, and Recreational Designations

Recreational use, including nonmotorized and motorized vehicle use, can affect cultural resources in the long term through direct disturbance, soil compaction, altered surface water drainage, erosion, intrusions to the setting, and access leading to unauthorized collection or vandalism. In addition, recreational facility development and maintenance can similarly affect cultural resources. The potential for impacts on cultural resources would increase as the population and recreational use increase or are concentrated in fewer areas or dispersed in areas where cultural resources are present. Ground disturbance as a result of dispersed recreational use and dispersed camping may have the potential to cause adverse effects on cultural resources. Thus, recreational designations and restrictions can affect the intensity and risk of impacts on cultural resources. The impact of repeated uses or visits over time could also increase the potential for impacts on cultural resources from erosion. Repeated visits to sites can also create social trails, directing more people to cultural sites. Increased access could damage resources through vandalism and unauthorized collection.

Effects from Designated Areas

Current management of designated lands, such as the FGNRA, scenic byways, national recreation trails, and existing wilderness, would continue. Under all alternatives, seven RNAs with a total area of 7,700 acres and the Sheep Creek Canyon Geologic Area would also be retained. Within the existing RNAs, Ashley National Forest cultural resource data indicate 1,600 acres have a high sensitivity for the presence of cultural resources and 2,200 acres have moderate sensitivity. For the Sheep Creek Canyon Geologic Area, 200 acres have a high sensitivity for the presence of cultural resources and 1,400 acres have moderate sensitivity (see table 3-67). Designated areas may incidentally protect cultural resources from ground-disturbing and access-related impacts and alterations of the setting. However, in some cases, limiting activities such as mechanical vegetation treatments may affect opportunities to address fuels buildup and mitigate wildfire potential.

Table 3-67. Summary of Cultural Resource Sensitivity by Selected Designated Areas and Vegetation Treatments

Allocation	Alternative A	Alternative B	Alternative C	Alternative D
Recommended Wilderness	0	10,300	50,200	0
High sensitivity for cultural resources	N/A	1,600	15,900	N/A
Moderate sensitivity for cultural resources	N/A	2,200	15,400	N/A
Research Natural Areas (RNAs)	7,700	7,700	9,100	7,700
High sensitivity for cultural resources	1,600	1,600	2,100	1,600
Moderate sensitivity for cultural resources	2,200	2,200	2,700	2,200
Sheep Creek Canyon Geologic Area	3,600	3,600	3,600	3,600
High sensitivity for cultural resources	200	200	200	200
Moderate sensitivity for cultural resources	1,400	1,400	1,400	1,400
Timber Harvest and Suitability	213,419	189,400	93,700	189,400
High sensitivity for cultural resources	N/A	70,600	39,400	70,600
Moderate sensitivity for cultural resources	N/A	60,000	31,400	60,000
Timber Production	N/A	109,800	80,500	114,300
High sensitivity for cultural resources	N/A	47,100	31,700	50,000
Moderate sensitivity for cultural resources	N/A	36,700	27,400	37,900
Annual Targets for Vegetation Management Treatments: year 1/subsequent years	No target	1,500/1,200	1,000/800	1,600/1,300

Source: Forest Service GIS 2020

Effects from Fire and Fuels Management

Under all alternatives, fires and fuels management and treatments have the potential to cause impacts from ground and direct disturbance of cultural resources, changes in cultural settings, and exposure of cultural resources to vandalism, looting, and erosion. Management actions associated with wildfire use and suppression can lead to adverse effects on cultural resources, including the construction of firelines through sites, burning of perishable materials resulting from suppression ignition, and the effects of high temperatures on artifacts and features. Treatments to reduce fuels and proactive identification of cultural resources would reduce the risk of wildfire on cultural resources from emergency wildfire suppression activities, such as fire breaks, where identification and avoidance may be impossible. Reducing wildfire risk would particularly benefit fire-sensitive resources like wooden structures and rock art, as well as natural resource locations that may be important to tribes.

Effects from Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Potential impacts on cultural resources from vegetation management and timber harvest are similar for all alternatives. Potential impacts on cultural resources could result from ground and direct disturbance of cultural resources, changes in cultural settings, exposure of cultural resources to vandalism, looting, and erosion. Vegetation treatments include mechanical thinning, prescribed fire, invasive species control, hazardous fuels removal, and restoration projects. The locations of vegetation treatments are not precisely defined, and targeted acres and preferred treatment methods vary among the alternatives.

Treatment methods also vary in the potential for impacts. For example, ground-disturbing, mechanical vegetation treatments could modify the spatial relationships of artifacts and site features and displace, break, or damage artifacts. The use of fire as a treatment could affect flammable cultural resource artifacts and features, cause spalling and staining of rocks, and distort the analysis of an artifact’s date and function. Any form of vegetation management that may affect cultural resources would be reviewed in compliance with relevant cultural resources laws and regulations.

Unlike other potential vegetation treatments, the locations of potential timber harvest are defined and their relationship to known cultural resources or sensitive areas can be compared. The Forest Service would continue to use timber harvest under all alternatives to salvage dead trees, reduce hazardous fuels, enhance habitat, and provide for commercial and consumer uses. Potential impacts are similar to other forms of vegetation treatment; however, timber harvest would typically involve more intensive ground disturbance at the harvest location and for access roads. Lands identified as suitable for timber harvest and for commercial timber production are quantified under the action alternatives.

Effects from Social and Economic Contributions

All the alternatives include ongoing activities that provide social and economic value to the local and regional economy and quality of life. These broadly include overlapping recreation opportunities, livestock grazing, resource enhancement, fire protection, forest products, cultural heritage, and aesthetic values. Cultural resources compliance under the NHPA section 106 process and other laws, requirements, and Forest Service guidance would continue to be implemented. The Forest Service would continue to assess the effects on cultural resources for all undertakings. The value of traditional and cultural uses on the Ashley National Forest would continue to be recognized in the Forest Service’s programs and activities.

Surface-disturbing activities are associated with economic uses of the Ashley National Forest. Cultural resources can be directly affected by the modification, displacement, and loss of artifacts, features, and middens, resulting in the loss of valuable cultural resource information on the site function, date of use, subsistence, past environments, and other research questions. Construction or removal of ranch fencing, corrals, and tanks could affect the integrity of cultural resources. In areas where livestock congregate and trail, cultural resource sites could potentially be affected by the short-term removal of vegetation cover, increased soil compaction, and some mixing of artifacts and contextual relationships. Livestock grazing can be associated with ongoing, long-term, or incremental impacts on cultural resources on or near the ground, if present, which can accelerate erosion and weathering in areas where livestock congregate. However, when rangeland health standards are maintained through adequate management of livestock grazing, significant impacts on cultural resources would not be anticipated (Osborn et al. 1987; Roney 1977).

All the alternatives would continue oil and gas leasing and development in selected areas; no new allocations or availability decisions would be made. Oil and gas leasing is associated with potential impacts from ground and direct disturbance of cultural resources, changes in cultural settings, and exposure of cultural resources to vandalism, looting, and erosion.

Environmental Consequences for Cultural and Historic Resources—Alternative A

Alternative A is the current management based on the 1986 forest plan, as amended and implemented. Ongoing work and approved planned activities would continue, and the Forest Service would address effects on cultural resources. This alternative would not recommend any new management areas; no changes would occur to the plan in response to issues raised, and it would not adjust management in response to the requirements of the 2012 Planning Rule.

As described under "Environmental Consequences for Cultural and Historic Resources Common to All Alternatives," the potential for impacts on cultural resources from ground and direct disturbance, intrusions to setting, erosion, and access would continue. Recreational use would continue to increase because recreational management allocations would not change. This would lead to the potential overuse in some areas. The potential for impacts from designated management areas, fires and fuels management, vegetation management, and timber harvest are similar to those described under "Environmental Consequences for Cultural and Historic Resources Common to All Alternatives."

Alternative A does not provide additional plan-level guidance specifying acres for targeting of vegetation treatments and fuel reduction. Currently, timber harvest and suitability acres total 213,419 acres. These locations are not defined, so cultural resource sensitivity cannot be assessed. The current plan emphasizes commodities and economic output, including timber and wood products; hazardous fuels treatment; road, trail, and facility maintenance; and new recreational facilities. The Forest Service would continue to assess impacts on cultural resources associated with these undertakings on a project-specific basis.

Environmental Consequences for Cultural and Historic Resources Common to Alternatives B, C, and D

Potential impacts on cultural resources are similar to those described under "Environmental Consequences for Cultural and Historic Resources Common to All Alternatives." The proposed plan (alternative B) and alternatives incorporate the Forest Service's 2012 Planning Rule, which provides more resources protection, adaptive planning, and integration among resources. Integrated plan components specifically address the protection of cultural resources, recognition of the value of traditional and cultural uses, and compliance with all laws, regulations, and policies. Desired conditions for cultural resources specified in the draft forest plan are common across all action alternatives. The action alternatives all include proactive objectives addressing a heritage program plan, cultural resource survey, site recordation, NRHP evaluations, and tribal meetings. These objectives vary among the alternatives in timelines and the number of actions anticipated.

Specifying proactive cultural resource objectives and desired conditions assists the Forest Service in meeting obligations under NHPA section 110 to maintain a preservation program for the identification, evaluation, and nomination to the NRHP, and protection of historic properties. At a plan level, identifying the locations, significance, historical context, and relative importance of cultural resources can lead to increased knowledge of the resource base and the preservation needs, and avoid the potential for future incompatible land allocation decisions.

Plan components for other resources, such as soils, scenic, water, areas of tribal importance, and others, include desired conditions that are largely consistent with cultural resource protection, enhancement, and impact avoidance. Fire and fuels management would include explicit objectives for defining and avoiding impacts on HVRAs, including cultural resources.

Environmental Consequences for Cultural and Historic Resources—Alternative B

Under the proposed plan (alternative B), the potential impacts on cultural resources are similar to those described under “Environmental Consequences for Cultural and Historic Resources Common to All Alternatives.” Specific proactive objectives for cultural resource management provide a 1-year timeline for developing a heritage program plan, annually completing at least 200 acres of cultural survey, documenting five sites, formally evaluating five sites for eligibility on the NRHP, and annual engagement with tribes.

When compared with alternative A, recreational management designations would be updated to support different types of recreational opportunities and levels of use. The potential for impacts on cultural resources from recreation would continue, and the areas defined for recreational uses would increase over alternative A. However, defining destination recreation areas and backcountry recreation areas may direct those activities to areas where the levels of use may be more appropriate for cultural resource preservation.

The addition of two recommended wilderness areas (totaling 10,300 acres) would provide incidental protection from incompatible and ground-disturbing activities, including roads and vehicle use. Ashley National Forest cultural resource data indicate 1,600 acres have a high sensitivity for the presence of cultural resources and 2,200 acres have moderate sensitivity in these recommended wilderness areas.

Vegetation management treatments (such as timber harvest, planned ignitions, thinning, and planting) on 1,500 acres would be targeted annually (1,200 acres annually in the second decade) for resource objectives. While vegetation treatments would continue under alternative A, alternative A does not currently have comparable plan targets for vegetation management.

Under alternative B, lands identified as suitable for timber harvest total 189,400 acres. Of these, Ashley National Forest cultural resource data indicate 70,600 acres have a high sensitivity for the presence of cultural resources and 60,000 acres have moderate sensitivity. Areas with a higher sensitivity for the presence of cultural resources have a higher risk of impacts from ground and direct disturbance of cultural resources, changes in cultural settings, and exposure of cultural resources to vandalism, looting, and erosion.

Lands identified as suitable for timber production total 109,800 acres. Of these, Ashley National Forest cultural resource data indicate 47,100 acres have a high sensitivity for the presence of cultural resources and 36,700 acres have moderate sensitivity. Impacts are more likely to occur in those areas with a high sensitivity for the presence of cultural resources. Potential impacts on cultural resources could result from ground and direct disturbance of cultural resources, changes in cultural settings, and exposure of cultural resources to vandalism, looting, and erosion.

Alternative B emphasizes a sustainable level of goods commodities and economic output, including timber and wood products; hazardous fuels treatment; road, trail, and facility maintenance; and new recreational facilities. The Forest Service would continue to assess the impacts on cultural resources associated with these undertakings on a project-specific basis.

Environmental Consequences for Cultural and Historic Resources—Alternative C

Under alternative C, the potential impacts on cultural resources are similar to those described for alternative B. For cultural resources management, objectives under alternative C double the targets for proactive (non-project-related) cultural survey, site recordation, and NRHP evaluations. These actions would assist in cultural resource identification, preservation, and protection.

Recreational management designations would emphasize backcountry recreation and quiet recreational experiences on 739,700 acres, which is over half of the forest. The potential for impacts on cultural resources from recreation would continue, but this emphasis would reduce the potential for impacts from ground disturbance, changes to the setting, induced erosion, and access leading to vandalism and looting.

When compared with alternative A, alternative C would add an additional RNA totaling 1,400 acres and four recommended wilderness areas totaling 50,200 acres. Within the additional RNA, Ashley National Forest cultural resource data indicate 500 acres have a high sensitivity for the presence of cultural resources and 500 acres have moderate sensitivity. Within the recommended wilderness, 15,900 acres have a high sensitivity for the presence of cultural resources and 15,400 acres have moderate sensitivity in these recommended wilderness areas. The recommended wilderness areas would provide incidental protection from incompatible and ground-disturbing activities, including roads and vehicle use.

Vegetation management treatments (such as timber harvest, planned ignitions, thinning, and planting) on 1,000 acres annually in the first decade and 800 acres annually in the second decade would be targeted for resource objectives. Emphasis would be on the use of natural processes, including wildland fire use. While there are ground-disturbing impacts on cultural resources from mechanical and other treatments, wildland fire is unpredictable; its use can lead to adverse effects on cultural resources, including the construction of firelines through sites, burning of perishable materials, and the effects of high temperatures on artifacts and features. Treatments that minimize the potential for future uncharacteristic wildland fire can reduce the potential for impacts on cultural resources.

Under alternative C, lands identified as suitable for timber harvest total 93,700 acres. Of these, Ashley National Forest cultural resource data indicate 39,400 acres have a high sensitivity for the presence of cultural resources and 31,400 acres have moderate sensitivity. Areas with a higher sensitivity for the presence of cultural resource have a higher risk of impacts from ground and direct disturbance of cultural resources, changes in cultural settings, and exposure of cultural resources to vandalism, looting, and erosion.

Lands identified as suitable for timber production total 80,500 acres. Of these, Ashley National Forest cultural resource data indicate 31,700 acres have a high sensitivity for the presence of cultural resources and 27,400 acres have moderate sensitivity. Potential impacts on cultural resources could result from ground and direct disturbance of cultural resources, changes in cultural settings, and exposure of cultural resources to vandalism, looting, and erosion.

Alternative C would continue Ashley National Forest's social and economic contributions emphasizing natural settings, nonmotorized recreation, and ecosystem services. The Forest Service would continue to assess the impacts on cultural resources associated with these undertakings on a project-specific basis. Alternative C would also support increased coordination with Native American tribes related to the support of treaty rights. Similarly, the frequency of cultural surveys would be increased to support preservation of these resources.

Environmental Consequences for Cultural and Historic Resources—Alternative D

Under alternative D, the potential impacts on cultural resources are similar to those described for alternative B. For cultural resources management, objectives under alternative D propose targets for proactive (non-project-related) cultural survey, site recordation, and NRHP evaluations, which is the same as under alternative B. These actions would still assist in cultural resource identification, preservation, and protection.

Recreational management designations would have a greater emphasis on general recreation destination areas. Management would emphasize motorized access, developed opportunities, and management controls to support these opportunities. The potential for impacts on cultural resources from recreation would continue; however, compared with alternative B, this emphasis would increase the potential for impacts from ground disturbance, changes to the setting, induced erosion, and access leading to vandalism and looting.

Alternative D would retain the current RNAs and not add any new designations that could provide incidental protection from incompatible and ground-disturbing activities.

Fires and fuels management would emphasize active management of wildland fire using a full range of suppression techniques. Fuels treatments would be maximized to minimize risks from uncharacteristic wildfire. Suppression can lead to adverse effects on cultural resources. Treatments to reduce fuels and proactive identification of cultural resources would reduce the risk of wildfire on cultural resources from emergency wildfire suppression activities, such as fire breaks, where identification and avoidance may be impossible. While the Forest Service would employ other vegetation treatments, there would be an emphasis on timber harvest and production with 1,600 acres annually in the first decade and 1,300 acres annually in subsequent years. For comparison, there are currently no applicable plan targets for vegetation management under alternative A.

Under alternative D, lands identified as suitable for timber harvest total 189,400 acres. Of these, Ashley National Forest cultural resource data indicate 70,600 acres have a high sensitivity for the presence of cultural resources and 60,000 acres have moderate sensitivity. Lands identified as suitable for timber production total 114,300 acres. Of these, Ashley National Forest cultural resource data indicate 50,000 acres have a high sensitivity for the presence of cultural resources and 37,900 acres have moderate sensitivity. Potential impacts on cultural resources could result from ground and direct disturbance of cultural resources, changes in cultural settings, and exposure of cultural resources to vandalism, looting, and erosion.

Alternative D would emphasize active management of resources, more motorized access, higher targets for vegetation treatment, fire suppression, and developing resources for local community uses. The emphasis on active management under this alternative would likely lead to a greater inventory of cultural resources, which would expand the body of scientific knowledge in the region. As such, the potential for looting and vandalism of cultural resources may increase, correlating with increased public access to areas that may contain cultural resources, when compared with management proposed under alternative A. The Forest Service would continue to assess the impacts on cultural resources associated with these undertakings on a project-specific basis.

Cumulative Environmental Consequences for Cultural and Historic Resources

The analysis area for cultural and historic resource cumulative effects is the National Forest System lands on the Ashley National Forest and the immediate vicinity. Past and present forest uses, including logging, mining, recreation, grazing, rights-of-way, roads, visitor infrastructure, fire suppression, water development, transportation, and vandalism, have likely affected cultural resources through direct impacts or degradation of resource values. Natural processes, such as erosion, drought effects, and weathering, could lead to discovery of previously unknown cultural resources, but the potential damage to these sites would overcome the potential for discovery. Under all alternatives, cumulative impacts on cultural resources from climate change may occur from increased wildfire and more severe and frequent flooding and erosion. Population growth and increased recreation trends may increase the potential for impacts on cultural resources.

Present and reasonably foreseeable future actions that may potentially cause ground disturbance or changes to the setting, which potentially affect cultural resources, include various habitat improvement, restoration, and vegetation treatment projects; transmission, pipeline, and fiber-optic cable rights-of-way; water development and stream restoration projects; recreational trails and other facilities; and mining and other mineral development projects.

Federally funded or authorized actions that could affect cultural resources within the plan area would continue to be subject to project and compliance review under the NHPA. Other ground-disturbing activities, such as road construction, local or tribal actions, and utility infrastructure, may be reviewed by other Federal, State, or local agencies, as necessitated by applicable law. All the alternatives would be subject to further cultural resource review as projects and actions are implemented. Adverse effects on cultural resources would be resolved in the section 106 process.

No contributions to cumulative effects are anticipated under the forest plan alternatives. The alternatives address desired conditions, which would improve the stewardship of cultural resources in the long term and continue and enhance consideration of the effects on cultural resources that the Forest Service manages.

Timber

Introduction

The Forest Service manages the harvest of timber and forest products to protect the sustainability of national forests, as well as their associated watersheds. Key to the management of such forests is to sustain healthy, diverse, and productive timber stands that will remain suitable for production. Timber harvest is an important contributor to the local economy and a critical tool used to manage vegetation. The overarching goal of the Forest Service's forest management program is to guarantee that forests will be managed in an ecologically sustainable manner. Prior to authorizing harvest, it is important that the ecological situation is favorable for the sustainable removal of timber. Maintenance and restoration of forests is the best way to sustain the health, productivity, and diversity of the land.

Historically, the Ashley National Forest produced a moderate amount of lumber, which led to the development of several local mills in surrounding communities. Compared with other western forests, the Ashley National Forest is known for smaller-diameter and shorter timber products, which makes it less competitive for commercial interests. Peak production of annual timber harvest on the Ashley National Forest occurred in the late 1980s at around 27,000 MBF (54,000 CCF).[11] Timber production on the Ashley National Forest provides wood materials for a variety of uses, including softwood saw timber, poles and posts, and fuelwood. Fuelwood represents an important source of energy for surrounding communities, with many having more than 6 percent of homes using wood as their primary fuel source.

Under the existing 1986 forest plan, 528,000 acres (38 percent) of the Ashley National forest were designated as suitable for timber production, up to an annual allowable sale quantity of 21,000 MBF.

[11] Conversion to CCF may vary dependent on timber product type; however, a conversion factor of 0.5 MBF to 1 CCF was used for the purposes of this analysis.

However, the area that is currently managed for timber production has been significantly reduced in size, and the volume harvested is significantly less than the annual allowable sale quantity. Since the existing plan was developed, the implementation of the 2001 Roadless Rule has reduced the number of acres suitable for timber production on the forest, specifically within IRAs, which account for approximately two-thirds of the acres available for production under the 1986 forest plan. In addition, the species, age class, and quantity of timber currently available for production have changed significantly due to stressors and drivers such as insects, disease, and lack of natural fire. Currently, suitability analysis indicates that approximately 130,080 acres (9 percent) of the Ashley National Forest are suitable for timber production.

Under the 2012 Planning Rule, identification of lands that are suited and not suited for timber production is required on national forests, based on legal withdraw, site-specific conditions, and the compatibility of lands with the desired conditions and objectives found within the plan components. Lands that are found suitable for timber production are likely to receive regularly scheduled timber harvest, where resource conditions and site limitations do not restrict the ability for harvest beyond a considerable degree. Timber sales, along with other vegetation management tools, play an important role in this process. Responsible and well-managed timber harvest can lead to a reduction in hazardous fuel loading and promote desirable stand diversity, structure, and density.

Regulatory Framework

Multiple-Use Sustained-Yield Act of 1960—This act establishes the policy and purpose of the national forests to provide for multiple use and sustained yield of products and services. This law authorizes the Secretary of Agriculture to administer and develop the use of renewable resources, including range, on National Forest System lands.

Timber Sales on National Forest System Lands (6 USC 472a)—This states that the Secretary of Agriculture may advertise timber products from National Forest System lands for sale via bid.

Forest and Rangeland Renewable Resources Planning Act of 1974—This law authorizes long-range planning by the Forest Service to protect, develop, and enhance the productivity and other values of forest resources. It requires that a renewable resource assessment and a Forest Service plan be prepared every 10 and 5 years, respectively, to plan and prepare for the future of natural resources. This act was reorganized, expanded, and otherwise amended by the National Forest Management Act of 1976.

The National Forest Management Act of 1976—This act requires every national forest or grassland managed by the Forest Service to develop and maintain an effective land management plan, also known as a forest plan. The process for the development and revision of plans, along with the required content of plans, is outlined in planning regulations, often referred to as the planning rule. Managers of individual forests and grasslands follow the direction of the planning rule to develop a land management plan specific to their unit.

2001 Roadless Rule—This rule was adopted to protect and conserve IRAs found on National Forest System lands. This rule prohibits road construction, road reconstruction, and timber harvesting on IRAs.

2012 Planning Rule—This requires that every national forest or national grassland managed by the Forest Service develop and maintain an effective land use plan (forest plan), which includes the management of available timber, including those stands both suitable and not suitable for production. Forest plans provide an outline for expected timber harvest and timber sales, and they describe the way in which timber will be produced.

Analysis Area

The analysis area encompasses all National Forest System lands inside the Ashley National Forest decision area.

Description of Affected Environment

Approximately 53 percent (729,400 acres) of the analysis area is coniferous and seral aspen to coniferous forest. Coniferous forest is associated with several different assemblies of tree species, including ponderosa pine, ponderosa pine-mix, persistent lodgepole pine, Douglas-fir, mixed conifer, and spruce/fir. The species primarily managed on the Ashley National Forest for timber production are lodgepole pine, Engelmann spruce, Douglas-fir, and ponderosa pine.

The current suitability analysis indicates that nearly 18 percent (130,080 acres) of forested vegetation on the Ashley National Forest is suitable for timber production. Timber production is defined as the growing, tending, removing, and regenerating of trees to produce logs or other products for industrial or consumer use. Outside of lands suitable for timber production, the Forest Service uses irregular or unscheduled timber harvest as a vegetation management tool. Timber harvest differs from timber production because timber harvest may include the removal of trees for wood fiber use and other multiple-use purposes.

Timber production and harvest take place on the Duchesne, Flaming Gorge, Roosevelt, and Vernal Ranger Districts. Under the amended plan, the planned allowable sale quantity is 21,000 MBF per year. Timber harvest volume is currently well below those projected in the existing forest plan. The average amount of timber harvested annually in the past 10 years was approximately 5,700 MBF per year.

Fuelwood harvest accounts for approximately 49 percent of forest products removed on the Ashley National Forest annually; saw timber accounts for 30 percent, and post and poles represent approximately 20 percent. Composition analyses in the decision area indicate that single-tree selection harvest represents approximately 38 percent (50,800 acres) of the total acres suitable for timber production on the forest. The second largest proportion of timber composition represents stands that are suitable for clearcutting (22 percent [29,900 acres]).

Both ecological and regulatory factors limit the volume of timber harvest on the Ashley National Forest. Additional information regarding forest conditions and threats to forested ecosystems is discussed in “Terrestrial Vegetation” and “Fire and Fuels.” The lack of natural fire over a century has led to timber stands that are increasingly dense with older trees, and thus more susceptible to insects and disease. Historical fire suppression has led to conditions that may have increased the frequency and scale of native bark beetle outbreaks, which can lead to cascading effects on soil, water, and wildlife. Outbreaks of insects have resulted in reduced growth and significant mortality of timber stands on the Ashley National Forest.

The primary culprits for parasitic plant and insect infestation of trees on the Ashley National Forest are dwarf mistletoe (*Arceuthobium* spp.), Douglas-fir beetle (*Dendroctonus pseudotsugae*), spruce beetle (*Dendroctonus rufipennis*), and mountain pine beetle (*Dendroctonus ponderosae*). Of the nearly 48,000 acres of Douglas-fir on the forest, approximately 58 percent (28,000 acres) have been affected by Douglas-fir beetle since 1997. Recent surveys have shown that up to 36 percent of lodgepole pine stands are infected with dwarf mistletoe (Forest Service 2017k). Mountain pine beetle is the most destructive bark beetle affecting pines in western North America. On the Ashley National Forest, most of the damage due to mountain pine beetle has been documented in lodgepole pine and ponderosa pine (Forest Service 2017k). Aerial insect and disease surveys on the Ashley National Forest conducted in 2015 estimate that

3,800 acres have a high-severity of insect and disease damage, 3,800 acres of moderate-severity damage, and 19,100 acres of low-severity damage (figure 3-11).

Mortality from beetles has modified the stand and age-class structure on the Ashley National Forest significantly since the 1986 forest plan was developed. The combination of fire suppression and insect infestation has also resulted in stand conditions that are potentially more susceptible to high-intensity wildfires. Because of these changes to the overall structure and availability of timber on the forest and inconsistencies between the 1986 forest plan and Forest Service Handbook direction, a new analysis is needed to account for changes in the types, size, and quantity currently available for harvest.

Environmental Consequences for Timber

Methodology and Analysis Process

Requirements in the 2012 Planning Rule at 36 CFR 219.11, The National Forest Management Act of 1976, and Forest Service Handbook 1909.12, chapter 60 provide guidance on conducting a timber suitability analysis as part of the forest planning process. Timber suitability was determined using resource data incorporated into GIS to apply criteria and identify lands suitable for timber production. Lands determined to be suitable for timber production are capable of producing a regular, sustainable, periodic output of timber, without impairment of the productivity of the land or inconsistency with other land management direction.

The sustained-yield limit reflects the quantity of wood products that could be sustainably removed from the Ashley National Forest in perpetuity. This quantity of timber and associated wood products delineates the sustainable level for the Ashley National Forest over the next 15 years. Quantities less than this threshold are anticipated to be sustainable in perpetuity unless forest growth rates decline significantly, or wildfire removes areas from production because they fail to regenerate; quantities above this threshold would only be feasible for short periods of time.

The projected timber sale quantity and projected wood sale quantity include timber and other forest products that can be expected to be sold over the next 15 years, following the implementation of the revised plan. The projected wood sale quantity includes all woody material likely to be sold from these harvests whether the woody material meets utilization standards. The projected timber sale quantity is a subset of the projected wood sale quantity; it is an estimate of the quantity of timber expected to be sold during the plan period. The volume in the projected timber sale quantity is the volume that meets utilization standards[12] and must be equal to or lower than the sustained-yield limit for the forest. The estimation of these two quantities must be consistent with the plan components of the final plan or the unique mix of plan components in each alternative, and consistent with the capability of the unit.

Analysis Assumptions

- On lands suitable for timber production, regularly scheduled timber removal is expected to occur.
- The sustained-yield limit on the Ashley National Forest is estimated to be an average annual volume of 21,446 CCF (10,723 MBF).

[12] Specifications for merchantable forest products offered in a timber sale

Indicators

- Forested acres that are available and accessible for timber production
- Forested acres that are available and accessible for timber harvest

Environmental Consequences for Timber Common to All Alternatives

Under all alternatives, there is plan direction to continue to sustainably remove forest products from the Ashley National Forest under the sustained-yield limit, which was calculated as 21,446 CCF (approximately 10,723 MBF) average annual volume. Forest products will be removed consistent with multiple-use objectives, as well as with consideration of the desired conditions of forested acres on the forest and desired conditions of other resources. A sustainable mix of timber products will continue to be offered, using a variety of harvest methods and contract types, in response to market demands.

Timber production and timber harvests will continue to contribute to the local economy. Sustainable removal of forest products will continue to promote the existing and emerging industry, though the Forest Service does not anticipate demand for forest products to change significantly over the life of the plan. The potential wood and timber sale quantity identified under each alternative would not be exceeded.

Timber harvest is a critical tool used to achieve desired vegetation conditions. All alternatives include mechanical treatments to vegetation, which may produce commercial timber, small-diameter timber, biomass, or fuelwood as a by-product. In addition, all alternatives provide opportunities for the public to collect fuelwood and other forest products under a permitted system.

Environmental Consequences for Timber—Alternative A

Under alternative A, 528,000 acres (38 percent) would be determined to be suitable for timber production (table 3-68) under the existing plan. However, this level of timber production does not account for policy changes, particularly under the 2001 Roadless Rule, which prohibits timber harvest in IRAs expect under certain circumstances; thus, this level of timber production is currently not achievable. Alternative A would retain similar production levels as the previous decade, and would continue to harvest old-growth, beetle-killed lodgepole and ponderosa pine. Under the existing plan, a total of 11,000 acres of vegetation management was set as an objective to improve natural regeneration; however, due to the aforementioned policy changes, this objective cannot be met. The emergence of new timber markets or any significant growth of existing markets would be least likely under this alternative, resulting in little change to the demand for timber products.

Table 3-68. Acres of Timber Suitability Classification on the Ashley National Forest

Timber Classification Category	Alternative A	Alternative B	Alternative C	Alternative D
Total National Forest System lands in the analysis area	1,378,500	1,378,500	1,378,500	1,378,500
Lands suitable for timber production	528,000 (130,100)*	109,800	80,500	114,300
Total lands not suitable for timber production	*1,248,400*	1,268,700	1,297,900	1,263,300
Lands not suited for timber production due to legal or technical reasons	*1,248,400**	*1,248,400*	*1,248,400*	*1,248,400*
Lands not suited for timber production due to incompatibility with desired conditions and objectives	*N/A*	*20,300*	*49,500*	*15,700*

Timber Classification Category	Alternative A	Alternative B	Alternative C	Alternative D
Lands suitable for timber harvest	N/A	189,400	93,700	189,400

Source: Forest Service GIS 2020
* This value is reduced due to the removal of timber from production due to incompatibility with policy changes under the 2001 Roadless Rule

Environmental Consequences for Timber—Alternative B

Effects from Timber Harvest and Production, Vegetation Management, and Fire and Fuels Management

Under alternative B, 109,800 acres would be determined as suitable for timber production (table 3-68). Outside of acres suitable for timber production, timber harvest would take place on up to 79,600 acres as a result of vegetation treatments and fire and fuels management, which would remove timber and wood products based on compatibility with desired conditions, objectives, standards, and guidelines.

Alternative B would propose annual fuels treatments on 6,600 to 32,000 acres. In areas suitable for timber harvest that are designated for fuels management, it is likely that timber harvest would be the primary method of management. The use of timber harvest to restore forest health is likely to maintain or improve vegetation, which would maintain or increase the productivity of acres suitable for timber production over the long term. However, restricting timber harvest or production during periods of rehabilitation could result in site-specific limitations over the short term.

Under this alternative, approximately 1,500 acres of forested vegetation in areas suitable for timber harvest would receive vegetation treatments annually, which would move forested ecosystems toward desired conditions. Alternative B would offer an annual projected wood sale quantity of 3,806 to 3,844 CCF (1,903 to 1,916 MBF; see table 3-69).

Table 3-69. Annual Projected Wood Sale Quantity

Sustained-Yield Limit	Alternative A	Alternative B	Alternative C	Alternative D
21,446 CCF (10,723 MBF)	11,557 CCF (5,779 MBF)*	3,806 to 3,833 CCF (1,903 to 1,916 MBF)	2,822 to 2,842 CCF (1,411 to 1,421 MBF)	3,956 to 3,983 CCF (1,978 to 1,992 MBF)

Source: Forest Service 2017a
*The average amount of timber harvested annually in the past 10 years. This figure includes salvage production; alternatives B, C, and D do not include salvage production. See proposed plan attachment C for planned wood product output.

Effects from Sustainable Recreation

When compared with alternative A, alternative B would focus on providing additional infrastructure to support recreation. However, there would be no limitations on the volume of timber harvest in recreation management areas, as long as that removal would coincide with the desired conditions of other resources.

Effects from Designated Areas

Alternative B would introduce two additional areas for recommendation as wilderness, totaling approximately 10,300 acres. These newly recommended wilderness areas would prohibit timber production to maintain the option for future designation as wilderness, thus reducing the acres suitable for production when compared with alternative A. There would be no additional stream segments found suitable for inclusion in the NWSRS.

Environmental Consequences for Timber—Alternative C

Effects from Timber Harvest and Production, Vegetation Management, and Fire and Fuels Management

Alternative C would determine the least number of acres suitable for timber production (80,500 acres) and timber harvest (93,700 acres). This reduction in suitable acreage would result in a lower projected annual output of wood and timber sales (table 3-69). Alternative C would also reduce the acres of annual forested vegetation available for treatments, further hindering the movement of forested vegetation toward desired conditions, when compared with alternative A. Alternative C would have the same number of acres available for fuels treatments as alternative B.

Fire and fuels management under alternative C would emphasize the use of natural processes to move conditions toward desired fire regimes. Outside of HVRAs, suppression would be used to protect human health and safety, as well as infrastructure. When compared with alternative A, alternative B would use modern fire-planning tools to determine high-risk areas, which may offer some protection to timber stands suitable for production and harvest. Over the short term, the lack of fire suppression may lead to a loss of wood products available for production or harvest. However, vegetation and fire and fuels management under this alternative are likely to move forested vegetation toward desired conditions over the long term, unlike alternative A.

Effects from Sustainable Recreation

Under alternative C, there would be an emphasis on management of recreation areas to improve the backcountry experience for recreationists, unlike under alternative A. This management would increase the acreage of backcountry management areas and would prohibit timber harvest within them. This would result in the decreased number of acres suitable for timber production and harvest.

Effects from Designated Areas

Alternative C would include the most acres managed to maintain wilderness characteristics; no acres would be found suitable for timber harvest within these areas to preserve the suitability of these areas for wilderness designation. Alternative C would also introduce additional miles of suitable for inclusion in the NWSRS. This would reduce the available acres for timber harvest.

Environmental Consequences for Timber—Alternative D

Effects from Timber Harvest and Production, Vegetation Management, and Fire and Fuels Management

When compared with alternative A, alternative D has an increased emphasis on commodity timber harvest. This alternative would emphasize vegetation management to the highest level and would have the greatest volume of acres suitable for timber production (114,300 acres) and timber harvest (189,400 acres; see table 3-68). This alternative would encourage using timber harvest as a primary method of vegetation management to accomplish other resource objectives. Increases in vegetation management would result in a high degree of movement of forested ecosystems toward desired conditions over the long term. Due to the increase in production and harvest, this alternative would result in the highest volume of wood product output over the life of the plan (table 3-69).

Alternative D would propose fuels treatments on 10,000 to 40,000 acres per year, which would increase the volume of timber harvest within stands suitable for harvest. In addition, management direction under this alternative would actively manage and suppress wildland fire, which may preserve suitable timber stands for future harvest and production. When compared with alternative A, alternative D is likely to maintain a greater amount of suitable timber stands by suppressing and managing wildfire.

Effects from Sustainable Recreation

Under alternative D, there would be an emphasis on high-intensity recreation opportunities, resulting in increased infrastructure and motorized access. However, there would be no limitations on the volume of timber harvest in recreation management areas, as long as that removal would coincide with the desired conditions of other resources.

Effects from Designated Areas

Under alternative D, there would be no recommended wilderness areas, and no additional wild and scenic river segments would be classified as suitable for inclusion in the NWSRS. Effects from designated areas on timber harvest and production would not change when compared with alternative A.

Cumulative Environmental Consequences for Timber

Lands managed by the Forest Service within the Ashley National Forest analysis area, as well as lands adjacent to the Ashley National Forest, are considered under the cumulative effects analysis area. Ongoing and planned actions on the Ashley National Forest and surrounding lands may influence and affect the cumulative environmental consequences for timber during the life of the plan (or approximately 15 years from the plan's implementation).

The timber and forest products industry may be affected by reductions in the supply of timber and wood within the region, both on Federal and non-Federal lands. Conversely, an increase in the availability of forest products on adjacent lands may lessen the impacts and demand for forest products on the Ashley National Forest. As populations increase in lands near the Ashley National Forest, more stress could be placed on the Ashley National Forest and surrounding lands to meet the demands of industry.

Current and future foreseeable actions (table 3-2) may affect timber production and harvest both positively and negatively. For instance, future forest restoration projects may largely depend on market demand for timber products. If demand for forest products increases, a greater potential for successful restoration work can be expected, resulting in beneficial impacts through a restored landscape. This would likely lead to an increase in acres suitable for production and harvest over the long term. If demand decreases, existing milling infrastructure may close, and less restoration work can be successfully completed. This would move the landscape away from desired conditions, likely resulting in a decrease of suitable acres. However, market variability within the timber industry can be difficult to predict, which makes evaluation of cumulative impacts of past, present, and future actions challenging.

Management of timber using best practices, fuels reduction projects, and restoration of ecosystems would be beneficial when applied across the Ashley National Forest. If mechanical treatments are not selected as a restoration tool, prescribed fire will likely be the only other treatment alternative; often restoration is not possible.

Restoration projects, in particular, may also be limited by operational costs; this could influence the overall success of restoration work. However, those restoration projects that are successful would provide the greatest benefit to timber production and harvest; consequently, those projects are critical to a continuous and sustainable supply of timber and forest products.

Livestock Grazing

Introduction

Livestock have grazed the rangelands on the Ashley National Forest for longer than the forest has existed administratively. Since initial settlement, domestic livestock have nearly continuously grazed what is now the Ashley National Forest and surrounding rangelands. Initially, the rangelands were grazed broadly by mostly cattle and sheep; however, since the enactment of the grazing permit system, the intensity and types of grazing permitted on these lands have decreased dramatically. Currently, most of the Ashley National Forest is grazed by cattle (13,370 head) and sheep (12,195 head).

Under the grazing permit system, the Forest Service administers domestic livestock grazing as compatible with other multiple-use objectives. Livestock grazing on rangelands offers several benefits to the local communities. Not only have rangelands provided an economic opportunity to sustain ranching operations for several generations, they also provide the basis for the local culture and lifestyle.

In addition to the economic benefit, rangelands offer large open spaces for recreation, such as hiking, hunting, and camping. Developments and structures built to provide water for livestock may also benefit wildlife species. Some grazing systems can be implemented to benefit targeted wildlife species, such as elk or greater sage-grouse (Vavra 2005). Permittees that hold grazing permits are generally individuals, families, or corporations, though permits may also be shared through partnerships. In the absence of livestock operations, the economic, recreational, and ecological benefits could be reduced. The level of impacts would depend on the availability of alternative forage and open spaces and water, the level of dependance on Forest Service forage and other site-specific factors.

Rangelands are divided into grazing units known as allotments, which are subdivided into pastures. Generally, allotments are managed on a rotational grazing schedule, which involves moving cattle from one pasture to another during different times of the year. Under most permits, grazing does not occur on National Forest System lands year-round. Grazing operators may rotate cattle between pastures throughout the year, both on and off Federal lands. The borders of allotments and pastures typically follow geographic and topographic features, such as canyons and riverine habitat, and they may also be completely fenced.

Livestock grazing on National Forest System lands is permitted through term grazing permits. The term grazing permit authorizes the number and kind of livestock as well as the period of use and grazing allotment on which livestock are permitted to graze. As previously noted, the Forest Service authorizes grazing permits through payment of a grazing fee that is based on HMs, defined as 1 month’s use and occupancy of the range by one weaned or adult cow with or without a calf, a bull, steer, heifer, horse, burro, or mule, or five sheep or goats.

The Forest Service uses adaptive management to adjust the timing, intensity, and rotation patterns on the allotment based on resource conditions. It alters livestock numbers and class annually to respond to environmental, social, and economic needs. Permittees attend annual meetings with Forest Service range program staff to develop operating plans and instructions. Although typical operators depend only partially on public lands to sustain their livestock, forage sources on Federal lands still represent a critical part of grazing operations.

Regulatory Framework

The Forest Rangeland Renewable Resources and Planning Act of 1974 and **the National Forest Management Act—**Authorize long-range planning to ensure the future supply of forest resources, and the availability of lands and their suitability for resource management.

The Public Rangelands Improvement Act of 1978—Defines the current grazing fee formula and establishes rangeland monitoring and inventory procedures.

Taylor Grazing Act of 1934—Provides directives for grazing on public lands (excluding Alaska) to improve the conditions of rangelands and regulate their use. Under this law, permits cannot exceed 10 years and can be revoked due to drought or other natural disasters.

Granger-Thye Act of 1950—Establishes new guidelines for managing grazing on national forests. This act authorizes range improvements from appropriated funds and allows the Forest Service to authorize grazing advisory boards and to issue grazing permits for periods not exceeding 10 years.

Multiple-Use Sustained-Yield Act of 1960—Establishes the policy and purpose of the national forests to provide for multiple-use and sustained yield of products and services. This law authorizes the Secretary of Agriculture to administer and develop the use of renewable resources, including range, on the National Forest System lands.

The Rescission Act of 1995 (Public Law 104-19)—Requires each national forest to establish and adhere to a schedule for completing NEPA analysis and decisions on all grazing allotments within a 15-year period. The current National Allotment NEPA Schedule, based on the 2004 Interior Appropriations Act (P.L. 108-108), Section 325 covers the timeframe of 2017-2028.

Executive Order 12548, Grazing fees, 1986—Establishes appropriate fees for grazing domestic livestock on public rangelands.

Analysis Areas

The analysis area is the Ashley National Forest. In the analysis area, approximately 997,600 acres (72 percent; table 3-70) are in grazing allotments. There are 66 grazing allotments that are authorized for the use of 89 permittees. Of the 66 grazing allotments, 5 (77,800 acres) are administered and facilitated by the BLM (impacts on BLM-administered grazing allotments are not analyzed in this document). The remaining 61 grazing allotments occupy 919,700 (67 percent) of the analysis area. In addition to the allotments themselves, operators may use roads outside of allotments to transport livestock and maintain their allotments; therefore, changes to travel and transportation management could affect grazing operations.

Table 3-70. Allotment Statistics for the Ashley National Forest

Ranger District	Number of Allotments	Acres	HMs
Duchesne	26	325,800	29,278
Flaming Gorge	15 (5 BLM)	144,600 (77,800 BLM)	5,427 (3,054 BLM AUMs)
Roosevelt	11	245,200	22,920

Ranger District	Number of Allotments	Acres	HMs
Vernal	14	204,100	19,297
Total[1]	**66**	**919,700**	**76,922**

Source: Forest Service GIS 2020

[1] Not including BLM-administered lands. The BLM bills based on AUMs. No decision will be made for grazing on BLM administered lands in this planning process.

Description of Affected Environment

The sizes of allotments on the Ashley National Forest vary greatly—from 100 acres to 58,300 acres—with the average allotment size of approximately 14,000 acres. Within allotments, the forage quality and availability, geology and topography, and compatibility with multiple-use objectives dictate the number of acres where grazing occurs. Currently permitted use accounts for 76,922 HMs across all Forest Service grazing allotments on the Ashley National Forest. Permitted HMs are closely connected to the forage production, topography, and water availability on each allotment, with larger allotments generally having more HMs available for grazing.

On the Ashley National Forest, approximately 919,700 acres are available for grazing administered by the Forest Service. Grazing use has varied annually since the 1980s, with grazing levels increasing in some ranger districts and declining in others. Overall, the amount of permitted grazing has declined an average of 0.25 percent annually since 1980, or approximately 10 percent over the last 4 decades. Market demand for livestock products in the U.S. is expected to slowly decline over the coming decades but will surely remain an important economic contributor for the surrounding communities (Thornton 2010).

Factors affecting livestock operations and range management on the Ashley National Forest are largely based on market demand for livestock and rangeland conditions, both of which are based primarily on forage availability. Forage availability is principally connected to the condition of vegetation; thus, changes to vegetation and vegetation management can heavily influence grazing capacity and permitted use.

The proliferation of invasive species, woody vegetation encroachment, and drought all may affect the forage production on allotments for livestock grazing. The return of sagebrush, which is less productive and palatable to livestock, may also affect forage production on the Ashley National Forest. In addition, native ungulates also utilize forage.

Most rangeland on the Ashley National Forest is in good condition, and vegetation trends appear to be favorable and sustainable; however, some allotments have experienced an increase in invasive annuals, which may lead to a decline in forage for cattle and a decline in ecological condition. The most common invaders are cheatgrass (*Bromus tectorum*), storks bill (*Erodium cicutarium*), tumble mustard (*Sisymbrium altissimum*), saltlover (*Halogeton glomeratus*), and musk mustard (*Chorispora tenella*). The invasion of noxious and nonnative vegetation is influenced by increases in fire and drought, which can subsequently increase the cover of invasive annuals, creating a feedback loop that can reduce forage quality. Additional information on invasive species and their impacts on ecological condition is in "Terrestrial Vegetation."

In 2011, rangelands on the Ashley National Forest were evaluated using watershed condition data. These data quantify such factors as vegetation condition, invasive species threats, and the overall condition of rangelands. Of the 123 subwatersheds analyzed, 113 were reported to be in good condition, 9 in fair condition, and 1 in poor condition. Most of those in fair or poor condition are due to the impacts of invasive plants and are in the Flaming Gorge Ranger District in Wyoming (Forest Service 2017a). See "Terrestrial Vegetation" for additional details of rangeland conditions.

Environmental Consequences for Livestock Grazing

Methodology and Analysis Process

The analysis in the following section assesses the potential impacts on rangelands and grazing in all current allotments on the Ashley National Forest. Since grazing operations are generally confined to allotments, the discussion of impacts from alternatives below would apply only to allotments available for grazing on the Ashley National Forest, which includes those that are active, vacant, or closed. The life of this proposed plan is estimated to be 15 years, which is the period for which impacts are analyzed.

The potential effects on livestock grazing from decisions or management on the Ashley National Forest include changes to livestock numbers, season of use, and associated HMs, as well as the availability and quality of forage in allotments. The potential impacts discussed below were identified by reviewing the best available science and data. The section specifically analyzes impacts on rangeland and grazing, whereas the impact of rangeland management on other resources is covered in the respective resource sections.

Analysis Assumptions

- Livestock will be managed so that range conditions maintain or move toward desired conditions, as outlined in this proposed plan.
- Livestock grazing will be managed to meet specific standards and guidelines for rangeland resiliency, including riparian standards and guidelines.
- Grazing allotments will remain open as long as there continues to be demand. If permittees waive their permits with no preference and there is no demand, the allotments could be put into a vacant status, designated as forage reserves, or closed.
- Unauthorized use of rangeland will be minimal to nonexistent.

Indicators

- Forage quality and availability
- Total acres open and closed to grazing
- Level of permitted use for grazing operations (HMs)

Environmental Consequences for Livestock Grazing Common to All Alternatives

Effects from Livestock Grazing Management

All alternatives would continue to provide forage for livestock and continue to support grazing operations on the Ashley National Forest. Livestock grazing management decisions that could affect grazing operations are generally based on allotment-specific adjustments in acres available and open to livestock grazing. Reducing the number of acres open to grazing within a given allotment may be accompanied by adjustments to grazing intensity (HMs; table 3-71), limiting the number of livestock that may be permitted to graze.

Table 3-71. Allotment Status by Alternative

Ranger District	Alternatives A, B, and D	Alternative C
Total acres open[1]	**919,700**	**906,700**
Duchesne	325,800	319,200
Flaming Gorge	144,600	141,700
Roosevelt	245,200	241,700
Vernal	204,100	204,100
Total acres closed	**0**	**13,000**
Duchesne	0	6,600
Flaming Gorge	0	2,900
Roosevelt	0	3,500
Vernal	0	0
Total HMs available[1]	**76,922**	**76,812**

Source: Forest Service GIS 2020
[1] Excludes BLM-administered allotments

In addition, adjustments and limits on utilization levels and stubble height guidelines in riparian areas may lead to additional changes in grazing systems, such as the duration of use and pasture divisions or rotations. These adjustments and limits also may lead to an increase or reduction in the number of permitted livestock, season of use for permitted use, and changes to the associated HMs.

Effects from Sustainable Recreation

Motorized recreation on the Ashley National Forest may affect forage condition. Erosion and soil compaction from motorized vehicles may reduce forage quality and availability. Motorized recreation is also known to increase the spread of invasive plants, thus further reducing forage quality (Wolf et al. 2017). Additionally, motorized recreation without the use of proper spark arrestors may lead to spark-ignited wildfires, resulting in the loss of available forage. Impacts from motorized recreation could lead to both short-term and long-term impacts on vegetation, which is likely to result in a loss of HMs. Motorized recreation vehicles may lead to direct impacts on livestock through collisions and stress from noise and human presence. Fugitive dust can increase the incidence of dust pneumonia and also reduce the palatability of forage.

While generally considered low impact, primitive and nonmotorized recreation may affect livestock by reducing forage quality in a similar manner to motorized recreation; however, these impacts are likely to be of lower intensity, when compared with motorized recreation and concentrated along trails and campsites, where livestock and visitors are most likely to be in proximity. The potential impacts of mismanaged or heavy nonmotorized recreation on rangelands are from erosion and trail damage, increased trail footprints, trampled vegetation, and increased spread of invasive plants, all of which may reduce forage quality and availability over the short and long term.

Effects from Designated Areas

Under all alternatives, the management of designated wilderness may affect permittees' grazing operations; however, grazing would be available on existing active allotments, regardless of wilderness designation, under any alternative. The most likely impact from management of recommended or designated wilderness would be alterations to the timing and intensity of grazing operations to meet desired conditions to maintain wilderness character. Other potential impacts on grazing management due to recommended or designated wilderness include impacts to access of allotments for maintenance of structural range developments, the ability to haul salt and minerals, and the retrieval of sick animals due to restrictions on motorized use.

The number of IRAs would not change under any alternative. Management actions in IRAs and RNAs that would not require the construction of new roads would still be allowed, including grazing. Because the acres of IRAs would not change under any alternative, there would be no impacts on grazing over the short or long term.

Segments of wild rivers deemed suitable may include quarter-mile buffers on either side of the suitable watercourse. Where wild and scenic rivers and grazing overlap, they would be managed under the guidelines in Forest Service Handbook 1909.12, chapter 82.5. The suitability of river segments does not preclude livestock grazing, as long as management of livestock maintains the wild, scenic, and recreational values for a given river segment. The interim protections offered to suitable river segments that protect, restore, or enhance vegetation may have beneficial impacts on forage quality and availability.

Effects from Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Under all alternatives, rangelands and livestock may be affected by various types of natural resource management, especially those that disturb the soil surface or remove vegetation. The type and intensity of impacts would depend on management objectives and methods under a given alternative. Nevertheless, any surface-disturbing activities may alter forage availability and lead to changes in grazing systems and infrastructure.

All alternatives would include some sort of vegetation treatments. Over the short term, vegetation management projects, including mechanical thinning and prescribed fire, would affect rangelands by removing forage and by compacting or eroding soils. Treated pastures may need to be rested or deferred during treatments and restoration, thus removing the availability of capable acres in those areas; however, vegetation management is generally planned around grazing rotations when cattle are not present, to minimize impacts on grazing operations. Over the long term, vegetation treatments would likely enhance forage quality and availability, potentially leading to an increase in forage and available HMs.

Additional protections for sensitive natural resources, such as bighorn sheep, may affect grazing operations by altering the timing, intensity, and availability of permitted grazing, thereby limiting the number of livestock and season of use authorized to grazing operators. For example, expansion of bighorn sheep populations could result in the need to modify management of domestic sheep allotments to minimize contact between these populations. Over the long term, additional protections of sensitive natural resources may lead to more sustainable vegetation conditions, which could increase forage availability for livestock.

Environmental Consequences for Livestock Grazing—Alternative A

Effects from Livestock Grazing Management

Under alternative A, approximately 919,700 acres would be open to grazing operations across the Ashley National Forest. Livestock operations would continue to be supported by the Ashley National Forest at sustainable levels, and the utilization of forage by livestock would continue at or near present available HMs.

Management of grazing would continue as it has in the past with site specific determination of forage utilization and stubble height based on “benchmark indicators” for utilization limits in allotment management plans, and terms and conditions of the permit.

Without Forest-wide guidelines, different forage use direction could be proposed. This could lead to inconsistent and subjective grazing management across the Ashley National Forest, potentially reducing plant resiliency and forage production.

Effects from Sustainable Recreation

Under alternative A, there would be approximately 646,000 acres available to primitive and nonmotorized recreation and approximately 283,000 acres available to motorized recreation across the Ashley National Forest. Impacts from a given recreation type are discussed under "Environmental Consequences for Livestock Grazing Common to All Alternatives."

Effects from Designated Areas

Impacts on livestock grazing under alternative A would be the same as those described under "Environmental Consequences for Livestock Grazing Common to All Alternatives."

Effects from Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Under alternative A, the goals, standards, and objectives for vegetation management from the 1986 forest plan would continue to be implemented. Fire and fuels management would continue to follow direction outlined in the proposed plan, though it would not use modern prediction and planning tools to determine high-risk areas. Without prioritizing those areas, fires may increase in frequency, duration, and intensity, which could remove forage for livestock and increase competition for resources with wildlife.

Alternative A would continue direction under the existing plan to convert or close sheep allotments that remain unused for 5 years. There are currently approximately 111,500 acres (29,956 HMs) permitted to graze sheep on the Ashley National Forest, 9,200 acres of which are in a vacant status and closed for sheep grazing.

Environmental Consequences for Livestock Grazing—Alternative B

Effects from Livestock Grazing Management

Under alternative B, no direct changes would occur to the level of permitted use or acres available for grazing compared to Alternative A.

Forage for livestock would be limited to 50 percent utilization and a stubble height of 4 inches, unless monitoring indicates a different level sufficient to meet and maintain desired conditions (table 3-68). In areas where these guidelines are not met and exceptions are not made, there could be modifications to the timing and intensity of grazing operations, particularly adjustments to livestock numbers or season of use, or both, and associated reductions in numbers and season of use permitted to grazing operators, when compared with alternative A.

Effects from Sustainable Recreation

Under alternative B, there would be approximately 639,000 acres available to primitive and nonmotorized recreation and approximately 289,000 acres available to motorized recreation across the Ashley National Forest. There would be a slight increase in nonmotorized recreation and a slight decrease in motorized recreation, when compared with alternative A. No specific recreation classification (general, backcountry, or destination) would prohibit livestock grazing. Impacts from a given recreation type are discussed under "Environmental Consequences for Livestock Grazing Common to All Alternatives."

Effects from Designated Areas

Alternative B recommends an additional 10,300 acres of wilderness; however, impacts on grazing would be nominal, as management decisions in wilderness areas would not preclude grazing on existing allotments. Impacts on livestock grazing from existing and newly recommended designated areas under alternative B would be the same as those described under “Environmental Consequences for Livestock Grazing Common to All Alternatives.”

Effects from Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Under alternative B, wildland fire and other vegetation treatments would be used to improve or maintain desired vegetation conditions. Treatments on 1,500 acres of the Ashley National Forest annually (1,200 acres in the second decade) would affect grazing operations through changes in grazing systems; however, these types of management are generally planned around grazing rotations to minimize impacts on grazing operations. When compared with alternative A, vegetation treatments under this alternative would likely enhance forage quality and availability over the long term, potentially increasing forage production and increasing grazing capacity in the future.

Under Alternative B when a domestic sheep or goat grazing permit for an allotment is voluntarily waived without preference, Forest Plan direction would include management options to protect bighorn sheep from disease, including providing separation consistent with the most current State Big Horn Sheep Management Plans 2) adjustment of time and/or dates, 3) conversion to a cattle and horse allotment, 4) utilization as a cattle and horse forage reserve, or 5) potential closure of all or a portion of the allotment to domestic sheep/goats. In addition, no new domestic sheep or goat allotments would be authorized under this alternative without demonstrated evidence of separation from bighorn sheep and a lack of disease prevalence. These measures may affect grazing by reducing number and season of use for permitted livestock through the potential closure of sheep and goat allotments as compared to Alternative A. However, providing options to allow for separation would limit the impacts on domestic sheep management. In addition, for subsequent management changes such as may be required when a term grazing permit is waived without preference, additional analysis of impacts to grazing operations and livestock operators would occur at the project scale. The level and type of analysis would be determined based on the option selected and may require additional NEPA analysis.

Environmental Consequences for Livestock Grazing—Alternative C

Effects from Livestock Grazing Management

Under alternative C, forage for livestock would be limited to a level of 40 percent utilization and a stubble height of 4 inches (table 3-71). Exceptions will not be made for utilization levels and stubble-height guidelines. In areas where these guidelines are not met, there would likely be modifications to the timing and intensity of grazing operations, particularly adjustments to the season of use and reductions in HMs, when compared with alternative A. Alternative C is likely to have the greatest potential for site-specific adjustments to current HMs during implementation due to the reduced site-specific exceptions to utilization levels and stubble height.

Effects from Sustainable Recreation

Under alternative C, there would be approximately 646,000 acres available to primitive and nonmotorized recreation and approximately 282,000 acres available to motorized recreation across the Ashley National Forest. The nature and type of impacts from recreation would be as described in “Environmental Consequences for Livestock Grazing Common to All Alternatives.”; however, the intensity of impacts under this alternative would be greater than alternative A, due to its emphasis on supporting additional recreation infrastructure.

Management under alternative C would prohibit domestic livestock grazing in destination recreation areas. Removing permitted acres in these areas would reduce the number of acres available for grazing by 13,000 acres, when compared with alternative A (table 3-72). The number of decreased acres represents a small proportion (1.4 percent) of total acres available for grazing on the forest. This reduction would result in a loss of HMs available on pastures which fall within destination recreation areas. Acres and HMs estimates below includes closures at a pasture level based on the destination recreation area restrictions. These is a small potnteial for the need for closures of additional acres in pastures where cattle could not be effectively restricted, resulting in additional loss of HMs. These impactes would be determined at the site-specifc level during implentation. Specific operators may be impacted under this alternative, though those impacts are likely to be minimal.

Table 3-72. Acres of Permitted Grazing in Destination Recreation Management Areas under Alternative C

Ranger District	Acres Closed	Percentage of Allotment Closed	Reduction in HMs
Duchesne	6,600	2.1	-54.9
Flaming Gorge	2,900	2.0	-52.2
Roosevelt	3,500	1.4	-2.8
Vernal	0	0	0
Total	**13,000**	**1.4**	**-109.9**

Effects from Designated Areas

Alternative C would have the highest percentage of the Ashley National Forest managed as designated areas; however, none of the acreage of the proposed designated areas overlapping current grazing allotments would preclude grazing. Some impacts may occur, however, related to the ability to access and maintain allotments in proposed wilderness areas, as described under "Environmental Consequences for Livestock Grazing Common to All Alternatives."

Effects from Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Under alternative C, wildland fire and other vegetation treatments would improve or maintain desired vegetation conditions. Treatments on 1,000 acres of the Ashley National Forest on an average annual basis (800 acres on an average annual basis in the second decade), would affect grazing operations through changes in grazing systems; however, these types of management are generally planned around grazing rotations to minimize impacts on grazing operations. Where naturally ignited fire is to be managed to meet resource objectives, there could be short-term losses to forage availability; however, when compared with alternative A, vegetation treatments under this alternative would likely enhance forage quality and availability over the long term, potentially increasing the forage production and increasing grazing capacity.

Alternative C includes specific measures to protect bighorn sheep from disease by closing domestic sheep or goat allotments, specifically those where permits are voluntarily waived without preference. No new domestic sheep or goat allotments would be authorized under this alternative without demonstrated evidence of separation from bighorn sheep and a lack of disease prevalence. Where domestic sheep and goats overlap bighorn sheep core range, there would be direction to close such allotments if the opportunity arose. These measures may affect grazing by reducing HMs at a site-specifc level through the closure of sheep and goat allotments.

Environmental Consequences for Livestock Grazing—Alternative D

Effects from Livestock Grazing Management

Impacts on livestock grazing under alternative D would be the same as those described under Environmental Consequences for Livestock Grazing—Alternative A.

Effects from Designated Areas

Alternative D would manage the fewest acres as designated areas. Grazing would be compatible with all proposed and existing designated areas; thus, impacts on livestock grazing from existing and newly recommended designated areas under alternative D would be the same as those described under "Environmental Consequences for Livestock Grazing Common to All Alternatives."

Effects from Sustainable Recreation

Under alternative D, there would be approximately 645,000 acres available to primitive and nonmotorized recreation and approximately 281,000 acres available to motorized recreation across the Ashley National Forest. There would be a slight increase in nonmotorized recreation and a slight decrease in motorized recreation, when compared with alternative A. No specific recreation classification (general, backcountry, or destination) would prohibit livestock grazing. Impacts from a given recreation type are discussed under "Environmental Consequences for Livestock Grazing Common to All Alternatives."

Effects from Vegetation Management, Timber Harvest, and Sustainable Ecosystems

Under alternative D, wildland fire and other vegetation treatments would be used to improve or maintain desired vegetation conditions. Treatments on 1,600 acres of the Ashley National Forest annually (1,300 acres in the second decade) would affect grazing operations through changes in grazing systems; however, these types of management are generally planned around grazing rotations to minimize impacts on grazing operations. Over the long term, vegetation treatments under this alternative would likely enhance forage quality and availability, when compared with alternative A, potentially leading to an increase in forage production and increase in grazing capacity in the future.

Alternative D would not have management direction to close or convert any existing sheep or goat allotments. Allotments that would be considered for conversion or closure under alternative A would not be affected under alternative D.

Cumulative Environmental Consequences for Livestock Grazing

The analysis area for cumulative impacts on livestock and rangelands is the Ashley National Forest and the private, State, Tribal, and other federally administered lands surrounding the forest. The time frame for assessing cumulative effects of rangelands and grazing is the maximum life of the plan, which is generally 15 years. Much of the Ashley National Forest is surrounded by rangeland, which is considered for cumulative analysis. Past, present, and future actions taken by surrounding private, State, Federal and Tribal lands could cumulatively affect rangelands and grazing on the Ashley National Forest. On lands surrounding the Ashley National Forest, past actions in the plan area have contributed to the existing conditions, while future actions will be addressed in specific project-level environmental analysis.

There are a wide range of planning and land use strategies that address land use next to the Ashley National Forest. Local soil and water conservation districts will continue to write land use plans to promote responsible and effective use and management of soil and water resources in their districts. This may contribute to the cumulative impacts on forage conditions on rangelands available for grazing.

In the counties that surround the Ashley National Forest, there is limited private land available for existing permit holders to graze livestock. Alternatives that remove available capable grazing acres on the national forest, such as alternative C, would cumulatively affect grazing to the greatest degree. Most permittees are unlikely to hold enough private land to graze their livestock year-round. Typically, livestock are supplemented with hay during months when they do not have access to grazing allotments on Forest Service or BLM-administered lands. Ranching operations that are permitted to graze on the Ashley National Forest are an important factor in sustaining the local ranching economy and lifestyle.

Under all alternatives, water availability for livestock grazing is a constant issue for many counties surrounding the national forest. As counties and municipalities make decisions on how to allocate water for consumption and agriculture (including grazing operations), impacts on grazing may take place in the cumulative analysis area as water availability for both livestock and forage decreases. The costs associated with grazing in the months that livestock spend off the national forest could increase as the local production of forage decreases.

Energy and Minerals

Introduction

Demand for energy and minerals exploration and development in the planning area, and the subsequent need for managing those activities, is directly related to the exploration and development proposals generated by the public and industry. These proposals are related to fluctuations in demand and prices for various energy and minerals products. Management of mineral resources is responsive to global demands, prices, and uses, rather than on long-range Forest Service or agency planning or decisions. Management of mineral resources therefore poses programming and scheduling challenges that are not common with other Forest Service resources or programs. It is the policy of the Forest Service to “foster and encourage” responsible minerals development; however, management of energy, locatable, and leasable mineral resources is governed by numerous laws and regulations and is not particularly discretionary at either the agency or forest level.

There are three categories of minerals: locatable, leasable, and salable. Each is subject to different Federal laws and implementing regulations. Most important, this affects whether Forest Service personnel have the discretion to deny some types of proposed mineral operations. This also affects how operations can be administered by the Forest Service.

Minerals are not a sustainable forest resource. Once a mineral resource is removed, it is no longer available; however, a major function of the minerals and geology program is to ensure that surface resources affected by mining are restored, to the extent possible. The restoration of these areas is an obvious contribution to the sustainability of other forest resources. For more of a detailed discussion of the minerals, geology, and energy programs, including renewable energy, see the Ashley National Forest Assessment Energy Resource, Mineral Resources, and Geological Resources and Hazards Report (Forest Service 2017L).

Regulatory Framework

Mining Law of 1872—The Mining Law, as amended, opened the public lands of the United States to mineral acquisition by locating and maintaining mining claims. Mineral deposits subject to acquisition in this manner are generally referred to as locatable minerals. Locatable minerals include both metallic minerals, such as gold, silver, lead, copper, zinc, and nickel, and nonmetallic minerals, such as fluorspar, mica, certain limestones and gypsum, heavy minerals in placer form, and gemstones. It is difficult to prepare a complete list of locatable minerals because the history of the law has resulted in a definition of minerals that includes economics (BLM 2020).

The Mineral Leasing Act of 1920—This act provides that deposits of laterally extensive minerals, such as coal, oil, gas, and phosphate, can be acquired through competitive leasing systems (U.S. Department of the Interior 1987).

The Materials Act of 1947—The Materials Act (30 USC 601–604) authorizes the Forest Service to dispose of mineral materials on Federal lands, provided that the disposal is not otherwise expressly authorized or prohibited by law and is not detrimental to the public interest.

The Mineral Leasing Act for Acquired Lands of 1947—This act promotes the mining of coal, phosphate, sodium, oil, oil shale, gas, and sulfur on lands acquired by the United States (U.S. Department of the Interior 1987).

The Energy Policy Act of 2005—This act addresses energy production in the United States, including energy efficiency, renewable energy, oil and gas, coal, tribal energy, nuclear matters and security, vehicles and motor fuels (including ethanol), hydrogen, electricity, energy tax incentives, hydropower and geothermal energy, and climate change technology (United States Congress 2005).

The Geothermal Steam Act and the Code of Federal Regulations (CFR)—This act encourages the development of geothermal energy. The rule allows the leasing of land containing geothermal resources; however, Congress excluded any lands in the National Park System, U.S. Fish and Wildlife Service lands, and any other lands prohibited from leasing by the Mineral Leasing Act of 1920 (Geothermal Steam Act of 1970).

Analysis Areas

The geographic scope of the analysis includes all National Forest System lands within the Ashley National Forest boundary. Additionally the cumulative effects consider the broader landscape and primarily focuses on Duchesne, Uintah, and Daggett Counties in Utah, for areas of the national forest in the Uinta Basin and High Uinta Mountains and on Sweetwater County in Wyoming. The geographic scope also includes areas of the Ashley National Forest in and around the FGNRA. When discussing the economic scale of analysis for energy and mineral uses on the Ashley National Forest, the planning area expands to municipalities providing services to the local energy industry: Duchesne, Roosevelt, Vernal, and other surrounding municipalities. The temporal scope is the anticipated life of the plan, approximately 15 years.

Description of Affected Environment

The Ashley National Forest contains a wide variety of energy and mineral resources. People have been using and benefitting from those resources for many years, and demand is expected to continue. The Ashley National Forest provides the conditions necessary for renewable as well as nonrenewable energy production. Locatable, leasable, and salable minerals have been developed and extracted, and this is expected to continue, to varying extents, on the Ashley National Forest. A wide variety of leasable minerals, including crude oil, natural gas, coal, tar sand, oil shale, gilsonite and elaterite (hard natural hydrocarbon tars), sodium minerals, and phosphate can be found in the plan area.

The Ashley National Forest contains relatively small amounts of widely scattered locatable minerals, due to the local and regional rock layers and geologic history. Most of these rock units are sedimentary and are not promising for development of large locatable mineral deposits. The Ashley National Forest also has a significant amount of salable minerals, primarily consisting of crushed and screened road gravel, barrier rocks, riprap, and general construction and maintenance material.

Energy and Minerals

Renewable Energy

The primary type of renewable energy associated with the Ashley National Forest is hydropower, with a large dam at Flaming Gorge Reservoir and a few smaller reservoirs that also generate power. The Flaming Gorge Dam is operated by the Bureau of Reclamation and is in the Flaming Gorge District of the Ashley National Forest. There are three generating units in the Flaming Gorge Powerplant, with a total installed capacity of about 150 megawatts. The power plant produces approximately 500 million kilowatt hours of energy annually, which is enough to serve about 50,000 households. The power produced by Flaming Gorge Powerplant is distributed by the Western Area Power Administration to Wyoming, Utah, Colorado, New Mexico, Arizona, Nebraska, and Nevada.

Small hydropower operations also exist at Yellowstone Lake and in Uinta Canyon, both within the Roosevelt District of the Ashley National Forest. The Moon Lake Electric Cooperative has indicated they plan to retire the Yellowstone Lake and Uinta Canyon hydropower plants (Hyde 2021). There are several other reservoirs on the national forest, but they do not produce hydropower. Additional opportunities for hydropower generation exist due to large topographic variations across the national forest; however, the amount of hydropower potentially available is small, relative to other potential energy sources.

Other forms of renewable energy, such as wind power, solar, geothermal, and biomass energy, have not seen similar interest or development on the Ashley National Forest. This is partially due to the low potential for these resources, relative to other areas in the country. It is also because of competition from abundant nonrenewable energy sources, such as crude oil, natural gas, and coal in the immediate and surrounding areas (Forest Service 2017L).

Leasable Minerals

Leasable minerals are a category of mineral resources made available for exploration and development by mineral leasing. They are specific types of mineral resources described by the Mineral Leasing Act of 1920, including crude oil, natural gas, coal, oil shale, sodium, phosphate, potassium, and geothermal energy. Locatable minerals on public lands may be classified as hard rock leasable when they are on Federal acquired lands.

The Ashley National Forest contains a wide variety of leasable minerals, including crude oil, natural gas, coal, tar sand, oil shale, gilsonite and elaterite (hard natural hydrocarbon tars), sodium minerals, and phosphate. The different kinds of leasable minerals are briefly discussed below; however, only the crude oil, natural gas, sodium, and phosphate appear to have economic potential for current or near-future development on the Ashley National Forest.

Crude oil and natural gas

There are considerable crude oil and natural gas resources in the South Unit of the Duchesne Ranger District of the Ashley National Forest. These resources are usually discussed together because they typically occur and are produced together, along with variable amounts of byproduct water. Most of the interest and development of oil and gas resources on the Ashley National Forest has been in the eastern half of the South Unit. See figure 3-17 for the location of existing oil and gas leases.

There is also potential for crude oil and natural gas resources in the western half of the South Unit, along the northern and southern margins of the Uinta Mountains, and within the FGNRA. However, these areas of the national forest have seen little or no development to date. Other areas of the Ashley National Forest generally have low potential for crude oil and natural gas resources.

All active oil and gas leases and developments on the Ashley National Forest are in the eastern half of the South Unit of the Duchesne Ranger District. The Ashley National Forest currently has 156 active oil and gas wells, drilled and operated from 46 well pad locations, all of which are operated by Berry Petroleum. From wells on the Ashley National Forest, Berry Petroleum currently produces about 260,000 barrels of crude oil and 980,000 mcf (thousand cubic feet) of natural gas per year.

A new oil and gas leasing analysis will likely be needed for any future oil and gas leasing on the national forest. This is because the existing EIS and decision date back to 1997; they do not take into account the 2001 Roadless Rule or the 2015 decision regarding greater sage-grouse and associated habitat.

Since about 2015, lower crude oil prices have slowed development of new oil and gas wells on the Ashley National Forest. Numerous additional oil and gas wells have been proposed, and some of those have been approved for development. How many of those additional wells might eventually be drilled depends on interest by Berry Petroleum, as well as on future market prices and demand for crude oil and natural gas.

Coal

Although several coal deposits are known or suspected to be on the Ashley National Forest, they are either prohibitively deep or are too small for significant economic development. Large coal deposits near Price, Utah, are suspected to extend northward at great depth, beneath the western portions of the South Unit of the Ashley National Forest. Such deposits are speculative, and the great depth likely prohibits exploration or development of these potential resources.

Small coal deposits of various thickness and quality have been documented from several rock units along both the South and North slopes of the Uinta Mountains. Only a few of these overlap the Ashley National Forest, and most were not of sufficient thickness or quality to justify mining. None are considered to be economic.

Tar sand

Tar sands are porous sandstones or other rocks, where the pore spaces are filled with solid to semisolid crude oil or tar. There are tar sand deposits near the mouth of Whiterocks Canyon in the Vernal District. There are also smaller uneconomic and undocumented tar sand outcrops on or near Reservation Ridge in the South Unit of the Duchesne Ranger District.

The tar sand deposits near Whiterocks Canyon occur on both sides of the national forest boundary. An inactive commercial open pit mine for tar sand is on private land bordering the Ashley National Forest. Materials removed from the mine were used as asphalt for paving local roads. The tar sand deposits also occur or continue onto the Ashley National Forest, but they have not been leased for exploration or development.

Tar sand deposits in the South Unit are related to the crude oil from the same area. Crude oil from the South Unit typically contains a large fraction of wax and is solid or semisolid at room temperature. Where porous rock layers are saturated with waxy crude oil and those rocks are exposed at the surface at room temperature, the oil-soaked rocks are considered tar sand deposits. In the South Unit, these deposits are small and intermittent and of little economic value, compared with the large deposits elsewhere.

Oil shale

The Ashley National Forest includes large areas with known or suspected deposits of oil shale. These deposits are in the Green River Formation, beneath large portions of the Flaming Gorge District and large portions of the South Unit of the Duchesne Ranger District. Although widespread, the known oil shale deposits on the Ashley National Forest are relatively thin and impure, and they are not economically promising for oil shale leasing.

Gilsonite and elaterite

Several small deposits of gilsonite or elaterite (natural hydrocarbon, tar-like, materials) are known to occur on the Ashley National Forest, but they are poorly documented. The known deposits are either prohibitively small for development, compared with much larger deposits elsewhere in the Uinta Basin, or appear to be largely exhausted.

Sodium minerals

An enormous deposit of trona (a leasable sodium mineral) occurs at depth within rocks of the Green River Formation, next to and partially underneath the Flaming Gorge NRA. At an estimated 127 billion tons, this constitutes the largest known trona deposit in the world. The trona is mined and processed to produce soda ash (sodium carbonate), an important industrial chemical used for a wide variety of products. In 2013, mining operations near Green River, Wyoming, produced more than 16 million tons of trona, employing 2,328 people and supplying approximately 90 percent of United States demand for soda ash.

All trona mining operations and associated surface facilities lie outside the Ashley National Forest; however, about 40 acres of the national forest is covered by an active sodium mineral lease, in the SE quarter of Section 12, T16N R109W. The known and minable trona beds continue underneath portions of the Flaming Gorge District of the Ashley National Forest. When the FGNRA was created, it was recognized that large and potentially valuable trona deposits existed beneath portions of the FGNRA surface. The FGNRA was not closed to future minerals leasing, with the requirement that future lease developments not have significant adverse effects on the purposes for which the area was created.

Phosphate

A large phosphate deposit is being mined in the Brush Creek Area, north of Vernal, on lands bordering the Ashley National Forest. The phosphate ore occurs in portions of the Meade Peak Member of the Permian-age Park City Formation. Phosphate is not being mined on the Ashley National Forest; however, past mining has continued right up to the Ashley National Forest boundary, and similar phosphate deposits are known to occur nearby and elsewhere on the national forest. There are no phosphate leases on the Ashley National Forest.

Locatable Minerals

Locatable minerals are sometimes called hard rock minerals and may include deposits of gold, silver, lead, zinc, copper, molybdenum, uranium, gypsum, chemical-grade limestone, and other rare or high-value minerals and metals. Rights to locatable minerals are obtained by staking mining claims, unlike leasable minerals where rights are obtained via mineral leases. Locatable minerals technically include any valuable mineral deposits that are subject to exploration and production under the Mining Law of 1872, as amended.

Compared with other national forests, the Ashley National Forest contains relatively small amounts of widely scattered locatable minerals, due to the local and regional rock layers and geologic history. Most of these rock units are sedimentary and are not promising for the development of large, locatable mineral deposits. As of December 2020, there were 84 active mining claims on the Ashley National Forest, most of which are clustered in the Blind Stream, Dry Ridge, Pole Creek, and Diamond Mountain areas. Mining claims are typically about 20.6 acres in size, for an approximate total of 1,730 acres of active mining claims.

The Ashley National Forest is open to the location of mining claims, except for the areas that have been formally withdrawn, discussed below, and areas of acquired land. Areas currently withdrawn from mineral entry and unavailable to exploration or extraction of locatable minerals are the High Uintas Wilderness, FGNRA, Ashley Karst NRGA, Sheep Creek Canyon Geologic Area, Stillwater Reservoir, Stillwater Diversion Tunnel, various power site withdrawals in large south-slope canyons, and a few smaller areas scattered across the Ashley National Forest (Forest Service 2019b). Various approved, active, or recent locatable minerals operations are scattered across the Ashley National Forest. The largest of these is the Limestone Mine, in the Diamond Mountain area, which produces chemical-grade limestone. Other locatable minerals operations on the forest are typically smaller and intermittent.

For the Ashley National Forest, potential future locatable mineral operations would likely include those minerals already being explored or minerals produced or mined in the past. These could include deposits of chemical-grade limestone, small high-grade copper-gold replacement deposits, small lead-silver deposits, low-grade disseminated copper-silver deposits, or additional deposits of honeycomb-style decorative calcite. Depending on industry action, market prices, and demand, there is some potential for exploration and development of new and different locatable minerals, including gypsum, uranium, rare earth elements, fluoride, gemstones, zeolites, and clay minerals.

Salable (Mineral Materials)

Salable minerals and mineral materials are common minerals sold or given away at the discretion of the Forest Service. Salable minerals are defined as lower-value, common variety materials, such as rock, gravel, and soil. The term salable minerals is synonymous with mineral materials and can also be called common variety minerals. The Forest Service has discretion to manage the sale or removal of these materials.

The Ashley National Forest contains large amounts of salable minerals. Some of these materials are used internally by the Forest Service for construction and maintenance of roads, campgrounds, and other infrastructure. The Ashley National Forest typically uses about 6,500 tons of salable minerals per year for construction and maintenance projects. This material consists primarily of crushed and screened road gravel, barrier rocks, riprap, and general construction and maintenance material.

Salable minerals are also sometimes provided free of charge to local governments for public projects and to the general public for small-scale noncommercial use. The Ashley National Forest typically issues roughly 75 free-use rock permits each year to private citizens for their own personal noncommercial use. These permits typically allow removal of up to 1 to 3 tons of material each. The materials removed under free-use permits generally consist of sandstone flagstones, quartzite boulders, and river rocks used for decorating and landscaping private local residences. Salable minerals are also sometimes available, on a case-by-case discretionary basis, for sale to local commercial projects.

Environmental Consequences for Energy and Minerals

Methodology and Analysis Process

Indicators were selected based on the level of expected development of locatable and leasable minerals and energy, under applicable regulations for each type of resource. Development of these resources is expected to continue, but the levels of development, and the exact locations for future developments, are not known at this time.

Analysis Assumptions

Mineral demand, exploration, and production vary, depending on a number of external factors, and most are highly unpredictable. An evaluation of historical production can provide context or a qualitative estimation of mineral needs and production, which are directly related to mineral exploration; however, both depend on the mineral being mined and the type of mining necessary to extract the resource profitably.

Indicators

- The number of acres open to mineral leasing on the Ashley National Forest
- The numbers of acres open to location of mining claims on the Ashley National Forest
- The numbers of acres open to renewable energy projects on the national forest

Environmental Consequences for Energy and Minerals Common to All Alternatives

Under all alternatives, decisions regarding mineral activities on the Ashley National Forest would align with law, regulation, and policy. They would be consistent with plan decisions for other resource areas, to the extent possible. This forest plan is not making any decisions regarding opening or closing of National Forest System lands to future mineral availability or development (such as via mineral withdrawals or no surface occupancy lease stipulations). Locatable and leasable mineral resources, including oil and gas resources, will continue to be managed by applicable laws, regulations, and policy.

Under all alternatives, no changes would be made to the current management of locatable or leasable minerals, such as the number of acres open, closed, or available for new mining claims or mineral leases. The designation of wilderness study areas or RNAs does not automatically make those areas unavailable for mining claims or mineral leases; therefore, there are no significant differences in impacts on mineral indicators between alternatives. Development of common variety minerals and renewable energy development may be affected by designating areas as wilderness study areas or RNAs.

Environmental Consequences for Energy and Minerals—Alternative A

Under this alternative, approximately 7,700 acres would continue to be managed as RNAs, where renewable energy developments would not be permitted; salable mineral development would also be discouraged but not necessarily disallowed.

Environmental Consequences for Energy and Minerals—Alternative B

Alternative B would manage two areas (10,300 acres total) as areas recommended for their wilderness characteristics, and 7,700 acres would be managed as RNAs. Renewable energy projects would not be permitted in these areas but would still be permitted across the rest of the national forest. Salable mineral development would be discouraged but not disallowed in these areas. An act of Congress would be required to officially designate the areas as wilderness and to withdraw them from locatable mineral entry or leasable mineral availability. An act of Congress is not a reasonably foreseeable action, so environmental consequences on leasable and locatable minerals are expected to be the same as under alternative A.

Environmental Consequences for Energy and Minerals—Alternative C

Alternative C would manage four areas (50,200 acres total) as areas recommended for their wilderness characteristics, and 9,100 acres would be managed as RNAs. Renewable energy projects would not be permitted in these areas but would still be permitted across the rest of the national forest. Salable mineral development would be discouraged but not disallowed in these areas. An act of Congress would be required to officially designate the areas as wilderness and withdraw them from locatable mineral entry or leasable mineral availability. Such an act of Congress is not a reasonably foreseeable action, so environmental consequences on leasable and locatable minerals are expected to be the same as under alternative A.

Environmental Consequences for Energy and Minerals—Alternative D

Under alternative D, 7,700 acres would be managed as RNAs. Renewable energy projects would not be permitted in these areas but would still be permitted across the rest of the national forest. This alternative emphasizes increased forest access and developed recreation opportunities. The construction of new roads, facilities, and parking areas to facilitate greater access could increase the demand for salable minerals, such as sand and gravel for use in construction and road maintenance. This could increase the volume of salable mineral production on the national forest. Increases in forest access emphasized under this alternative could reduce costs associated with mineral exploration if additional forest roads are constructed. Increases in road access could also improve access for renewable energy and petroleum development.

Cumulative Environmental Consequences for Energy and Minerals

Mineral development depends on a variety of factors including local and global demand, prices, and costs of exploration and development. Changes in any of these factors could result in increased or decreased levels of energy and mineral development on the Ashley National Forest. Impacts from mineral and energy exploration and development would be associated with ground disturbance and equipment use. This would lead to disturbed soils, vegetation, habitat, and wildlife, as well as noise and visual intrusions and air impacts. The cumulative impact from minerals and energy in the plan area is not known. Areas withdrawn or closed to minerals and energy would limit development and production and thereby reduce impacts associated with these activities.

Geologic Resources and Hazards

Affected Environment for Geologic Resources and Hazards

The Ashley National Forest includes a variety of geologic resources and geologic hazards. The hazards can pose a risk to people and infrastructure, and include landslides, debris flows, earthquakes, sinkholes, and other concerns. Geologic resources on the Ashley National Forest include many types and ages of fossils, natural caves and other karst resources, and areas with scenic or scientifically important rock layers or features. Significant fossils, natural caves, and related resources are protected by Federal laws and regulations. Fossil and cave resources are both fragile and nonrenewable, and special considerations are required to provide for both resource protection and recreational and scientific opportunities. Locations and details for significant fossil sites and natural caves are considered sensitive information and should be protected from inappropriate public disclosure.

The Ashley National Forest contains several geologic units that are prone to debris flows and landslides. These units tend to be weak, clay-rich, or poorly drained. The actual risk of landslides and debris flows, in areas with susceptible geologic units, depends on various other factors. One example is the presence of vegetation, which tends to stabilize shallow soils, delay water infiltration, and remove pressure from shallow groundwater. Areas where vegetation has been removed or killed by recent fires are typically more prone to landslides and debris flows.

Geologic hazards on the Ashley National Forest also include steep slopes, deep winter snowfall that can cause avalanches, and rock units susceptible to rockfalls. Affected areas are typically remote and the hazards are well known, such that Forest Service infrastructure and visitors can generally avoid the most hazardous areas. Rockfall hazards and snow avalanches are best mitigated by keeping infrastructure and forest visitors away from steep or vertical cliff areas.

The Ashley National Forest is in an area of the United States with no active volcanic activity; however, there is a moderate risk of infrastructure damage from local or regional earthquakes. Geologic maps show numerous bedrock faults scattered across the Ashley National Forest. Most of these faults are inactive, created or related to large-scale crustal movements that are no longer active; however, there are several faults or fault zones on the Ashley National Forest that are geologically active. Movement on these faults or others could result in significant earthquakes from time to time.

In addition to local geologic faults, the western portions of the Ashley National Forest are only about 30 miles from the well-known and geologically active Wasatch Fault Zone. Because of this proximity, visitors and infrastructure in the western portions of the Ashley National Forest would be at risk from large earthquakes on the Wasatch Fault Zone.

Certain kinds of bedrock are susceptible to the creation of natural caves and underground drainage systems. Areas with such rocks, where caves, sinkholes, and underground drainage systems have developed, are often called karst areas by geologists and other scientists. Most karst areas are associated with rock layers of limestone, dolomite, or gypsum, because underground drainage systems can form more quickly in such rocks. The Ashley National Forest includes several karst areas, and large areas are underlain by karst-susceptible rock units. A few large karst sinkholes and karst collapse features are known to exist on the Ashley National Forest; however, they are typically associated with known caves and karst systems and are in rugged and remote areas with little infrastructure (figure 3-18).

Karst areas are often hard to identify from the surface. Karst drainage systems and caves are often deep underground and difficult to access. Management of cave-related resources tends to focus on known caves, even though they represent only a small fraction of the actual caves and related resources that certainly exist.

Environmental Consequences for Geologic Resources and Hazards

Methodology and Analysis Process

Indicators are based on the potential for impacts on known geologic resources and hazards occurring on the national forest.

Analysis Assumptions

No significant natural changes to geologic resources or hazards will occur over the life of the plan.

Indicators

- The risk of damage to significant fossils, caves and karst features, and other geologic resources
- The danger to national forest users and infrastructure presented by geologic hazards

Environmental Consequences for Geologic Resources and Hazards Common to All Alternatives

Under all alternatives, mineral development, facility construction, and road design and construction would take steps to avoid impacts on significant fossils, cave and karst resources, and other geologic resources. These guidelines could reduce the risk of damage to geologic resources in the future. Roads, trails, and other facilities would be designed and located to avoid geologic hazards, such as rockfalls, landslides, and avalanches, which will continue to present a risk to forest users and infrastructure under all alternatives.

Environmental Consequences for Geologic Resources and Hazards—Alternative A

Under this alternative, approximately 7,700 acres would be managed as RNAs. This management would provide protection to geologic resources from most forms of development.

Environmental Consequences for Geologic Resources and Hazards—Alternative B

Under this alternative, approximately 10,300 acres would be managed as recommended wilderness areas, and 7,700 acres would be managed as RNAs. This management would provide protection to geologic resources from most forms of development.

Environmental Consequences for Geologic Resources and Hazards—Alternative C

Under this alternative, approximately 50,200 acres would be managed as recommended wilderness areas, and 9,100 acres would be managed as RNAs. This management would provide protection to geologic resources from most forms of development.

Environmental Consequences for Geologic Resources and Hazards—Alternative D

Alternative D emphasizes increased forest access and developed recreation opportunities. Care would need to be taken to keep developed recreation away from areas with geologic hazards to protect recreationists. Approximately 7,700 acres would be managed as RNAs. This management would provide protection to geologic resources from most forms of development.

Cumulative Environmental Consequences for Geologic Resources and Hazards

No cumulative impacts on geologic resources and hazards are expected to occur as a result of the management decisions made in this document.

Transportation and Facilities Infrastructure

Introduction

The infrastructure on the Ashley National Forest includes roads, bridges, trails, and other facilities, such as forest service buildings, drinking water and wastewater systems, and dams.

Regulatory Framework

- National Forest Roads and Trails Act of October 13, 1964—Authorizes acquisition, construction, and maintenance of forest roads and trails
- 36 CFR 212, 2005 Travel Management Rule—Requires designation of those roads, trails, and areas that are open to motor vehicle use, consistent with the provisions of EOs 11644 and 11989 regarding off-road use of motor vehicles on Federal lands

The following manuals and handbooks define maintenance levels and provide guidance on how the Forest Service's transportation system is managed, including additional direction on motorized and nonmotorized trail management:

- Forest Service Manual 2350 Trail, River, and Similar Recreation Opportunities
- Forest Service Handbook 2309.18 Trails Management Handbook
- Forest Service Handbook 7709.58 Transportation System Maintenance Handbook
- Forest Service Manual 7700 -Transportation System, chapter 7730
- Forest Service Manual 7730 and 7709 and 23 CFR 650
- Forest Service Handbook 7309.11, section 22
- Forest Service Manual 7310

Analysis Area

The analysis area for assessing effects on the infrastructure is the Ashley National Forest and other transportation corridors outside its boundary that provide important national forest access routes. The infrastructure falls under the jurisdiction of the Forest Service or adjacent counties and states. Specifically, the analysis area is the Ashley National Forest; surrounding Federal lands that border it (Bureau of Indian Affairs and BLM-administered lands and the Uinta-Wasatch-Cache National Forest), State lands, tribal lands, private inholdings, and private lands.

The analysis area includes all lands within the boundaries of the Ashley National Forest and is broken down into four spatial areas, based on the existing ranger district boundaries: Flaming Gorge, Vernal, Duchesne-Roosevelt North, and Duchesne-Roosevelt South. The temporal scope is the expected life of the plan.

Description of Affected Environment

An inventory of transportation and facility infrastructure on the Ashley National Forest is provided in table 3-73. There are 1,472 miles of roads and 1,107 miles of trails and 90 road and trail bridges on the forest. There are 409 forest service buildings, 31 dams, 30 drinking water systems, and 58 wastewater systems.

Table 3-73. Facilities and Infrastructure on the Ashley National Forest

Infrastructure	Flaming Gorge	Vernal	Duchesne-Roosevelt North	Duchesne-Roosevelt South	Total
Forest Service buildings	233	75	94	7	**409**
Other buildings[1]	60	91	41	1	**193**
Dams[2]	8	14	9	0	**31**
Roads (miles)	462	445	307	258	**1,472**
Road bridges[3]	13	14	22	1	**50**
Trails (miles)	213	358	461	75	**1,107**
Trail bridges[4]	10	13	17	0	**40**
Trailheads	0	4	7	0	**11**
Wastewater systems	36	3	19	0	**58**
Water systems (in operation)	14	5	11	0	**30**
Recreation residence areas	1	2	1	0	**4**

Infrastructure	Flaming Gorge	Vernal	Duchesne-Roosevelt North	Duchesne-Roosevelt South	Total
Resorts	2	0	2	0	**4**
Marinas	3	0	0	0	**3**
Boat ramps	13	1	2	0	**16**
Canals	13	12	14	0	**39**

Source: Forest Service 2017m
[1]Other Buildings—Recreation residences and outbuildings (114), snow telemetry (SNOTEL) sites (13), resorts and outbuildings (32), marinas and outbuildings (15), communication sites (11), miscellaneous (8)
[2]Dams—Bureau of Reclamation (3), special use permit (27), Forest Service (1)
|[3]Road Bridges—Structures whose condition is reported to the Federal Highway Administration
[4]Trail Bridges—Longer than 20 feet in length and 5 feet above the ground

Roads and Road Bridges

Access to National Forest System lands is generally provided by a seamless transportation system under the jurisdiction of multiple public road agencies, as follows: federal highways, state highways, county highways and roads, municipal surface streets, and other roads managed by Federal agencies, such as the Forest Service or the BLM. Cooperative agreements between these agencies allow for shared maintenance and improvement schedules.

The Ashley National Forest uses county road agreements with Daggett, Duchesne, Sweetwater, and Uintah Counties to maintain many of the major roads on the forest and to help bridge financial gaps in appropriated funds for road maintenance. Many roadways outside the Ashley National Forest boundaries pass through tribal or BLM lands and provide the only means of access to the national forest; roads accessing the Duchesne Ranger District, for instance, are on tribal lands. Other districts are accessible by roads on BLM and State lands (Mortenson 2020).

The 2009 Motorized Travel Plan for Ashley National Forest (Forest Service 2009b) designated the location of routes open to public motorized use, the class of vehicle appropriate for each route, and the timing of use, for example seasonal restrictions. The plan designated 1,458 miles of open roads and 185 miles of open motorized trails. Each route was assigned a system number and shown on a motor vehicle use map. The 2015 Travel Analysis Report (Forest Service 2015d) identified the minimum road system for safe and efficient travel on the forest. This report tiered to the 2009 motorized travel plan and identified 11 miles of system roads as likely not needed; these system roads may be analyzed for future decommissioning or trail conversion.

A seamless transportation network is critical for the efficient and safe movement of people, goods, and services, particularly emergency services. The Ashley National Forest maintains its road system with funding provided through annual congressional appropriations, through county road agreements, and through other agreements and funding sources. Most maintenance is funded through congressional appropriations and county road agreements. Currently 412 miles of road, approximately 28 percent of the Ashley National Forest road system, are maintained under county road agreements; 329 of these miles are passenger car roads, which is approximately 59 percent of the passenger car system on the national forest.

The primary components of road maintenance on the Ashley National Forest are blading and shaping; culvert cleaning and drainage improvements; sign maintenance and replacement; and gravel placement, chip seals, and asphalt resurfacing. The Ashley National Forest has 50 road bridges that require inspection on a minimum 2-year cycle, per Federal Highway Administration guidelines. Currently, 4 of the 50 bridges are classified as deficient, with others remaining in adequate condition (Mortenson 2020).

Trails and Trail Bridges

The 2009 Motorized Travel Plan for Ashley National Forest designated 185 miles of open motorized trails (Forest Service 2009b). The national forest also contains 890 miles of nonmotorized trails. Motorized and nonmotorized trails are maintained on a fixed schedule.

There are 40 trail bridges on the Ashley National Forest. A trail bridge is generally defined as 20 feet long or longer and over 5 feet high. Trail bridges are inspected every 4 years by a qualified bridge engineer, and most trail bridges on the Ashley National Forest are in fair condition. More information regarding the nonmotorized trail system is provided in “Recreation.”

Other Facilities

Administrative facilities

There are currently 409 Forest Service buildings on the Ashley National Forest. Most maintenance for these facilities is funded through congressional appropriations. In recent years, the number of buildings on the Ashley National Forest has been reduced through decommissioning and through the conveyance process, a method of transferring ownership of a building and site to another entity for an equitable value. From 2010 to 2017, the Ashley National Forest removed 49 buildings through either conveyance or decommissioning. In 2010, 10 buildings at five different administrative sites were conveyed. In 2012, an additional four buildings at two administrative sites were conveyed. In 2017, another 10 buildings at five administrative sites were conveyed.

The Ashley National Forest has also decommissioned 25 additional buildings that were deemed too costly to maintain and not critical to operations; further disposal of buildings is anticipated. Current efforts are now underway to decommission the existing Indian Canyon Ranger Station. The Indian Canyon Ranger Station, which is currently condemned and beyond the state of restoration, is planned for eventual removal. Alternatives are currently being explored for the Old Stockmore Ranger Station, which is located on land not connected to the national forest.

Revenue obtained from these conveyances has been used to support the construction of a new, consolidated office in Manila for the northern end of the Flaming Gorge District and a new bunkhouse in Duchesne for the Duchesne Ranger District (Mortenson 2020). Older buildings that are potentially eligible for listing on or that are listed on the NRHP require additional considerations and funding to repair and bring them up to standard. The Forest Service is also required to consider alternative uses before decommissioning these buildings. In general, the Ashley National Forest’s buildings are being used efficiently and are in areas that support current land management needs.

Dams

Of the 31 dams on the Ashley National Forest, the Forest Service has sole jurisdiction of the Daggett Lake dam; the other 30 dams are under special-use authorizations or easements. The number of dams is decreasing. New dams are not being built, and many remote high-mountain reservoir dams have been decommissioned. These include 14 wilderness dams that have been breached, thus stabilizing the reservoirs to natural lake levels (Mortenson 2020). The most recently decommissioned dam was at Milk Lake. Three of the six remaining wilderness dams have been reconstructed by special-use permittees. Recent plans for decommissioning include a request by Moon Lake Electric to remove a dam located on the Yellowstone River in Yellowstone Canyon. The reason for decommissioning the dam is because it is no longer economically viable for use as a hydroelectric facility. The Forest Service is complying with this request, and removal is anticipated to occur within the 2022–2023 time frame.

Drinking water and wastewater systems

Thirty drinking water systems are in operation on the Ashley National Forest at a number of campground and administrative sites. These drinking water systems are maintained through annual congressional appropriations, grants and agreements from outside agencies, and recreation fees. These systems are tested monthly during their operational period to ensure they meet State drinking water standards.

The national forest has, in recent years, reduced the number of drinking water systems at some campgrounds. This is because aging water systems are costly to maintain and replace and they are at campgrounds where visitation levels do not justify the costs of maintenance. Additional reductions are being considered.

There are currently 58 wastewater systems across the Ashley National Forest, located at a number of campgrounds and administrative sites. Maintenance of these wastewater systems is funded primarily through congressional appropriations. In recent years, the number of associated wastewater systems has been reduced as a result of reductions in the number of drinking water systems across the national forest. At present, there are several campgrounds being considered for decommissioning or reduced services, such as removal of water and wastewater systems, due to low visitor use and high operational costs.

General Infrastructure Condition

Infrastructure on the Ashley National Forest is in generally good condition. The Forest Service uses available funding to ensure road maintenance and to mitigate safety and resource concerns, a trend that is expected to continue. Roads and trails that provide access to Federal lands are maintained on a schedule. The number of OHVs, particularly multi-passenger models, is increasing on the national forest, and the demand for looped routes to accommodate these vehicles is growing. As the available road budget decreases, the staff of the Ashley National Forest may reduce the operational maintenance level of some roads to shift funding to the maintenance of more heavily traveled roads.

Many of the facilities on the Ashley National Forest are at the end of their lifecycles; that is, they are beyond the age that they were intended to last without maintenance and upgrades. As facilities continue to age, facility maintenance budgets have failed to keep up with maintenance needs. As a result, there is a large backlog of maintenance work required to bring buildings up to standard. The Forest Service has also been reducing the number of unneeded buildings through decommissioning and conveyance, a trend which is expected to continue. Some distribution and water collection systems have failed or water-collection systems have been determined to be under the influence of surface water, requiring additional water treatment and disinfection.

Environmental Consequences for Transportation and Facilities Infrastructure

Methodology and Analysis Process

The approach to impacts analysis involved a qualitative assessment of effects on the indicators described below. The impacts would come from various plan components proposed under each of the action alternatives, as compared with alternative A, no action. Impacts were assessed at the programmatic level since proposed plan components are not quantified but, rather, they are described in terms of qualitative planning-level goals and objectives. The area of analysis for direct and indirect impacts is the Ashley National Forest. It also includes other transportation corridors outside the national forest boundary that provide important national forest access routes and that fall under the jurisdiction of the Forest Service or adjacent counties and States. The analysis area for assessing cumulative effects on transportation infrastructure and facilities is the Ashley National Forest; surrounding Federal lands that border the Ashley National Forest under the jurisdiction of the Bureau of Indian Affairs, the BLM, and Uinta-

Wasatch-Cache National Forest; State lands; tribal lands; private inholdings; and private lands that border the Ashley National Forest. The temporal scope is the expected life of the plan.

Analysis Assumptions

The various activities described in the plan, such as providing infrastructure to support recreation, will occur to the extent necessary to achieve the objectives described by each alternative. The specific locations and designs of these activities are not known at this time; therefore, this analysis refers to the potential of the effect to occur, realizing that in many cases the degree of potential effects from these activities can only be estimated and not determined with a high level of precision.

Indicators

Analysis indicators for transportation and facilities infrastructure are movement toward or away from adequate or fair condition of nonmotorized trails, motorized routes, and facilities and movement toward or away from providing adequate access via the existing transportation network

Environmental Consequences for Infrastructure Common to All Alternatives

The Ashley National Forest manages a wide array of infrastructure and facilities that are accessed via a seamless transportation system. The system is under the jurisdiction of multiple public road agencies, as detailed in the preceding "Description of Affected Environment." National direction for Forest Service management actions would continue to affect how infrastructure and facilities are managed across the national forest. Under all alternatives under consideration in this EIS, variable infrastructure and facilities budgets would affect maintenance and further infrastructure development. National direction will also continue to provide forests with guidance in the management of facilities and infrastructure on Forest Service lands.

Environmental Consequences for Infrastructure—Alternative A

Under alternative A, the no action alternative, current management practices would continue under the 1986 forest plan, as amended and implemented. The current forest plan would continue to guide management of the national forest, and ongoing work or work previously planned and approved would be done under that guidance. This alternative does not recommend any new management areas; there would be no changes to the plan in response to issues raised, and it would not adjust management in response to the requirements of the 2012 Planning Rule.

Roadway improvements would continue as needed under alternative A; however, there would be no further action taken to move roads and trails toward desired conditions. The Forest Service would not promote improvements to motorized trails and roads in general recreation areas, nor would there be additional objectives to chip and seal or slurry roads in destination recreation areas. The lack of such further action and objectives would keep maintenance activities on existing motorized trails and roads at the status quo.

The Ashley National Forest has facilities that are being used for purposes not originally intended. For example, some facilities and areas have been converted from one use to another, and even for multiple uses, to meet the current needs of the Forest Service. The maintenance requirements of the facilities and infrastructure are increasing, with much of the annual and cyclic preventive maintenance becoming deferred. The accumulation of deferred maintenance leads to deterioration of performance, increased costs to repair, and a decrease in asset values.

As the workforce and mission services continue to evolve, the existing infrastructure may become obsolete from the originally designed purpose. This will require the Forest Service to look at adaptive reuses, multiple uses, and other ways to address accumulating deferred maintenance.

Under the current plans, short- and long-term effects on transportation and facilities infrastructure would continue as is. Using facilities for purposes not originally intended would continue, as would the conversion of use from one type to another. Maintenance requirements of the facilities and infrastructure would continue to increase, with much of the annual and cyclic preventative maintenance remaining deferred. The accumulation of deferred maintenance would result in further deterioration of performance, increasing costs to repair and decreasing asset values.

Environmental Consequences for Infrastructure—Alternative B

Under alternative B, the focus of recreation management would be on providing infrastructure to support recreation, while taking into account other resource values. In addition, management would provide for a variety of developed and dispersed recreation tourism opportunities to support a diverse set of users and local communities. Three recreation management areas would be established to support different recreation opportunities: destination recreation areas, emphasizing developed recreation experiences in high-use areas, with motorized access and support facilities; backcountry recreation areas focused on dispersed recreation outside wilderness areas with limited infrastructure; and general recreation areas that allow for a range of recreational uses, including motorized and nonmotorized use, along with other forest uses.

Compared with alternative A, impacts from objectives related to backcountry recreation areas, general recreation areas, and destination recreation areas would benefit transportation and facilities infrastructure from the following:

- Improvements to trails and the provision of more dispersed camping docks and mountain bike-designated use
- Improvements to dispersed camping sites and access roads, OHV loop tails, and other recreational facilities

In particular, although many of the objectives are contingent on outside partnerships, adhering to such objectives under alternative B would improve motorized trails and roads in general recreation areas. Similarly, actionable objectives to chip and seal or resurface roads in destination recreation areas and activities to improve nonmotorized trails in backcountry areas would move existing trails and roads toward adequate condition.

There would be short-term adverse impacts on transportation infrastructure during construction and maintenance. Overall, there would be long-term beneficial effects on facilities and transportation infrastructure from these improvements, which would move the condition of facilities and infrastructure toward desired conditions.

The establishment of recommended wilderness areas would result in the prohibition of new infrastructure, such as communication sites, roads, and utility corridors. While these prohibitions would create barriers to future development of infrastructure, they would result in no effect on existing transportation and facilities infrastructure. Ongoing maintenance of forest roads would continue, and there would be no effect on desired conditions.

Environmental Consequences for Infrastructure—Alternative C

Impacts under alternative C would be similar to those described under alternative B. Motorized recreation would be reduced due to restrictions on use in backcountry recreation areas and increased acres with the backcountry classification. Objectives for backcountry recreation areas, general recreation areas, and destination recreation areas would generally be the same as under alternative B; however, under alternative C, the emphasis for recreation would be on backcountry recreation and recreation classes, emphasizing a quiet experience. This would likely result in lower periodic maintenance requirements for backcountry areas, with more gradual movement toward adequate or fair condition of routes and long-term beneficial effects on transportation and facilities infrastructure in backcountry areas.

The prohibition of new communication sites, roads, utility corridors, and other infrastructure in recommended wilderness areas would be the same as described under alternative B; however, recommended wilderness would occur over a greater area of the national forest. This would constitute 50,200 acres under alternative C, compared with 10,300 under alternative B. Any maintenance to dams, bridges, and administrative and drinking water facilities would require methods designed to ensure preservation of wilderness values. This would result in increased maintenance costs associated with compliance.

Environmental Consequences for Infrastructure—Alternative D

Alternative D would emphasize accessibility of the national forest, promoting increased motorized use and developed recreation opportunities. Compared with alternative B, there would be more acres in the planning area classified as destination recreation areas supporting infrastructure development and motorized use. Motorized use would be permitted in backcountry recreation areas, and objectives across management areas would emphasize increased roads, trails, and recreation infrastructure.

Impacts from objectives related to backcountry recreation areas, general recreation areas, and destination recreation areas would be similar to those described for alternative B; however, there would be additional transportation and facilities infrastructure. They would accrue from the provision of more dispersed camping docks, mountain bike-designated use, improvements to dispersed camping sites and access roads, OHV loop tails, and other recreational facilities. In addition, increased maintenance for roads would result in measurably greater benefits to transportation infrastructure.

Under alternative D, additional loops and routes for motorized activities could be constructed. The Forest Service would consider expanding existing campgrounds to accommodate larger trailers and OHV users. This would result in the need for more periodic maintenance but would also lead to enhancements to existing facilities on the national forest.

Cumulative Environmental Consequences for Transportation and Facilities Infrastructure

Past, present, and reasonably foreseeable plans and actions with a nexus to transportation and facilities infrastructure on the Ashley National Forest are as follows:

- The Great American Outdoors Act, activated into public law on August 9, 2020, will provide funding for facilities and roads on the Ashley National Forest, reducing forest-wide deferred maintenance. The Forest Service has already submitted applications for funding of specific projects, all of which are intended to reduce the backlog of deferred maintenance. Funding in subsequent years may be used for facility renovation.

- Designation of the Ashley Karst National Recreation and Geologic Management Plan resulted in a prohibition of new roads in the area, with effects to both facilities and infrastructure.
- The Uinta Basin Railway Project, which is proposed by the Seven County Infrastructure Coalition, will construct a railroad along Highway 191, from Kayune to Myton and through Indian Canyon, passing just south of Duchesne. Roughly 11 miles of the route will be in the Roosevelt Ranger District.
- The Western Area Power Administration Right-of-Way Maintenance and Reauthorization Project will update vegetation management along 278 miles of transmission lines in the Vernal and Flaming Gorge Ranger Districts.
- The Badlands Trail Project will construct an approximately 3.3-mile-long OHV trail connection on the South Unit of the Duchesne-Roosevelt Ranger District.
- The Round Park Hardened Stream Crossing Project hardened ford structures at two stream crossings in the Round Park area.

In general, these actions will result in beneficial effects on the transportation and facilities infrastructure on the Ashley National Forest. They will enhance existing infrastructure and move routes and facilities toward adequate conditions. In cases where these new plans would limit potential future development, such as in the case of the proposed Ashley Karst National Recreation and Geologic Management Plan, these plans would result in no effect on existing transportation and facilities infrastructure. Effects from these past, present, or reasonably foreseeable plans and actions would be the same across all alternatives.

It should be noted that additional reasonably foreseeable state and county-level plans and projects not specifically identified above may contribute to cumulative impacts to the extent that they have a nexus to transportation and infrastructure.

Additionally, public use on the Ashley National Forest is increasing, as is the population of the Wasatch Front and other areas of Utah. There is a greater demand for services, as well as greater degradation of the road system from the increased use; additional maintenance and improvements are required. This trend is expected to continue. There will continue to be a need to provide access for multiple uses, including timber harvesting, grazing, and recreation.

When combined with forest management actions under the alternatives analyzed above, none of the past, present, or reasonably foreseeable plans and actions would result in adverse cumulative effects on transportation and facilities infrastructure on the Ashley National Forest that would rise to a level of significance, warranting further discussion or analysis of effects.

Recreation

Introduction

The Ashley National Forest offers a variety of developed and dispersed recreational activities, such as camping and picnicking, hiking, mountain biking, horseback riding, wildlife and scenic viewing, hunting and fishing, enjoying snow sports, and rock climbing. Wintertime activities are snowshoeing, cross-country skiing, ice fishing, and snowmobiling.

Popular Ashley National Forest destinations are the FGNRA and the High Uintas Wilderness. There are 55 developed campgrounds, 7 picnic areas, and 2 visitor centers. Of the approximately 1,200 miles of recreation trails on the forest, 185 miles are motorized. The remaining trails are nonmotorized, with approximately 250 miles of those trails in wilderness areas (Forest Service 2009b).

The Ashley National Forest is a popular recreation destination for residents in eastern Utah, southwestern Wyoming, and northwestern Colorado. It is also common for travelers along the corridor between Yellowstone and Arches National Parks to spend time recreating on the Ashley National Forest.

Based on the percentage of people who reported participating in an activity, the main activities are fishing (38 percent), viewing natural features (37 percent), hiking/walking (36 percent), viewing wildlife (28 percent), relaxing (28 percent), driving for pleasure (24 percent), developed camping (23 percent), motorized water activities (17 percent), and picnicking (12 percent) (Forest Service 2017n).

Regulatory Framework

Organic Administration Act of June 4, 1897 (30 Stat. 11, as amended)—Authorizes the establishment of national forests.

Term Permit Act of March 4, 1915 (Public Law 63-293, Ch. 144, 38 Stat. 1101, as amended; 16 USC 497)—Provides direction to the National Forest System lands to authorize occupancy for a wide variety of uses through permits not exceeding 30 years.

Multiple-Use Sustained-Yield Act of June 12, 1960 (Public Law 86-517, 74 Stat. 215)—Provides direction for the National Forest System lands to provide access and recreation opportunities; it states "The policy of Congress is that national forests are established and administered for outdoor recreation . . . ."

National Forest Roads and Trails Act of October 13, 1964 (Public Law 88-657, 78 Stat. 1089, as amended)—Declares that an adequate system of roads and trails should be constructed and maintained to meet the increasing demand for recreation and other uses. The act authorizes road and trail systems for the national forests. It authorizes granting easements across National Forest System lands, construction and financing of maximum-economy roads (Forest Service Manual 7705), and imposition of requirements on road users for maintaining and reconstructing roads.

Land and Water Conservation Fund Act of 1965 (Public Law 88-578, 78 Stat. 897, as amended; 16 USC 460l-4604 (note); 460l-4604 through 6a, 460l-4607 through 460l-4610, 460l-4610a–d, 460l-4611)—"The purposes of this act are to assist in preserving, developing, and assuring accessibility to all citizens of the United States of America . . . [to] such quality and quantity of outdoor recreation resources . . . [and] providing funds" to the States for acquisition, planning, and development of recreation facilities and to Federal agencies for acquisition and development of certain lands and other areas.

Architectural Barriers Act of August 12, 1968 (Public Law 90-480, 82 Stat. 718 51 USC 4151-4154, 4154a, 4155-4157)—Establishes additional requirements to ensure that buildings, facilities, rail passenger cars, and vehicles are accessible to individuals with disabilities. It covers architecture and design, transportation, and communication elements of recreational site planning and development.

National Trails System Act of October 2, 1968 (Public Law 90-543, 82 Stat. 919, as amended)—Establishes the National Trails System and authorizes planning, right-of-way acquisition, and construction of trails established by Congress or the Secretary of Agriculture.

Rehabilitation Act of September 26, 1973 (Public Law 93-112, Title V, 87 Stat. 390, as amended; 29 USC 791, 793-794, 794a, 794b)—Requires that programs and activities conducted by Federal agencies and by entities that receive funding from, or operate under a permit from, Federal agencies provide an equal opportunity for individuals with disabilities to participate in an integrated setting, as independently as possible. The only exception to the requirement is when the program would be fundamentally altered if changes were made solely for the purpose of accessibility.

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974 (Public Law 93-378, 88 Stat. 476, as amended)—Declares (per Sec. 10) that "the installation of a proper system of transportation to service the National Forest System . . . shall be carried forward in time to meet anticipated needs on an economical and environmentally sound basis."

Federal Land Policy and Management Act (FLPMA) of October 21, 1976 (Public Law 94-579, 90 Stat. 2742, as amended)—Declares (per Sec. 102) that "the public lands be managed in a manner that . . . will provide for outdoor recreation and human occupancy and use."

Omnibus Parks and Public Lands Management Act of November 12, 1996 (Public Law 104-333, Div. I, Title VII, Sec. 701, 110 Stat. 4182; 16 USC 497c)—Section 701 of this act authorizes the following:

- Establishes a system to calculate fees for ski area permits issued under the National Forest Ski Area Permit Act of 1986 (16 USC 497b)
- Provides for holders of ski area permits issued under other authorities to elect this permit fee system (Forest Service Handbook 2709.11, Sec. 38.03a)
- Includes provisions concerning compliance with the NEPA when issuing permits for existing ski areas (Forest Service Manual 2721.61f and Forest Service Handbook 2709.11, sec. 41.61b)

Secure Rural Schools and Community Self-Determination Act of October 30, 2000 (Public Law 106-393, 114 Stat. 1607; 16 USC 500 [note])—Provides provisions to make additional investments in, and create additional employment opportunities through, projects that improve the maintenance of existing infrastructure, that implement stewardship objectives that enhance forest ecosystems, and that restore and improve land health and water quality.

Federal Lands Recreation Enhancement Act of December 8, 2004 (Public Law 108-447, as amended)—Gives the Secretaries of Agriculture and the Interior the authority to establish, modify, charge, and collect recreation fees on Federal recreational lands where a certain level of amenities have been developed.

The Federal Cave Resources Protection Act of 1988 (Public Law 101-691)—Aims to "secure, protect, and preserve significant caves on Federal lands for the perpetual use, enjoyment, and benefit of all people; and to foster increased cooperation and exchange of information between governmental authorities and those who utilize caves located on Federal lands for scientific, education, or recreational purposes." Specific effects of the act include prohibiting disclosing the locations of significant caves, removing cave resources, and vandalizing or disturbing cave resources.

Executive Order 12862, Setting Customer Service Standards—Requires information about the quantity and quality of recreation visits be included in national forest plans.

Executive Order 11644, as amended—Establishes policy and procedure to ensure that the use of off-road vehicles "on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands."

Executive Order 13443, Facilitation of Hunting Heritage and Wildlife Conservation—Directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

Analysis Area

The analysis area is all lands on the Ashley National Forest, regardless of ownership or jurisdiction. When discussing larger population trends driving demand for recreation on the Ashley National Forest from surrounding areas, the scale of the analysis includes the greater Wasatch Front, southwestern Wyoming, and northwestern Colorado.

The Ashley National Forest and the nearby Dinosaur National Monument are on the primary corridor between Yellowstone and Grand Teton National Parks in northwestern Wyoming, Arches and Canyonlands National Parks in southeastern Utah, and Rocky Mountain National Park in north-central Colorado. Tourists who travel these corridors are considered in this analysis as well.

Recreation Opportunity Spectrum

The Forest Service uses the ROS as a tool for managing diverse recreation opportunities and settings. Recreation opportunities include nonmotorized, motorized, developed, and dispersed recreation on land and water and in the air. The social, managerial, and physical attributes of a place collectively provide a distinct recreational setting.

Opportunities along the spectrum range from a primitive setting where there is a high probability of solitude, self-reliance, challenge, and risk to rural or urban settings where self-reliance, challenge, and risk are less relevant to the recreation experience. The physical setting is defined by the absence or presence of infrastructure, facilities, and other human-made modifications to the landscape. The social setting reflects the amount and type of contact between individuals or groups. The managerial setting is defined by the level of visitor and facility management. The Ashley National Forest has primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, and rural ROS classes (table 3-74). There are no areas classified as urban.

The most developed recreation opportunities are in the Flaming Gorge Ranger District, 63 percent of which is roaded natural or rural. The most opportunities for recreation in a primitive setting are in the Duchesne-Roosevelt Ranger District, 60 percent of which is either primitive or semiprimitive nonmotorized (see table 3-75).

Table 3-74. Recreation Opportunity Spectrum Classes and Definitions

Recreation Opportunity Spectrum Class	Description
Primitive	Large, remote, wild, and predominantly unmodified landscapes; areas with no motorized activity and little probability of seeing other people; few management controls
Semiprimitive nonmotorized	Areas of the forests managed for nonmotorized use; uses include hiking and using equestrian trails, mountain biking, and using other nonmotorized mechanized equipment; rustic facilities and opportunity for exploration, challenge, and self-reliance

Recreation Opportunity Spectrum Class	Description
Semiprimitive motorized	Backcountry areas used primarily by motorized users on designated routes; roads and trails designed for OHVs and high-clearance vehicles; offers motorized opportunities for exploration, challenge, and self-reliance; rustic facilities; often provide portals into adjacent primitive or semiprimitive nonmotorized areas
Roaded natural	Often referred to as front country recreation areas, these areas are accessed by open system roads that can accommodate sedan travel. Facilities are less rustic and more developed, with campgrounds, trailheads, and airstrips often present. Provide access points for adjacent semiprimitive motorized, semiprimitive nonmotorized, and primitive settings.
Rural	Highly developed recreation sites and modified natural settings; easily accessed by major highways; in populated areas where private land and other land holdings are nearby and obvious; facilities are designed for user comfort and convenience
Urban	Characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Sights and sounds of people are predominant, with the likelihood for large numbers of users. Recreation is highly controlled and structured.

Source: Forest Service 2017o

Table 3-75. Summer Recreation Opportunity Spectrum by Class and Ranger District

Administrative Unit	Primitive	Semiprimitive Nonmotorized	Semiprimitive Motorized	Roaded Natural	Rural	Urban
Flaming Gorge Ranger District	3%	27%	7%	59%	4%	0%
Vernal Ranger District	4%	32%	25%	39%	0%	0%
Duchesne-Roosevelt Ranger District	36%	24%	25%	15%	0%	0%
Ashley National Forest	**20%**	**27%**	**20%**	**32%**	**1%**	**0%**

Source: Forest Service 2017o

Managing recreation consistent with the physical, social, and managerial settings associated with those classifications can be challenging, especially in light of increasing visitor use and intensity. Some areas, such as at the marinas in the FGNRA, likely approach an urban setting in the peak recreation season (May to September), even though they are mapped as roaded natural. Local governments have developed or are developing trail master plans, and many of them emphasize adding motorized trails. A new motorized trail has been constructed on the south side of the Duchesne-Roosevelt Ranger District since the 2017 assessment was written. Motorized trails in areas classified as primitive or semiprimitive nonmotorized would conflict with the recreation settings.

The Ashley National Forest ROS map is based on seasons when over-snow travel is not allowed, mostly summer and fall. Winter classifications have not been completed; however, winter travel is represented on Ashley National Forest winter travel maps. During the winter and early spring, snowmobiles are used in the semiprimitive summer ROS classifications. Other winter activities are ice fishing, cross-country skiing, and snowshoeing. There are no developed ski areas on the Ashley National Forest, but there are rental yurts that are available and popular with cross-country skiers.

Developed Recreation

Developed recreation takes place at facilities constructed for specific activities or groups of activities. Developed sites offer visitors a sense of security and structure, as well as facilities such as toilets, parking, picnic tables, and cooking areas.

The main developed recreation activities that occur on the Ashley National Forest are as follows:

- Staying overnight in developed campgrounds
- Viewing scenery from developed overlooks and interpretive sites
- Launching watercraft from developed boat ramps
- Entering the High Uintas Wilderness from developed trailheads
- Staying overnight at cabins and yurts
- Visiting interpretive and historic developed sites

The Ashley National Forest has 165 developed sites (see table 3-76). The developed sites, with the exception of boat-in campgrounds, are all accessed by motorized roads. Many developed recreation sites are access points for dispersed recreation, such as trailheads and boat ramps.

Table 3-76. Developed Recreation Facilities on the Ashley National Forest

Facility Type	Sites
Campgrounds	55
Group campgrounds	11
Rental yurts, cabins, and buildings	11
Marinas	3
Boat ramps	16
Day-use areas	8
Resorts and lodges	4
Trailheads	11
Visitor centers	2

Source: Forest Service 2017o

During the peak-use times—weekends and summer from May to September—most of the popular developed recreation sites are nearly all full. This indicates that use demand is successfully being met for most developed recreation facilities. During the summer, most activity is at campgrounds, marinas, visitor centers, and trailheads. During the winter, there is snowshoeing, cross-country skiing, and snowmobiling at trailheads and along trails.

Flaming Gorge National Recreation Area

The FGNRA includes some of the most highly developed recreation sites on the Ashley National Forest (see *Designated Areas*). Boat ramps provide motorized and nonmotorized boat access to the Flaming Gorge Reservoir. Marinas include restrooms, docks, picnic areas, fish cleaning stations, and concessions. Motorized and nonmotorized water-based recreation is popular with key water access points at Cedar Springs, Lucerne Valley, and Buckboard Marinas (see figure 3-19). These areas often have full parking areas and congestion at the boat ramps during the peak summer recreation season. Recently, paddle trails were created on the reservoir for paddle boarding and kayaking. These water trails are various lengths and can be accessed from multiple points along the reservoir.

Recreation Facilities and Sites

There are two visitor centers, one at the Flaming Gorge Dam, which is primarily run by the Bureau of Reclamation, and the other at Red Canyon. The Red Canyon visitor center is the primary interpretation point for the Ashley National Forest and provides scenic points of interest, educational programs, natural history, interpretive trails, and recreation information for the larger FGNRA and other recreational opportunities surrounding the FGNRA. The Flaming Gorge Dam provides guided tours, interpretive displays, and opportunities for picnicking and fishing.

The historic Swett Ranch Historic Site is an interpretive site on the FGNRA. The ranch was home to the Swett family, who ran the ranch in the early and mid-1900s.

Ute Tower Historic Site is a fire lookout tower constructed between 1933 and 1935. Though no longer serving as a lookout tower, the structure remains. The site gives people the opportunity to see what living and working in the tower was like for early lookouts.

Dispersed Recreation

Dispersed recreation is any recreation outside of a developed recreation site: camping outside a developed campground, backpacking, operating OHVs, snowmobiling, driving for pleasure on roads and trails, fishing (including ice fishing) and boating, mountain biking, trail running, horseback riding, and cross-country skiing. Less common activities are target shooting and drone flying.

The level of dispersed use depends on each visitor’s desired recreation experience, setting, ease of access, and nearby facilities. Dispersed camping is popular along the Flaming Gorge Reservoir shoreline. Visitors often use recreational vehicles and boats in such areas as Stateline Cove and South Buckboard. The eastern portion of the Vernal Ranger District, western and northern portion of the Flaming Gorge Ranger District, and areas in the Duchesne-Roosevelt Ranger District are popular for dispersed camping and OHV use.

Hunting and camping are popular on the Ashley National Forest. There is a 16-day overnight stay limit. No motorized retrieval of big game off designated roads and trails is allowed. Large game species are bear, mountain lion, moose, elk, mule deer, pronghorn antelope, and bighorn sheep. While hunting season can vary by species, most hunting occurs in the fall.

Dispersed winter use is concentrated around areas with sufficient snow for backcountry and cross-country skiing, skiing or snowshoeing into cabins and yurts, and ice fishing. There are several designated cross-country ski trails that are closed to snowmobiles and other over-snow motorized travel. Rental cabins and yurts, which are accessible by snowmobile, snowshoe, or cross-country ski, allow recreationists to stay overnight on the Forest in the winter.

The Ashley National Forest has a cooperative agreement with Uinta and Daggett Counties to groom snowmobile trails on the Vernal and Flaming Gorge Ranger Districts. The most popular snowmobile groomed trail is the Red Cloud Loop on the Vernal Ranger District. From this trail, snowmobilers can access many other areas on and off the Forest. On the Green River below the Flaming Gorge Dam, anglers fish from shore or by boat throughout the winter, as the Green River does not freeze. Popular winter areas for nonmotorized recreation are Dry Fork Canyon, the Grizzly Ridge area, the Limber Flag yurt area, Buckboard Marina, Red Canyon, Green River below the Flaming Gorge Dam, and Little Hole Trail.

Trail-based Recreation

The Ashley National Forest offers a variety of motorized and nonmotorized trail-based recreation on approximately 1,200 miles of trails (Forest Service 2009b). Trail-based motorized travel is restricted to 185 miles of trails designated for motor vehicle travel. Some trails have seasonal limitations to protect natural resources, such as wildlife or riparian areas.

The Ashley National Forest also offers abundant nonmotorized opportunities on approximately 1,000 miles of nonmotorized trails, such as hiking, backpacking, climbing, horseback riding and packing, fishing, mountain and road biking, antler collecting (shed hunting), trail running, primitive camping, nonmotorized boating (kayaking, rafting, canoeing), backcountry downhill skiing, cross-country skiing, and snowshoeing. Dry Fork Canyon on the Vernal Ranger District is the most easily accessed portion of the Ashley National Forest from Vernal, Utah. Popular trail-based activities are horseback riding, hiking, and mountain biking. The more primitive settings in the Duchesne-Roosevelt Ranger District provide opportunities for hiking and backpacking in a primitive setting.

Many forest roads also serve as designated groomed snowmobile trails in the winter. Some of the most popular winter motorized recreation areas are Blind Stream, Grizzly Ridge, Oaks Parks, Deep Creek, Hickerson Park, Paradise, and Red Cloud Loop. Motorized equipment is often used for ice fishing on the Flaming Gorge Reservoir, when ice conditions allow it.

High Uintas Wilderness

Dispersed recreation in the High Uintas Wilderness is popular. This use is primarily concentrated around the multiple lake basins scattered across the south slope of the Uinta Mountains. There are 290 miles of wilderness trails on the Ashley National Forest's portion of the High Uintas Wilderness and no established campsites.

Dispersed camping is allowed subject to the following regulations:

- No camping within 200 feet of a National Forest System trail
- No camping within 200 feet of live water
- No camping within 200 feet of an occupied campsite

At 13,528 feet, Kings Peak in the High Uintas Wilderness is the highest point in Utah. It is a popular backpacking and trail-running destination. The Upper Uinta River was found to be suitable as a wild river and provides water-based recreation. The suitable segments of the Upper Uinta River include Gilbert Creek, Center Fork, and Painter Draw in the High Uintas Wilderness.

Permitted Activities

The Green River corridor, below the Flaming Gorge Dam, is a blue-ribbon trout fishery[13]. Visitors to the Green River participate in commercially guided trips. In 2015, there were 3,775 commercial fishing trips between Flaming Gorge Dam and the Little Hole day-use area (Forest Service 2017n). This area is also popular for commercial float trips; 3,345 vehicle shuttle trips between the Spillway boat launch and the Little Hole take-out indicate the popularity of commercial and self-guided float boating (Forest Service 2017n).

[13] A Blue Ribbon fishery is a designation made in the United States by government and other authorities to identify recreational fisheries of extremely high quality.

Other permitted activities are those in the Duchesne-Roosevelt Ranger District, which include outfitters and guides in the High Uintas Wilderness. The most popular wilderness trips are wilderness therapy programs.

Recreation Issues and Trends

The recreation program on the Ashley National Forest plays a key role in the social stability, environmental integrity, and economic vitality of the surrounding communities. Sustainable recreation is defined as the set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations. A sustainable recreation program is integral in protecting the natural, cultural, and scenic environment for present and future generations to enjoy. Several factors relating to societal, lifestyle, and demographic trends can affect recreation participation.

The population along the Wasatch Front and in the Uinta Basin is estimated to increase by 25 percent over the next 15 years. Smaller population increases are predicted for Uinta and Sweetwater Counties, Wyoming, and for the state of Wyoming for the same period. These are the areas where 75 percent of the Ashley National Forest visitors live (Forest Service 2017n).

Nature-based recreation is expected to increase across the U.S., but the nature and type of preferred recreation is difficult to predict. If national park visitation continues to increase, a greater number of people could alternatively choose to recreate on National Forest System lands. An estimated 15 to 30 percent growth in visitation is predicted over the next 15 years on the Ashley National Forest, based on the projected increases in regional population and demand for nature-based recreation (Forest Service 2017n).

Activities likely to show increases in overall rate of participation (as a percentage of visitation) are using motorized trails, mountain biking, cross-county skiing, and visiting developed areas for motorized and nonmotorized day-use activities (water-based, trail-based, interpretive, and viewing). Local county government and tourism councils are encouraging visitors to stay an extra night on their way to other destinations.

There are also efforts to promote mountain biking in the northern portion of the Forest, near Vernal, and statewide. This will likely contribute to increased recreation on the Ashley National Forest, especially as the most popular places, like Moab, Utah, become overcrowded. Activities likely to have the same rate of participation are visiting primitive areas, developed and dispersed camping, snowmobiling, hunting, fishing, and patronizing private providers, including resorts and outfitter-guide services.

Increasingly popular activities on the Ashley National Forest are operating side-by-side OHVs,[14] geocaching, fat-tire mountain biking, drone flying, and stand-up paddle boarding. Other unique activities, such as operating timber sled snow machines, kite skiing, and riding electronic bicycles could also emerge as important recreation uses in the future.

Changes in the level, location, and type of recreation may result in increased conflicts between recreation and other forest uses and resources, conflicts between recreation users, and the need to reallocate Forest resources to provide for desired recreation experiences.

[14] A small four-wheel drive utility-terrain vehicle or recreational off-highway vehicle that can seat 2–6 people.

Environmental Consequences for Recreation

Methodology and Analysis Process

For the forest plan revision, management direction that may lessen or worsen threats to recreation is evaluated at a programmatic level. The forest plan does not authorize site-specific projects or activities; therefore, there are no direct effects from adopting the forest plan. Direct and indirect site-specific effects will be further analyzed when future projects are proposed. Although potential short-term consequences may be described where appropriate from implementing the programmatic approach, this evaluation focuses on longer term indirect and cumulative effects that may occur over the 10- to 15-year life of the forest plan.

Analysis Assumptions

- Demand for motorized and nonmotorized land- and water-based recreation on the Ashley National Forest will continue to increase.
- Owing to local and state initiatives to promote regional recreation opportunities, nonmotorized water-based recreation, mountain biking, and other trail-based recreation will increase.
- The total acres managed as the FGNRA will not change.
- The Forest Service will continue to maintain recreation facilities and controls that contribute to the operational setting.
- Across all alternatives, there will be no changes in the type and number of special recreation permits available on the Ashley National Forest.

Indicator

- Quality and availability of recreational opportunities; this indicator reflects changes to recreation from anticipated management activities associated with each alternative; it includes the degree to which conflicts occur between different types of recreation activities
- Changes in the recreational opportunity spectrum, as measured by changes in ROS acres
- Potential for displaced recreation opportunities, as measured by acres of treatments

Environmental Consequences for Recreation Common to All Alternatives

Effects from Natural Resource Management

Two broad categories of active vegetation treatments were evaluated: timber harvest and its associated vegetation manipulation, and fire management, including prescribed fire and naturally ignited fire. See also “Environmental Consequences for Fire and Fuels.” These treatments would change scenery in forested vegetation communities, thereby indirectly affecting recreationists’ experiences in both the short term—1 to 5 year—and the long term (over 5 years). Recreationists would avoid areas of blackened and burned vegetation for overnight or long-term stays, and frequent and extensive vegetation treatments may require area closures or cause recreationists to avoid these sites. This would result in short-term adverse impacts on recreation by displacing visitors. In the longer term, these treatments would improve forest health and enhance the scenic and recreational setting.

Long-term loss of screening vegetation or forest canopy that provides shading along trails or at dispersed camping sites could also adversely affect recreation; however, areas with open canopies can also facilitate access to dispersed camping sites. Areas opened by fuel treatments or harvest may cause the increase in creation of unauthorized trails and increased off-road use.

These vegetation management practices vary in number of potential acres treated under different action alternatives and are discussed below. The range of potential burned acres by vegetation types does not vary by action alternatives (see table B-10, Potential Number of Acres Burned per Decade and Desired Severity Based on each Vegetation Type).

Environmental Consequences for Recreation—Alternative A

Effects from Recreation Opportunities and Settings

Under alternative A, the existing plan would remain in effect. Forest Service personnel would continue to use the existing ROS, and current management practices would continue as outlined in the 1986 forest plan.

Over 52 percent of the Ashley National Forest would remain in the semiprimitive motorized and roaded natural classes, and 47 percent would remain in the semiprimitive nonmotorized and primitive classes. Anticipated increased use requires an examination of the ROS, in order to ensure that the Ashley National Forest can adequately meet recreation demands and provide a variety of experiences. Without changes to management, recreation conflicts and displacement impacts may occur if demands are not met.

Effects from Designated Areas

Alternative A would include the continuation of no additional recommended wilderness. All current management areas and 31 designated areas would continue to exist as they are described in the 1986 forest plan, with the exception of the, the Ashley Karst NRGA (established in 2019). There would be two wild and scenic river segments that would be classified as suitable for inclusion in the NWSRS, totaling 48 miles. Under alternative A, the special management areas are the Sheep Creek Canyon Geologic Area and seven RNAs—Ashley Gorge, Gates of Birch Creek, Lance Canyon, Pollen Lake, Sims Peak Potholes, Timber-Cow Ridge, and Uinta Shale Creek—totaling 7,700 acres.

Recreation management would continue to provide dispersed and developed recreational opportunities and would enhance experiences by providing access, services, and facilities with other resource considerations; however, this alternative would not provide recreational opportunities that are consistent with the social, environmental, and economic resource capacity of the Ashley National Forest, as required by the 2012 Planning Rule. This is because recreation trend data and visitor use have changed dramatically over time, and issues, opportunities, and expectations are now different. Due to these changes it is difficult, now and into the future, to adequately manage the forest's recreation program by referencing a document created in the mid-1980s.

Effects from Vegetation and Fuels Management and Timber Harvest

Under alternative A, natural resource management objectives may not be adequately met and could affect the recreation experience. Lack of attainable vegetation management objectives would hinder the movement toward desired conditions, such as ecosystems that are resilient or adaptive to stressors, such as fire, insects, pathogens, and climate variability. This could lead to vegetation degradation and would affect scenic resources. Changes in vegetation type or cover due to disease or wildfire could change the accessibility and quality of recreation opportunities on the Ashley National Forest.

Environmental Consequences for Recreation—Alternative B

Effects from Recreation Management Area Designations

Alternative B includes the creation of destination recreation areas (emphasizing developed recreation experiences), backcounty recreation (emphasizing non-developed recreatoin experiences outside of designed wilderness), and general recreation areas, which allow for a range of motorized and nonmotorized use. Creation of these management areas would allow for further refinement of management for different uses compared with alternative A, and would address specific areas where many different recreation activities are concentrated. This would balance developed recreation opportunities and settings with opportunities for backcountry activities.

Table 3-77. Alternative B Recreation Management Areas

Recreation Management Area	Acres
Destination recreation areas	28,700
Backcountry recreation areas	404,200
General recreation areas	670,000

Effects from Recreation Opportunities and Settings

Compared with alternative A, alternative B acres vary only slightly, with a slight increase in motorized ROS classes (ROS roaded and ROS semi-primtive motirozed) and a shift of some acres from semi-primtive nonmotirzed to primitive ROS class. Compared with alternative A, this may provide enhanced opportunities for motorized users as well as those looking for less developed, primitive non-motorized recreation experiences. Altnerative B would also include objectives to increase and improve both motorized and nonmtorized routes, improving recreation opprotuntes for these users.

Effects from Designated Areas

Alternative B would have a greater number of designated acres, compared with alternative A, by managing two recommended wilderness areas totaling 10,300 acres. Alternative B would classify the same two wild and scenic rivers as suitable as alternative A. Recommended wilderness areas provide opportunities for natural and unconfined recreation. Recommended wilderness would create a more primitive recreational opportunity for visitors, such as providing nonmotorized trails and minimizing future development of developed recreation sites. Recommended wilderness areas under this alternative would be managed as semiprimitive nonmotorized. See figure 2-5 for the ROS map for alternative B.

Primitive recreation, including hiking and horseback riding, would be emphasized, and there would be no motorized access for recreation. Compared with alternative A, these areas would lead to additional opportunities to experience unaltered landscapes. This would allow visitors in designated and recommended wilderness areas to connect with nature and experience solitude and primitive and unconfined recreation.

Increases in recommended wilderness under alternative B would expand these forms of recreational opportunities, compared with alternative A. Recommended wilderness areas would provide opportunities for solitude and recreation in a primitive, natural setting; however, it would also include restrictions that would preclude uses, such as camping near water and mountain biking, that are otherwise compatible with the backcountry setting. This would displace certain users to locations elsewhere in the forest that do not have these restrictions. The result could be crowding, conflicts, and potential setting changes outside the wilderness areas.

User conflicts could occur as a result of decreased access to recreational opportunities. Mountain bikers may be displaced from newly recommended wilderness management areas where they are accustomed to recreating.

Effects from Vegetation and Fuels Management and Timber Harvest

Vegetation management under Alternative B would include annual treatment targets that would result in changes to sort and long-term changes to vegetation structure and related recreational settings. For example, Alternative B aims to treat 1,500 acres annually in the first decade and 1,200 acres annually in the second decade of vegetation management and naturally ignited fires would be managed on at least 10 percent of the ignitions every 10 years. Overall, wildland fire and other vegetation treatments would be used to improve or maintain desired vegetation conditions on 6,600 to 32,000 acres per year during the life of the plan. Approximately 109,700 acres are suitable for timber production under alternative B. Timber harvest focus would be to maintain or restore forest and woodland types through science-informed management specific to vegetation types over commercial extraction. This would provide long-term vegetation resilience to support ecosystem health and sustainable forest economics, compared with alternative A.

Vegetation desired conditions for more open forests would be less appealing to campers who may avoid dispersed sites with less vegetation screening. Conversely, more open park-like areas would be more visually appealing and would improve access to dispersed camping sites for such visitors as those pulling large trailers or driving recreational vehicles. User-created trails for bicycling, horseback riding, and hiking may be more likely in areas opened by fuel treatments or uncharacteristic large disturbances. Frequent and extensive vegetation treatments that elicit formal closures or cause recreationists to avoid these sites would negatively affect users' recreational experiences on the Ashley National Forest in the short term. Overall, short-term impacts on recreation would result from temporary and localized displacement of recreational opportunities during vegetation treatments. This would limit access to dispersed recreational opportunities and displace visitors. In the long term, vegetation and fuels treatments would improve forest health and enhance the recreation setting, compared with alternative A.

Mechanical thinning and prescribed burning could be consistent with managing for predominantly natural-appearing environments of primitive, semiprimitive nonmotorized, semiprimitive motorized, and roaded natural ROS classes, even though they would be visually evident; however, when compared with alternative A, these treatments could result in more open environments and changes in the quality of recreation opportunities by increasing the evidence of other users. This may not be consistent with semiprimitive nonmotorized and semiprimitive motorized ROS classes.

In contrast, primitive ROS classes would not have similar effects. This is because most of the primitive areas on the Ashley National Forest are in wilderness, where mechanical thinning could not occur, or they are in areas that receive fewer visitors; in such places the chance of encountering other users is lower.

In addition, fires that are uncharacteristically large and burn with more intensity could have effects that occur over larger areas and last longer and are thereby inconsistent with managing for predominantly natural-appearing ROS classes. Any minor inconsistencies in managing for ROS settings would persist until the evidence of modification practices, such as stumps, are not evident and vegetation desired conditions are restored.

Environmental Consequences for Recreation—Alternative C

Effects from Recreation Management Area Designations

Alternative C places a greater emphasis on backcountry recreation areas, which are focused on dispersed recreation outside wilderness areas with limited infrastructure. These management areas would manage for dispersed recreation opportunities and would establish management for roadless lands that have high conservation value. It would provide more dispersed recreation opportunities, compared with all other alternatives; however, due to restrictions on wheeled motorized travel in backcountry management areas under alternative C, motorized and mechanized (i.e. mountain bikes) recreation opportunities may be displaced.

Table 3-78. Alternative C Recreation Management Areas

Recreation Management Area	Acres
Destination recreation areas	23,000
Backcountry recreation areas	739,700
General recreation areas	340,100

Effects from Recreation Opportunities and Settings

Changes in the ROS under alternative C result from more recommended wilderness acres than alternatives A and B. Due to recommended wilderness areas being managed as primitive, the desired ROS would have fewer acres classified as semiprimitive nonmotorized than the other action alternatives; it includes over 80,000 acres shifted from semiprimitive nonmotorized to the primitive ROS class. See figure 2-6 for the ROS map for alternative C.

This alternative offers the most opportunities for recreation users seeking remote locations with few management controls on the ground, no facilities, and large areas offering solitude. Recreation users seeking developed recreation would have fewer opportunities under this alternative, compared with alternatives A and B. In addition, due to the emphasis on a primitive ROS setting, recreation users interested in both motorized and mechanized use may have fewer recreation opportunities under this alternative as compared to all other alternatives.

Effects from Designated Areas

Alternative C would manage more acres as recommended wilderness areas (50,000 more acres than alternative A). This alternative would establish four recommended wilderness areas, totaling 50,200 acres. This would expand natural and unconfined recreational opportunities more than any other alternative. Additionally, increases in recommended wilderness would decrease developed, motorized, and mechnized recreation access in those areas, compared with alternatives A and B. In addition, six river segments, totaling 59.7 miles, would be classified as suitable for inclusion in the NWSRS. Under this alternative, no miles of suitable rivers would be determined suitable for timber harvest, which would lessen impacts on recreation near these segments.

Effects from Vegetation and Fuels Management and Timber Harvest

Alternative C emphasizes passive vegetation management rather than active increased vegetation treatments. It aims to treat 1,000 acres in the first decade and 800 acres in the second decade of vegetation management. Under alternative C, naturally ignited fires would be managed on at least 20 percent of the ignitions every 10 years. Wildland fire and other vegetation treatments would be used to improve or maintain desired vegetation conditions on 6,600 to 32,000 acres per year during the life of the plan, the same as alternative B. Alternative C has the fewest acres suitable for timber production (approximately 80,500 acres) and timber harvest (93,700 acres).

Alternative C may have fewer short-term impacts on recreation than alternative B due to its emphasis on passive vegetation treatments; however, with a greater proportion of managed wildland fire, there would be an increased risk that a fire could escape, resulting in reduced quality and availability of recreational opportunities. See alternative B for short-term and long-term impacts from vegetation treatments.

Environmental Consequences for Recreation—Alternative D

Effects from Recreation Management Area Designations

Compared with all alternatives, management under alternative D would be more focused on developed recreation opportunities and settings. Impacts would be similar to those under alternative B; however, there would be an even greater emphasis on general recreation areas and destination areas, as opposed to backcountry recreation. Management would emphasize motorized access, developed opportunities, and management controls to support these opportunities and experiences. For nonmotorized users, the setting would be less compatible and there would be the potential for conflicts with motorized uses. In addition to the increased acres of destination recreation area management, alternative D would consider expanded campgrounds to accommodate trailers and OHV users. Expanded campgrounds would increase and improve recreation opportunities for developed camping and OHV users.

Table 3-79. Alternative D Recreation Management Areas

Recreation Management Area	Acres
Destination recreation areas	34,100
Backcountry recreation areas	299,000
General recreation areas	769,800

Effects from Recreation Opportunities and Settings

Impacts are similar to those described under alternative A, since alternative D does not change management for any existing designated areas. It does not designate new areas, such as recommended wilderness areas or wild and scenic rivers. Alternative D has a slightly higher number of rural acres, classifying 34,000 acres as rural ROS. Recreation emphasis in these areas is on high-intensity activities, supported by facilities, motorized access, and management controls, such as signs and guided tours. Increased motorized access would occur in semiprimitive motorized and roaded natural ROS areas. See figure 2-7. In general, this would intensify recreational use in these areas, and there would be a distinct shift in the ROS.

Effects from Designated Areas

Effects would be the same as described under alternative A.

Effects from Vegetation and Fuels Management and Timber Harvest

Alternative D aims to treat 1,600 acres in the first decade and 1,300 acres in the second decade of vegetation management. Approximately 114,300 acres are suitable for timber production and 189,400 for timber harvest under alternative D. Under alternative D, naturally ignited fires would be managed on at least 5 percent of the ignitions every 10 years. Wildland fire and other vegetation treatments would be used to improve or maintain desired vegetation conditions on 10,000 to 40,000 acres per year during the life of the plan.

Alternative D allows for minimum impact suppression tactics only in wilderness. The intent is to manage fire to protect developed resources. There would be limited focus on moving vegetation toward desired conditions.

Likewise, alternative D would have a greater impact on recreation than alternative B due to its focus of treatment near heavily visited, developed areas; however, due to management actions being based on current best available science and techniques, alternative D would improve access to recreational opportunities, compared with alternative A. Impacts would be greatest near developed recreation areas, compared with alternative B.

Alternative D has more emphasis on commodity timber harvest but would still use vegetation treatments that would improve recreational access, compared with alternative A. See alternative B for short-term and long-term impacts from vegetation treatments.

Cumulative Environmental Consequences for Recreation

Recreational uses on national forest lands are expected to continue to increase, as more people nationwide continue to look for places to recreate. The Ashley National Forest is a regional destination for the greater Wasatch Front and a stopover for people traveling between nearby national parks. As more people venture onto public lands, differing societal desires and ideas of what recreation opportunities public lands should provide will continue to influence public land management policy.

Current management under alternative A is not able to adequately address increases in visitation and use. Management focused on primitive recreation, such as under alternative C, would not meet demand for motorized and mechanized recreation that is being promoted by local governments and regional tourism groups. Alternative B would balance developed recreation opportunities and settings with opportunities for backcountry activities to address increased in demands for both developed and dispersed recreation opportunities. Alternative D would address the demand for developed recreation but may not meet needs for those looking for a more primitive recreation experience, due to its emphasis on motorized access and developed facilities. Cooperation and funding for development and maintenance from other agencies, organizations, and local governments would continue to be necessary to meet public demands.

Reasonably foreseeable future actions on the Ashley National Forest relevant to this analysis are as follows:

- OHV and ATV trail construction and rerouting projects such as the Badlands Trail Project, Big Brush Creek-Outlaw ATV Trail Reroute Project, and Highline ATV Trail Reroute Projects
- Future vegetation management projects, including restoration projects and fuels treatments
- The Ashley Karst NRGA Management Plan

OHV and ATV trail construction and rerouting projects would increase short-term impacts on recreation access from construction and closures under all alternatives; however, they would lead to improved recreational opportunities and availability in the long term. Future vegetation management projects could result in instances of displaced recreation opportunities in the short-term, but would improve the quality of recreation opportunities in the long term. For motorized and mechanized recreational users, these cumulative impacts would be greatest under alternative C.

The Ashley Karst NRGA Management Plan could result in cumulative recreational impacts if certain activities such as motorized recreation are restricted. The extent and magnitude of these cumulative impacts is unknown.

Scenic Resources

Introduction

Scenery as well as other natural resources must be cared for and managed in order to maintain quality scenery for future generations. Scenery varies, depending on existing natural features, including vegetation, water features, landform, and geology, along with the cultural features and human alterations found in the landscape (such as buildings or manipulations of the land or vegetation). Cultural features and human alterations may contribute to scenic character when these elements have historic backgrounds, have nostalgic connotations, reflect the cultural legacy of an area, or create a visually pleasing complement to the natural character of the landscape (Hill 2019).

Regulatory Framework

In 1995, the U.S. Forest Service updated the Visual Management System (VMS) to the Scenery Management System (SMS). The VMS (Forest Service 1974) had been used since the mid-1970s as the analysis tool for managing scenic resources and determining effects on scenery from proposed activities.

The VMS and SMS are both structured to primarily emphasize natural appearing scenery, but the SMS recognizes the positive scenic values associated with some human modified (cultural) features and settings that are valued for their scenic influence. The SMS provides a systematic approach for determining the relative value and importance of scenery in National Forest System lands. Ecosystems provide the environmental context for the SMS, recognizing that a landscape is a dynamic and constantly changing community of plants and animals. The SMS also provides for improved resource integration of aesthetics, biological, physical, social, and cultural resources (Forest Service 2020k, 1995).

The VMS was used in the current forest plan (1986) to identify visual quality objectives (VQOs) for the Ashley National Forest (Forest Service 1986). The 1986 forest plan VQOs represent Ashley National Forest management direction to ensure that visitors are afforded views of natural-looking landscapes when seen from popular travel way and developed recreation sites and where other visitor use is concentrated. The VQOs represent a combination of three visual components: landscape variety classes, distance zone, and viewer sensitivity. These ratings describe the level of visual variety or diversity of a landscape, areas of landscapes denoted by specified distances from an observer, and the observer’s degree of interest in the visual qualities of the landscape (Buerkle 2017).

Agriculture Handbook 701, Landscape Aesthetics: A Handbook for Scenery Management (Forest Service 1995), defines the SMS for the inventory and analysis of the aesthetic values of National Forest System lands. The SMS represents the Forest Service’s latest science in managing scenic resources and achieving high-quality scenery. It provides an overall framework for the orderly inventory, analysis, and management of scenery. It is a tool for integrating the benefits, values, desires, and preferences regarding aesthetics and scenery for all levels of land management planning. The SMS integrates increased understanding of ecological settings and resiliency concepts, disturbance patterns, and cultural landscapes in identifying the effects of various management practices on scenic resources (Hill 2019).

Forest Service Manual 2380 (Forest Service 2003) requires the agency to inventory, evaluate, manage, and, where necessary, restore scenery as a fully integrated part of the ecosystems of National Forest System lands and the land and resource management and planning process. Scenery must be treated equally with other resources. Forest Service Manual 2380 specifies the use of the basic concepts, elements, principles, and variables defined in Agriculture Handbook 701 (Buerkle 2017).

Additional regulatory framework is described in the SMS Inventory Report, Ashley National Forest Land Management Plan Revision (Hill 2019) and is incorporated by reference. It contains descriptions of how NEPA and other laws, such as the Wilderness Act (1964), the 2012 Planning Rule, Forest Service Manual 1920, and other USDA handbooks influence the management of scenic resources on National Forest System lands.

Analysis Areas

The analysis area for scenic resources is the National Forest System lands on the Ashley National Forest (decision area). Also included, for cumulative considerations, are adjacent lands managed by entities other than the Forest Service.

Description of Affected Environment

The Ashley National Forest is comprised of diverse landscapes covering about 1.4 million acres in northeastern Utah and southwestern Wyoming. Although most of it is in the Uinta Mountain Range, the Ashley National Forest's diverse landscapes span three different landform types: the Uinta Mountains, the Green River Basin, and Tavaputs Plateau (Hill 2019).

The scenery of the Ashley National Forest is among the amenities contributing to lifestyles and tourism in southwestern Wyoming and northeastern Utah. Ashley National Forest lands provide a scenic backdrop for the travel, work, and play of daily life for area residents. The Ashley National Forest's scenery contributes to casual and inexpensive recreation experiences near home and contributes to a general sense of well-being, security, and constancy (Buerkle 2017).

National visitor use monitoring data show that viewing natural features (37 percent) and driving for pleasure (24 percent) are main recreational activities (Forest Service 2017n). Viewing scenery is a direct component of these activities. More detailed descriptions of the scenic character of the forest are provided in SMS Inventory Report, Ashley National Forest Land Management Plan Revision (Hill 2019, p. 3) and Ashley National Forest Assessment, Scenery Report (Buerkle 2017, pp. 1 and 5-35); these reports are incorporated here by reference.

The U.S. Secretary of Transportation recognizes certain roads as national scenic byways, based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. In addition, there are other scenic byways formally recognized by states. The two scenic byways on the Ashley National Forest decision area are the Dinosaur Diamond Scenic Byway (11.8 miles in the decision area) and Flaming Gorge-Uintas Scenic Byway (53.6 miles in the decision area) (Forest Service GIS 2020). Also, the Red Cloud Loop Scenic Backway is 36.2 miles in the decision area, and the Sheep Creek Scenic Backway is 11.4 miles in the decision area. Conserving scenic values is also a purpose of the FGNRA and Ashley Karst NRGA.

VMS VQOs are measurable standards or objectives for the management of scenery on National Forest System lands. The inventoried VQOs in the current forest plan are preservation, retention, partial retention, modification, and maximum modification (Buerkle 2017). VMS VQO acres for the forest are presented in table 3-80 and are shown in figure 2-8.

Table 3-80. Acres of Visual Quality Objective in the Analysis Area

Visual Quality Objective	Acres	Percentage of Analysis Area
Preservation	243,200	18
Retention	457,700	33
Partial retention	304,400	22
Modification	351,000	26
Maximum modification	15,000	1

Source: Forest Service GIS 2020

In 2009 and 2018 Ashley National Forest personnel completed SMS inventories as part of the plan revision process to map scenic resource conditions. SMS inventories are described in detail in SMS

Inventory Report, Ashley National Forest Land Management Plan Revision (Hill 2019). The Ashley National Forest Assessment, Scenery Report (Buerkle 2017) describes scenic character, scenic integrity, and trends affecting scenery on the Ashley National Forest. As part of a forest plan revision process, the SMS inventory and other resource considerations were used to develop scenic integrity objectives (SIOs) and other plan components and guidance in the proposed forest plan and alternatives.

Environmental Consequences for Scenic Resources

Methodology and Analysis Process

This section discloses and evaluates the potential environmental consequences to scenic resources. The analysis considers how each alternative provides for scenery management. The analysis area for scenic resources is National Forest System lands on the Ashley National Forest (decision area). Also included for cumulative considerations are adjacent lands managed by entities other than the Forest Service. Criteria for evaluating the potential level of alteration to the landscape are measured by acres of either a VQO or SIO on National Forest System lands under each alternative; they are accompanied by a qualitative discussion of the potential effects on scenic resources from management activities. Because this analysis is for lands on the Ashley National Forest, it is a programmatic analysis, instead of a site-specific analysis.

Analysis Assumptions

The following assumptions are specific to scenic resources in this analysis:

- For the no action alternative, the VMS's terminology of "VQOs" identified in the current plan and other current plan direction will be used to manage scenery. To describe and compare the environmental consequences, this analysis uses the SMS's terminology of SIOs for all action alternatives. The terminology crosswalk from the VMS's VQOs to the SMS's SIOs is outlined in table 3-81. The VQO objectives are defined in Buerkle 2017.
- The principles of scenery management and environmental design will be applied in project-level planning in all Forest Service management activities.
- Scenery management techniques and principles will be used to mitigate any future site-specific land-altering activity or introduced elements on the land, to achieve and maintain desired SIOs and desired scenic character. Scenery inventory GIS data layers will be reviewed during future project-level analysis and updated, based on ground-truthing, to keep the data layers accurate and relevant.
- Managing for natural-appearing scenery is important to the public.
- Natural changes to forest conditions will continue and these changes will have a dynamic effect on the scenery of the Ashley National Forest.
- The SIOs proposed for each alternative assume that vegetation will continue to evolve and be affected by various factors, such as fire, insects, drought, and disease. Also, the wildland urban interface areas will continue to expand and become more developed. This may increase both the need to address fuel buildup around properties under other ownership, as well as pressure to protect aesthetics associated with landowners' sense of place.
- Changes in scenery and changes in public expectations related to landscape aesthetics and scenery will be monitored and documented (Forest Service Manual 2382—Scenery Management).

Table 3-81. Terminology Crosswalk from Visual Management System to Scenery Management System

Visual Management System's Visual Quality Objectives	Scenery Management System's Scenic Integrity Objectives	Perception of Scenery
Preservation	Very high	The landscape is intact with only minor changes from the valued attributes described in the scenic character; naturally evolving.
Retention	High	Management activities are unnoticed, and the landscape appears unaltered.
Partial retention	Moderate	The landscape appears slightly altered; management activities are noticeable but are subordinate to the scenic character; relatively naturally appearing.
Modification	Low	The landscape appears altered. Management activities are evident and sometimes dominate, but they are designed to blend with surroundings by repeating form, line, color, and texture of attributes described in the scenic character.
Maximum modification	Very low	Describes landscapes that are heavily altered and in which the valued attributes described in the scenic character are not evident. Forest Service Manual 2310 states that very low is used only to describe the existing scenic integrity; it is not used as an SIO or desired condition.

Source: Forest Service 1974, 1995, 2020f

- Changes in public expectations related to landscape aesthetics and scenery will most likely be monitored at a regional or national level but may also be assessed during scoping for site-specific projects and review of current research when completing scenery analyses for site-specific projects.

Indicators

The analysis indicator for scenic resources is the acres of VQOs under alternative A and acres of SIOs under the action alternatives. Table 3-82 lists scenery management acres by alternative.

Table 3-82. Scenery Management by Alternative

Visual Quality Objective/Scenic Integrity Objective	Alternative A (acres)	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)
Preservation/Very high	243,200	283,900	323,600	273,600
Retention/High	457,700	436,100	686,300	240,000
Partial retention/Moderate	304,400	423,600	320,400	596,100
Modification/Low	351,000	232,600	45,900	266,500
Maximum modification/Very Low	15,000	0	0	0

Source: Forest Service GIS 2020

Environmental Consequences for Scenic Resources Common to All Alternatives

Each alternative provides for scenery management to varying degrees, with either current VQOs or proposed SIOs. They provide management direction for activities that modify or maintain the landscape, including sustainable recreation, designated areas, fire and fuels management, vegetation management, and timber harvest; however, negative impacts on the scenery may result where mitigation to meet the assigned objective is considered technically or economically infeasible. The objectives and associated plan components would not directly prohibit any on-the-ground work, but they may influence the design or the location of projects to meet or exceed the lowest allowable level of scenic integrity. The effects on scenery would be determined during a project-level analysis. Scenic management direction and scenic integrity objectives would influence the outcome of management activities throughout the life of the plan, providing for more natural or altered scenic character depending on the SIO assigned.

Environmental Consequences for Scenic Resources—Alternative A

Table 3-80, above, shows the acreage for the VQOs assigned to the forest by the current forest plan (1986; see figure 2-8). There would be no change in how scenery is currently managed on the forest. VQOs would continue to be used and are based on the degree of acceptable change to the visual character.

About 51 percent of the forest would continue to be assigned preservation or retention VQOs, where the management emphasis would maintain or enhance the visual character. Overall, scenic resources would be maintained in preservation or retention VQOs where changes would not be noticeable to the casual observer. This would be less change than under alternative D because of the greater acreage in the preservation or retention VQOs (equivalent to high or very high SMS SIOs)

About 22 percent of the forest would continue to be assigned a partial retention VQO, where the valued scenic character appears slightly altered and deviations must remain visually subordinate.

Using the VMS, 27 percent of the forest would continue to be managed with a modification or maximum modification VQO. Under this, the valued scenic character appears moderately to strongly altered, and deviations begin to dominate; management activities may dominate or disrupt the scenic character.

The 1986 forest plan direction for scenery management does not incorporate ecosystem management concepts into scenery management. This makes it difficult for managers to plan projects and work toward an improved scenic resource condition. For example, healthy, fire-resistant vegetation is important for long-term scenic quality and scenic character resilience, such as under conditions that allow fires to move through the landscape without doing major damage and that recover relatively quickly from fire.

Maps with VQOs would continue to be used during project planning. These maps do not reflect changes in visitor use patterns, do not incorporate views from trails, do not reflect current public opinion, and do not reflect an ecosystem management landscape context. Additionally, VQOs do not recognize the cultural importance of traditional cultural properties and some human modifications, including prehistoric sites, historic sites, and human-made features, such as campgrounds; therefore, VQOs do not provide adequate or integrated resource guidance for maintaining or protecting scenic quality when compared with the action alternatives.

The Forest Service would continue to return fire to the ecosystem, reduce hazardous fuels, and maintain historical fire regimes. There would continue to be no acre targets proposed for fuels treatment to improve or maintain desired vegetation conditions. As a result, there would continue to be greater opportunity for a catastrophic wildfire to dramatically change scenic resources, especially in areas with dense vegetation that is outside the natural range of variability.

In alternatives B, C, and D, the landscape characteristics for the different subareas on the Ashley National Forest are provided in the proposed forest plan, appendix E, attachment F. They tie to the ranger districts or geographic areas of the Ashley National Forest. This description of desired scenic character is not a component of alternative A, thereby hindering informative decision-making when managing scenery.

Forest Service personnel would continue to use the existing ROS, and current management practices would continue as outlined in the 1986 forest plan. Without updating the ROS, the Ashley National Forest would struggle to adequately meet recreation demands in a way that also balances the desired scenic integrity. This would continue to degrade the scenic integrity where recreational activities are incompatible with scenery management.

Alternative A would continue to designate 528,000 acres as suitable for timber production. This would alter the scenic character where timber production occurs because of the presence of timber management activities and areas with reduced vegetation. These impacts would be mitigated to meet the assigned VQOs; however, visitor expectations may not be met if areas with a modification or maximum modification VQO have increased visitor use and more concern for natural-appearing scenery. As reforestation progresses, these adverse impacts would diminish. However, this level of timber production does not account for policy changes, particularly under the 2001 Roadless Rule; thus, this level of timber production is currently not achievable.

Alternative A would continue to have 912,000 acres open to livestock grazing. The scenic character of areas open to livestock grazing would continue to be affected, such as through changes in vegetation condition and the presence of range improvements. Management activities such as livestock grazing also contribute to pastoral scenery and cultural heritage values.

Alternative A would continue to not have an objective related to prioritizing easements for providing access to the national forest. Nevertheless, the Forest Service would continue to manage the development of easements according to VQOs, which are based on the degree of acceptable change to the visual character.

Environmental Consequences for Scenic Resources—Alternative B

Under alternative B, SIO acres would be assigned to the forest, as shown in table 3-83 (see figure 2-9). Alternative B would increase the number of acres in areas where the management emphasis would maintain or enhance the valued scenic character. This is because 53 percent of the lands would have high or very high SIOs under alternative B, compared with 51 percent under alternative A. Very high SIO is assigned to designated wilderness and recommended wilderness. High SIO is assigned to high-concern-level travel ways, recreation sites, and cultural and historic sites in the foreground (0–0.5 mile) and middleground (0.5–4 miles) distance zone viewsheds.

Table 3-83. Acres of Scenic Integrity Objective in the Analysis Area—Alternative B

Alternative A			Alternative B		
Visual Quality Objective	**Acres**	**Percentage of Analysis Area**	**Scenic Integrity Objective**	**Acres**	**Percentage of Analysis Area**
Preservation	243,200	18	Very high	283,900	21
Retention	457,700	33	High	436,100	32
Partial retention	304,400	22	Moderate	423,600	31
Modification	351,000	26	Low	232,600	17
Maximum modification	15,000	1	Very low	0	0

Source: Forest Service GIS 2020

Alternative B would also increase the number of acres in areas where the valued scenic character appears slightly altered and deviations must remain visually subordinate. This is because 31 percent of the lands would have a moderate SIO under alternative B, compared with 22 percent under alternative A.

Alternative B would reduce the number of acres in areas where the valued scenic character appears moderately to strongly altered and deviations begin to dominate. This is because 17 percent of the lands would have very low or low SIOs under alternative B, compared with 27 percent under alternative A.

Between 6,600 and 32,000 acres per year would be managed for fuels treatment to improve or maintain desired vegetation conditions. This would establish vegetation conditions appropriate to the forest. It would also establish conditions that would lessen opportunities for a catastrophic wildfire. These would maintain and enhance scenic character attributes (such as live tree cover, large trees, and scenic vistas) and improve the long-term scenic quality and scenic character resilience, compared with alternative A.

Through integration with other resources, SIOs were mapped and desired scenic character is described for the forest plan analysis area. Plan components contain guidelines for vegetation management activities, new project activities, and new landscape modifications to meet SIOs. SIOs establish limits of acceptable human alterations as the landscape moves toward a landscape character goal. The landscape characteristics for the different subareas on the Ashley National Forest are provided in appendix E, attachment F. They are a description of desired scenic character for the forest. Alternative A has outdated objectives and desired scenic character.

Unlike alternative A, alternative B utilizes the SMS to determine the relative value, stability, resiliency, and importance of scenic values. The SMS recognizes natural disturbance processes, such as fire, insects, and disease, as part of the natural landscape that are dynamic and important in maintaining healthy, sustainable, and scenic landscapes. Under alternative B, the SIOs were reviewed and modified, as appropriate, to follow scenic character guidelines based on the proposed ROS and recreation management areas, per the guidelines of the 2012 Planning Rule. Compared with alternative A, this would improve scenery management with respect to the ROS.

Alternative B would designate 109,800 acres as suitable for timber production. This would alter the scenic character where timber production occurs because of the presence of timber management activities and areas with reduced vegetation, however, the scenery plan components and SIOs provide guidance for the desired outcomes for scenery management. As reforestation progresses, these adverse impacts would diminish. This would occur on 418,200 fewer acres, compared with alternative A.

The impacts on scenic resources in areas open to livestock grazing would be the same as those described under alternative A.

The impacts on scenic resources from the development of easements would be the same as those described under alternative A.

Environmental Consequences for Scenic Resources—Alternative C

Under alternative C, SIO acres would be assigned to the forest, as shown in table 3-84 (see figure 2-10). Alternative C would increase the number of acres in areas where the management emphasis would maintain or enhance the valued scenic character. This is because 74 percent of the lands would have high or very high SIOs, compared with 51 percent under alternative A. Very high SIO is assigned to designated wilderness and recommended wilderness. High SIO is assigned to high- and moderate-concern-level travel ways, recreation sites, and cultural and historic sites in the foreground (0–0.5 mile) and middleground (0.5–4 miles) distance zone viewsheds.

Table 3-84. Acres of Scenic Integrity Objective in the Analysis Area—Alternative C

Alternative A			Alternative C		
Visual Quality Objective	Acres	Percentage of Analysis Area	Scenic Integrity Objective	Acres	Percentage of Analysis Area
Preservation	243,200	18	Very high	323,600	24
Retention	457,700	33	High	686,300	50
Partial retention	304,400	22	Moderate	320,400	23
Modification	351,000	26	Low	45,900	3
Maximum modification	15,000	1	Very low	0	0

Source: Forest Service GIS 2020

Alternative C would reduce the number of acres in areas where the valued scenic character appears moderately to strongly altered and deviations begin to dominate. This is because 3 percent of the lands would have very low or low SIOs under alternative C, compared with 27 percent under alternative A.

The impacts from the proposed fuels treatment to improve or maintain desired vegetation conditions would be the same as those under alternative B.

The impacts on scenic resources from establishing SIOs, scenery plan components included in the forest plan, and desired scenic character (appendix E, attachment F) would be the same as those under alternative B.

In addition, the impacts on scenic resources from the SIOs and ROS would be the same as those under alternative B.

Alternative C would designate 80,500 acres as suitable for timber production. This would alter the scenic character where timber production occurs because of the presence of timber management activities and areas with reduced vegetation, however, scenery plan components and SIOs provide guidance for the desired outcomes for scenery management. As reforestation progresses, these adverse impacts would diminish. This would occur on 447,500 fewer acres compared with alternative A.

Alternative C would have 899,000 acres open to livestock grazing. The scenic character of areas open to livestock grazing would be affected, such as through changes in vegetation condition and the presence of range improvements. Management activities such as livestock grazing also contribute to pastoral scenery and cultural heritage values. This would occur on 13,000 fewer acres compared with alternative A.

Every 5 years, the Forest Service would consider and prioritize easements identified and agreed upon by state and county governments and private landowners, for providing access to the national forest. This would provide the Forest Service with more opportunities to plan for changes that affect the visual character, compared with alternative A.

Environmental Consequences for Scenic Resources—Alternative D

Under alternative D, SIO acres would be assigned to the forest, as shown in table 3-85 (see figure 2-11). Only 17 percent of the forest would be assigned a high SIO, where the management emphasis would maintain the valued scenic character, compared with 33 percent under alternative A. Very high SIO is assigned to designated wilderness. High SIO is assigned to high-concern-level travel ways, recreation sites, and cultural and historic sites in the foreground (0–0.5 mile) distance zone viewsheds.

Table 3-85. Acres of Scenic Integrity Objective in the Analysis Area—Alternative D

Alternative A			Alternative D		
Visual Quality Objective	Acres	Percentage of Analysis Area	Scenic Integrity Objective	Acres	Percentage of Analysis Area
Preservation	243,200	18	Very high	273,600	20
Retention	457,700	33	High	240,000	17
Partial retention	304,400	22	Moderate	596,100	43
Modification	351,000	26	Low	266,500	19
Maximum modification	15,000	1	Very low	0	0

Source: Forest Service GIS 2020

Alternative D would also increase the number of acres in areas where the valued scenic character appears slightly altered and deviations must remain visually subordinate. This is because 43 percent of the lands would have a moderate SIO under alternative D, compared with 22 percent under alternative A.

Alternative D would reduce the number of acres in areas where the valued scenic character appears moderately to strongly altered and deviations begin to dominate. This is because 19 percent of the lands would have very low or low SIOs under alternative D, compared with 27 percent under alternative A.

Between 10,000 and 40,000 acres per year would be managed for fuels treatment to improve or maintain desired vegetation conditions. This would establish vegetation conditions appropriate to the forest. It would also establish conditions that would lessen opportunities for a catastrophic wildfire. These would maintain and enhance scenic character attributes (such as live tree cover, large trees, and scenic vistas) and improve the long-term scenic quality and scenic character resilience, compared with alternative A.

The impacts on scenic resources from establishing SIOs, scenery plan components included in the forest plan, and desired scenic character (appendix E, attachment F) would be the same as those under alternative B.

In addition, the impacts on scenic resources from the SIOs and ROS would be the same as those under alternative B.

Alternative D would designate 114,300 acres as suitable for timber production. This would alter the scenic character where timber production occurs because of the presence of timber management activities and areas with reduced vegetation, however, the scenery plan components and SIOs provide guidance for the desired outcomes for scenery management. As reforestation progresses, these adverse impacts would diminish. This would occur on 413,700 fewer acres compared with alternative A.

The impacts on scenic resources in areas open to livestock grazing would be the same as those under alternative A.

The Forest Service would annually consider and prioritize easements identified and agreed upon by state and county governments and private landowners, for providing access to the national forest. This would provide the Forest Service with more opportunities to plan for changes that affect the visual character, compared with alternative A.

Cumulative Environmental Consequences for Scenic Resources

Reasonably foreseeable future actions on and near the Ashley National Forest involve varying types of development and infrastructure, which can add artificial elements to undeveloped or natural areas. These actions include general land management planning (by counties or other Federal agencies), ROWs, and mineral development, such as the Uinta Basin Railway Project, the Wyoming Pipeline Corridor Initiative Project, and the Simplot Fringe Lease. Activities outside the forest would have the greatest impact on scenery along the boundary of the forest. The timing and nature of the impacts involving activities outside the forest are largely unknown.

Some reasonably foreseeable future actions involve vegetation management, which can diminish landscape conditions in the short term from changing vegetation features in order to improve landscape conditions in the long term. These actions include forest restoration, habitat improvement, fuels treatment, and forest restoration in areas damaged by beetles.

Other reasonably foreseeable future actions involve recreation, such as the Ashley Karst NRGA Management Plan. These actions can add artificial elements to undeveloped or natural areas from recreation trails and infrastructure. They can also restrict actions, thereby maintaining undeveloped or natural areas. Additionally, recreation management actions can encourage visitors concerned about landscape conditions to visit the forest.

Each alternative provides for scenery management to varying degrees, with either current VQOs or proposed SIOs. They provide management direction for activities that modify or maintain the landscape, including sustainable recreation, designated areas, fire and fuels management, vegetation management, and timber harvest. The objectives and associated plan components would not directly prohibit any on-the-ground work; but they may influence the design or the location of projects to meet or exceed the lowest allowable level of scenic integrity. The effects on scenery would be determined during project-level analysis.

All action alternatives would provide for certain scenery management improvements. They would include ecosystem management concepts, incorporate desired scenic character (appendix E, attachment F) in scenery management, address recreation management areas per the guidelines of the 2012 Planning Rule, and consider timber production with respect to the 2001 Roadless Rule. These would have beneficial cumulative impacts that would not occur under alternative A.

Alternative C would provide for the most natural and natural-appearing scenic character with management activities blending with the characteristic landscape; this is because 74 percent of lands would have high or very high SIOs. It would also have the fewest acres open to livestock grazing and the fewest acres suitable for timber production. Therefore, when combined with the impacts described above from reasonably foreseeable future actions, alternative C would have the fewest cumulative impacts on the scenic character.

Alternative D would provide for a more slightly altered or altered scenic character, and management activities may be more noticeable with the most cumulative changes. This is because only 37 percent of lands would have high or very high SIOs. Alternatives A and B are relatively similar with respect to high or very high SIOs (or retention or preservation SQOs); however, alternative B would have fewer cumulative changes to the landscape than alternative A. This is because 31 percent of the lands would have a moderate SIO under alternative B, compared with 22 percent under alternative A.

Land Status and Ownership and Special Uses

Introduction

Within the Ashley National Forest's boundaries, landownership (containing surface and subsurface) includes public lands managed by the Forest Service, private inholdings, and Utah State lands. Land status is determined by legal regulations, restrictions, and permissions on how the land is used or managed for use, including planning, zoning, easements, and other legal designations. Landownership status on National Forest System lands can be changed through land adjustments. Under the land adjustment programs, the Forest Service acquires and consolidates key tracts of non-Federal land to conserve valuable natural habitat, reduce the risk of permanent development in sensitive areas, and enhance public recreation opportunities.

Land use on the Ashley National Forest varies based on landownership and status. With the exception of specific terms regarding water systems and permitting processes, the Forest Service cannot dictate use within private inholdings or on State land; however, the Forest Service must take these lands into consideration during planning and when making management decisions within the plan area. Current land use on lands managed by the Forest Service is based on current land allocations and permitted uses within existing land management plans.

Lands special uses require special-use authorizations and permits for recreation uses or land and/or mineral development activities.

Regulatory Framework

The following is a select set of statutory authorities that govern landownership adjustments and the issuance and administration of special-use authorizations. They are briefly identified and described below to provide context to the management and evaluation of these resources. There are multiple other laws, regulations, and policies not described below that also guide the management of these programs; Forest Service Manuals 2700, 5400, and 5500 provide a comprehensive listing.

Organic Administration Act of June 4, 1897 (16 USC 477-482, 551)—This act authorizes the Secretary of Agriculture to issue rules and regulations for the occupancy and use of the national forests. This is the basic authority for authorizing use of National Forest System lands for other than rights-of-way (ROWs).

Occupancy Permits Act of March 4, 1915 (16 USC 497 et seq.), as amended—This act authorizes use and occupancy on National Forest System land for recreational purposes, including resorts and recreation residences.

General Exchange Act of March 20, 1922 (16 USC 485, 486)—This act authorized the Forest Service to consolidate its holdings in national forests where a large percentage of private lands were intermingled with National Forest System lands. It made possible the exchange of inholdings within national forests for private lands of equal value and within the same state.

Highway Act of August 27, 1958 (23 USC 317), supplemented by the Highway Safety Act of October 15, 1966 (49 USC 1651)—This act authorizes the Federal Highway Administration to grant easements to States for highways that are part of the Federal-Aid System or that are constructed under the provision of chapter 2 of the Highway Act. The Forest Service consents to the grant of these easements in a form agreed upon by the two agencies and upon the State highway agency's execution of stipulations. This is the only authority for granting ROWs for projects on the Federal-Aid System or projects constructed under the provisions of chapter 2 of the Highway Act (Forest Service Manual 2731).

National Forest Roads and Trails Act of October 13, 1964 (16 USC 532-38)—This act authorizes the Secretary of Agriculture to grant temporary or permanent easements to landowners who join the Forest Service in providing a permanent road system that serves lands administered by the Forest Service and lands or resources of the landowner. It also authorizes the grant of easements to public road agencies for public roads that are not a part of the Federal-Aid System (Forest Service Manual 2732).

The Act of November 16, 1973 (30 USC 185), amending Section 28 of the 1920 Mineral Leasing Act—This act authorizes the Forest Service to issue authorizations for oil and gas pipelines and related facilities located wholly on National Forest System land. When the lands are under the jurisdiction of two or more Federal agencies, authority for issuance is reserved to the United States Department of the Interior and BLM, subject to approval by the agencies involved.

Federal Land Policy and Management Act of October 21, 1976 (43 USC 1761–1771)—Title V of FLPMA authorizes the Secretary of Agriculture to issue permits, leases, or easements to occupy, use, or traverse National Forest System lands. FLPMA directs the United States to receive fair market value unless otherwise provided for by statute and provides for reimbursement of administrative costs in addition to the collection of land use fees (43 USC 1764(g)). This act also establishes policy for the exchange of lands under uniform procedures and that the lands exchanged be consistent with the prescribed mission of the agency.

Alaska National Interest Lands Conservation Act of 1980 (16 USC 3210)—This act provides numerous authorities related to access that are specific to national forests in Alaska. The provisions of section 1323(a) (16 USC 3210) apply to all National Forest System lands. This section provides that, subject to terms and conditions established by the Secretary of Agriculture, the owners of non-Federal land within the national forest shall be provided adequate access to their land. Regulations implementing section 1323(a) are set forth at 36 CFR 251, Subpart D—Access to Nonfederal Lands. See Forest Service Manual 2701.3, paragraph 3, for the summary of the provisions of 36 CFR 251, Subpart D.

Small Tracts Act of January 12, 1983 (16 USC 521c–521i)—This act authorizes the sale, exchange, or interchange of certain parcels of minimal size.

Photographic Activities on Federal Lands Act of May 26, 2000, (16 USC 406l-6d)—This act supplements the authority of the Secretary of Agriculture to regulate commercial filming and still photography on National Forest System lands. It also authorizes the secretary to retain and spend land use fees collected for commercial filming and still photography without further appropriation, and it provides for recovery of administrative and personnel costs in addition to the collection of the land use fee.

Executive Order 13604—Improving Performance of Federal Permitting and Review of Infrastructure Projects, issued March 22, 2012—This EO states that "it is critical that executive departments and agencies take all steps within their authority, consistent with available resources, to execute Federal permitting and review processes with maximum efficiency and effectiveness. . ."

Energy Policy Act of 2005, Section 1211(c), Access Approvals by Federal Agencies (August 8, 2005, Public Law 109-58)—This act states, "Federal agencies responsible for approving access to transmission and distribution facilities located in the United States shall expedite any Federal agency approvals that are necessary to allow the owners or operators of such facilities to comply with reliability standards regarding vegetation management, electric service restoration, or resolution of situations that imminently endanger the reliability or safety of the facilities."

Executive Order 13212—Actions to Expedite Energy-Related Projects, issued May 18, 2001—This EO directs executive departments and agencies to take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy.

The following regulations provide direction for special uses management on National Forest System lands: **36 CFR 251—Land Uses** and **36 CFR 254—Landownership Adjustments**.

Analysis Area

The analysis area includes all lands within the proclaimed boundaries of the Ashley National Forest. These lands are divided into four distinct areas, based on the existing ranger district boundaries: Flaming Gorge Unit, Vernal Unit, Duchesne -Roosevelt North Unit, and Duchesne-Roosevelt South Unit (table 3-86 and figure 1-1). For the purpose of this analysis, Duchesne-Roosevelt has been separated into North and South areas. The cumulative analysis will also include lands adjacent to the forest boundaries.

Description of Affected Environment

There are 1,400,282 acres of National Forest System lands, 21,074 acres of private land, and 1,720 acres of State land within the boundaries of the Ashley National Forest (see table 3-86).

Table 3-86. Landownership Acreage within the Ashley National Forest Boundaries

Ranger District	National Forest System Land	Private Land	State Land
Flaming Gorge	353,928	10,695	1,720
Vernal	341,218	7,428	0
Duchesne-Roosevelt North	500,779	2,295	0
Duchesne-Roosevelt South	204,357	656	0
Total	**1,400,282**	**21,074**	**1,720**

Source: Forest Service 2017a

Lands adjacent to the Ashley National Forest boundaries include parcels owned or managed by the BLM, Uinta-Wasatch-Cache National Forest, Uinta and Ouray Indian Reservation, the States of Utah and Wyoming, private entities, and counties.

Land Special Use Authorizations

The Ashley National Forest issues special-use authorizations for recreation (see table 3-86) and non-recreation (see table 3-87) uses. The 2017 Landownership and Status, Use, and Access Report (Forest Service 2017p) discusses the current conditions and trends of landownership and status. It includes information on conveyances, acquisitions (purchases and donations), land exchanges, ROW corridors, easement and ROW acquisitions, surveys of the Ashley National Forest, communication sites, and land status withdrawals that have occurred since implementation of the 1986 forest plan. Recreation special-use authorizations include recreation residences, resorts, marinas, outfitter and guide services, and temporary events. There are currently 125 recreation special-use authorizations issued on the Ashley National Forest. Requests for and interest in recreation special-use authorizations are increasing and expected to continue. This increase is primarily for temporary events such as fishing derbies.

Table 3-87. Recreation Special-Use Authorizations by Ashley National Forest Ranger District

Recreation Special Uses	Flaming Gorge	Vernal	Duchesne-Roosevelt North	Duchesne-Roosevelt South
Privately owned improvements Recreation residences	10	40	8	0
Privately owned resorts	2	0	2	0
Marinas	3	0	0	0
Government-owned improvements	2	0	0	0
Concessions rental service	1	0	0	0
Concessions outfitter guide	20	1	10	0

Recreation Special Uses	Flaming Gorge	Vernal	Duchesne-Roosevelt North	Duchesne-Roosevelt South
Temporary events (number varies yearly)	21	5	0	0
Total recreation special uses	**59**	**46**	**20**	**0**

Source: Forest Service 2017p

The Forest Service processes and administers lands special-use authorizations for a variety of uses. These uses range from roads, powerlines, canals, and water pipelines, to small dams and reservoirs. There are currently 146 lands special-use authorizations issued on the Ashley National Forest (see table 3-88). Requests for and interest in these types of authorizations are increasing primarily for utilities, such as power, oil and gas, fiber optic, and cellular. To date, the Ashley National Forest has not received any requests for authorizations in relation to renewable energy for wind or solar power, but some interest has been shown in the development of hydropower projects.

Table 3-88. Lands Special-Use Authorizations by Ashley National Forest Ranger District

Lands Special Uses	Flaming Gorge	Vernal	Duchesne-Roosevelt North	Duchesne-Roosevelt South
Agricultural and agricultural improvements	2	0	0	0
Research	3	0	0	0
Cultural resource and treasure trove uses	0	0	0	1
Storage	1	0	0	0
Oil and gas development	3	1	0	0
Energy generation and transmission	0	0	2	0
Electric transmission and distribution	8	2	5	1
Federal aid highway right-of-way	5	0	0	3
Road or trail authorization	12	0	5	1
Communications, communication use	5	5	1	0
Other communication uses (SNOTEL15/seismic)	1	0	5	1
Telephone	4	1	5	0
Canals	5	6	6	0
Canals under ditch bill easements16	8	6	8	0
Dams, reservoirs	5	3	3	0
Dams, reservoirs under ditch bill easements	0	2	0	0
Water developments and measure (gauging station)	3	3	5	0
Total lands special uses	**65**	**29**	**45**	**7**

Source: Forest Service 2017p

[15] SNOTEL is an automated system of snowpack and related climate sensors operated by the Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture in the Western United States.
[16] Ditch bill easements are authorized under the Ditch Bill Act which authorizes the Secretary of Agriculture to issue permanent easements for water conveyance systems in order to resolve title claims arising under Acts repealed by the Federal Land Policy and Management Act of 1976, and for other purposes.

Right-of-Way Corridors

The utility corridor management emphasis areas in the current forest plan are generally consistent with the current needs identified by the Western Utility Group, an organization of major western gas, electric, and telecommunications companies. The current forest plan direction identifies energy transportation and utility corridor/window designations. It also identifies areas of exclusion, such as the FGNRA, that have a statutory prohibition to ROWs for linear facilities or corridor/window designations, see figure 3-20.

Recent increased activity in large transmission projects, such as the Zephyr, Energy Gateway South, and Transwest Express projects, demonstrates that along with increased interest in communication uses and technologies, the demand for enhanced energy infrastructure and electrical connectivity is on the rise and is expected to increase.

Land Withdrawals and Conveyances

The term “withdrawal” as described in FLPMA means withholding an area of Federal land from settlement, sale, location, or entry, under some or all of the general land laws, for the purpose of limiting activities under those laws to maintain other public values in the area; reserving the area for a particular public purpose or program; or transferring jurisdiction over an area of Federal land, other than “property” governed by the Federal Property and Administrative Services Act, as amended (40 USC 472), from one department, bureau, or agency to another department, bureau, or agency.

Prior to the passage of FLPMA, withdrawals generally took the form of an EO, public land order, or a secretarial decision. These executive actions, once published in the *Federal Register*, segregated the affected Federal land from mineral entry or location under the General Mining Act of 1872.

Since approval of the forest plan in 1986, six withdrawals have been revoked and one partially revoked within the Ashley National Forest. Roughly 12,000 acres remain withdrawn for various and sundry administrative purposes, including improved campgrounds, caves, reservoirs, and special geological areas. There are currently no withdrawal requests pending, and the Forest Service does not anticipate any requests in the near future.

Since implementation of the forest plan in 1986, the following conveyances have taken place on Ashley National Forest land under the authority of the Forest Service Facility Realignment and Enhancement Act:

- Manila Landfill (conveyed under Townsite Act authority) for 7.81 acres, completed 2015
- Roosevelt Office Administrative Site for 2.62 acres, completed 2013
- Green River Administrative Site for 4.23 acres, completed 2013
- Duchesne Ranger Station for 0.83 acres, completed 2010
- Roosevelt Dwelling #1 for 0.34 acres, completed 2010
- Roosevelt Dwelling #2 for 0.28 acres, completed 2010
- Duchesne Dwelling for 0.43 acres, completed 2010
- Vernal Administrative Site for 0.23 acres, completed 2010
- Central Utah Water Project, Bureau of Reclamation

Historic Treaty Rights

The Ute and Eastern Shoshone Tribes continue to assert certain access and resource gathering rights within portions of the plan area through treaties. Multiple treaties, congressional acts, and case law have defined the relationships between the Federal Government and Native American tribes. (Refer to the "Areas of Tribal Importance" section for more discussion regarding this topic.)

Environmental Consequences for Land Status and Ownership and Special Uses

Methodology and Analysis Process

The Forest Service evaluated and compared current landownership patterns and the potential for land adjustments across all alternatives. This section focuses on land adjustment management that changes across alternatives and its effect on the lands program.

The Forest Service compared the number of special use authorizations currently in effect with the potential changes that might result from implementation of any of the alternatives considered. The section is organized by the issue topics identified during scoping and subsequent alternatives development that are most applicable to lands special uses. A project-specific analysis would provide more in-depth analysis when implementing the plan.

Analysis Assumptions

- There are no changes being made to landownership through the forest plan.
- The Forest Service has the personnel and funding capacity to screen, process, and manage landownership adjustments.
- Community and public needs for services will continue.
- The emphasis of the lands program will remain on consolidating the Ashley National Forest's land base for easier management; it will not be shrinking or transferring the Federal estate to private parties or other jurisdictions.
- Acres subject to congressional delegation would not be open for land adjustments.
- Demand for special uses on the Ashley National Forest is expected to increase, and infrastructure (power, communication, water, and transportation) needs will require additional facilities on National Forest System land.
- All alternatives are expected to achieve desired conditions for special uses.
- All projects would follow the outlined Lands Special Use Standards and Guidelines.
- All projects implemented on the Ashley National Forest will require a site-specific analysis of their potential impacts on and from special uses.
- Special-use permits across all alternatives are anticipated and assumed to remain at constant levels or increase moderately based on demand.

Indicators

- Acres identified for conveyance into or out of Federal ownership
- Changes in access that would affect land use (for example, closure of roads or trails that would eliminate or increase the ability to access land for recreation, tribal uses, or timber harvesting)
- Acreage of land available for development for special use, roads, dams, water systems, utility corridors, communication sites, and other private or commercial uses that cannot be accommodated on private lands and that conform to management direction for the area

- Acreages per alternative of designated areas not available for development or (such as wilderness areas) off limits to development/special-use authorizations
- Acres of designated utility corridors

Environmental Consequences for Land Status and Ownership and Special Uses Common to All Alternatives

Acres identified for conveyance into or out of Federal ownership is the same across all alternatives. The process for completing land-use authorizations and permits is not identified to change under any of the alternatives; however, adjustments such as designation of wilderness areas and closure of roads or trails would indirectly affect land use in those areas. This is because they would be subject to closures or include restrictions on development.

Under all alternatives, 28.4 acres of designated utility corridors would remain open to special-use authorizations. This would allow for continued development and expansion in these areas under all alternatives.

Environmental Consequences for Land Status and Ownership and Special Uses—Alternative A

Under alternative A, changes to landownership and use would follow current management practices outlined in the 1986 forest plan. There would not be any new recommended management areas; therefore, land available for special-use authorizations and access routes would not change. Existing RNAs and designated wilderness areas would remain the same with current restrictions on 187,000 acres and 274,000 acres of land, respectively.

Under alternative A, there would be no changes to access roads or trails, and no IRAs are proposed in recommended wilderness areas; therefore, the associated land use is not anticipated to increase or decrease, based on a gain or loss of access.

Environmental Consequences for Land Status and Ownership and Special Uses—Alternative B

Under alternative B, 10,300 acres for two new wilderness areas would be designated. These wilderness areas would also be IRAs. When compared with alternative A, this would decrease the amount of land available for special-use authorizations by 10,300 acres and prohibit access within these areas. Therefore, less acreage is available for special-use authorizations under alternative B, when compared to Alternative A.

Under alternative B, the Forest Service would encourage the formation of user associations in lieu of individual special-use permits and ROWs in common-use facilities, uses, or areas. Under alternative B, multiple permits to the same organization should be incorporated into one permit, if this facilitates permit administration. These efforts would assist in expediting the permitting process for organizations and decreasing internal workload for the Forest Service staff.

Additionally, under alternative B, the following goals and objectives would improve access and recreation sites:

- Improve 5 miles of existing nonmotorized National Forest System trails for mountain bike use every 5 years over the life of the plan, if user groups or other partnerships are available to assist in improvement work.

- Make the backcountry recreation area suitable for wheeled motorized travel consistent within desired recreation opportunity spectrum settings as assigned and on designated roads, trails, and areas.
- Provide five new dispersed camping docks on the shoreline of the Flaming Gorge Reservoir within 10 years of plan approval if funding is available
- Expand recreation opportunities by constructing 10 miles of trails designed for use by mountain bikes over the life of the plan, if local user groups or partnerships are identified to conduct annual trail maintenance
- Improve 1 mile of road to dispersed camping sites every 3 years
- Expand recreation opportunities by constructing two OHV loop trails (no more than 60 inches wide) within 10 years of plan approval, if local user groups or partnerships are identified to conduct annual trail maintenance
- Expand recreation opportunities by converting 10 miles of National Forest System 50-inch-wide (or narrower) OHV trails to no more than 60 inches wide within 5 years of plan approval. This would be done through cooperation with local motorized use groups who identify trails that have the highest use by side-by-side, OHVs and if identified trails can be converted without resulting in resource issues.
- Improve 2 miles of motorized trails every 3 years, if local user groups are available to assist in improvement work
- Chip seal or slurry seal 2 miles of roads within destination recreation areas every 5 years, if road conditions warrant maintenance
- Improve facilities and infrastructure at five developed campgrounds every 10 years for the life of the plan, emphasizing areas with higher use and in a deteriorated condition

Access and recreation facilities improvement objectives and goals identified under alternative B would provide the ability for land users to access Forest System lands more safely and efficiently; therefore, this would provide more opportunities for special land use authorizations. There are more access and recreation improvement objectives proposed under alternative B, when compared with alternative A.

Environmental Consequences for Land Status and Ownership and Special Uses—Alternative C

Under alternative C, one new 1,400-acre RNA and 50,200 acres of new wilderness areas would be designated. Additionally, under this alternative, new ROWs would be considered unsuitable within the RNAs, and the recommended wilderness areas would include 48,600 acres of IRAs. This would decrease the amount of access and land available for special-use authorizations, by 113,000 acres, when compared with alternative A.

Under alternative C, restrictions on access also include a restriction on motorized use within 739,700 acres in the backcountry recreation area, which would decrease the ability and availability of special-use authorizations in the area. Access improvement objectives identified under alternative C would provide the ability for land users to access Forest System lands more safely and efficiently. While alternative C provides more restrictions on access and land use than alternative A, access improvement objectives may increase the land use in certain areas. Overall, there would be less National Forest System lands available for special-use authorizations under alternative C, when compared with alternative A. However, with the use of designated energy corridors and other National Forest System lands available to accommodate special-use permits, there would be sufficient land for development.

Under alternative C, the following objectives and goals for access and recreation facilities improvements would provide more opportunities for land use than alternative A, but less than alternative B:

- Improve 1 mile of road to dispersed camping sites every 3 years
- Chip seal or slurry seal 2 miles of roads within destination recreation areas every 5 years, if road conditions warrant maintenance
- Improve facilities and infrastructure at five developed campgrounds every 10 years for the life of the plan, emphasizing areas with higher use and in a deteriorated condition

Environmental Consequences for Land Status and Ownership and Special Uses—Alternative D

Availability of land for special-use authorizations would not change under alternative D, since there are no additional areas, such as wilderness, RNAs, SMAs, or IRAs, identified for special designation.

Under alternative D, a goal for land status and ownership is to work with organizations to maintain and represent current individual inholdings. This would provide the Forest Service the opportunity to work collectively on maintaining the current land status.

Under alternative D, goals for lands special uses include prioritizing organizations that represent multiple permittees during the permitting process, and annual considerations and prioritization of easements identified and agreed upon by State and county governments and private landowners for providing access to the national forest. Working closely with permittees and other landowners within the Ashley National Forest boundaries would increase the efficiency of approving or denying special land use authorizations. When compared with alternative A, this would be an anticipated improvement.

Additional goals and objectives under alternative D include the following:

- Consider expanding existing campgrounds to accommodate larger trailers and OHV users
- Improve 10 miles of existing nonmotorized National Forest System trails for mountain bike use every 5 years over the life of the plan, if user groups are available to assist in improvement work
- Provide seven new dispersed camping docks on the shoreline of the Flaming Gorge Reservoir within 10 years of plan approval, if funding is available
- Expand recreation opportunities by constructing 20 miles of trails designed for use by mountain bikes over the life of the plan, if local user groups or partnerships are identified to conduct annual trail maintenance
- Improve 4 miles of road to dispersed camping sites every 3 years
- Expand recreation opportunities by constructing two OHV loop trails within 10 years of plan approval, if local user groups or partnerships are identified to conduct annual trail maintenance
- Expand recreation opportunities by converting 10 miles of National Forest System 50-inch-wide (or narrower) OHV trails to no more than 60 inches wide within 5 years of plan approval. This would be done through cooperation with local motorized use groups who identify trails that have the highest use by side-by-side, OHVs and if identified trails can be converted without resulting resource issues. (This is the same as under alternative B.)
- Improve 6 miles of motorized trails every 3 years, if local user groups are available to assist in improvement work

- Chip seal or slurry seal 6 miles of roads within destination recreation areas every 5 years, if road conditions warrant maintenance
- Improve facilities and infrastructure at eight developed campgrounds every 10 years for the life of the plan, emphasizing areas with higher use and in a deteriorated condition

Access and recreation facilities improvement objectives identified under alternative D would provide the ability for land users to access Forest System lands more safely and efficiently; therefore, this would provide more opportunities for special land use authorizations. When compared with alternatives A and C, there are more access and recreation facilities improvement objectives proposed under alternative D, but less than under alternative B.

Overall, alternative D would have the most acreage available for special-use authorizations. This is because of fewer designated areas and more improvements to access and recreation facilities when compared with the other alternatives.

Cumulative Environmental Consequences for Land Status and Ownership and Special Uses

Landownership within the boundaries of Ashley National Forest is not anticipated to change drastically within the life of the plan. The Forest Service will continue to address potential adjustments to landownership through existing laws, regulations, and policies.

When a special-use proposal is received, Forest Service manual direction requires Forest Service personnel to consider whether the proposed use is consistent with the mission of the Forest Service or can reasonably be accommodated on lands of other ownership. Private lands can provide opportunities for requests, such as wind and solar power and small distribution lines, but not for activities requiring large, continuous land bases, such as for hunting, tours, and access and utilities for inholdings.

Some restrictions to special-use authorizations would be required to meet the desired conditions, standards, and guidelines for other resource areas addressed in the action alternatives. The cumulative consequences of any of the proposed alternatives would not be significant. This is because they would have little to no effect on the activities and opportunities for these types of uses across the greater landscape. Cumulative impacts on special uses could occur through changes in the designation and development of land resources and the need for access. The presence of threatened, endangered, and sensitive species and historic and archaeological features and concerns may preclude the issuance of some land-use authorizations and place restrictions on others.

Reasonably foreseeable future actions on the Ashley National Forest that may increase visitor use and lead to increased special-use authorizations include a 3.3-mile OHV trail that will be constructed to connect Sowers Canyon Road to Forest Service Road 497 as part of the Badlands Trail Project. Additionally, the Big Brush Creek–Outlaw ATV Trail Reroute Project would reroute a popular section of a multiuse trail in the Vernal Ranger District to provide an improved recreational experience and to improve resource conditions. An additional trail would be constructed from the current trail to a turnaround near the cave. The Highline ATV Trail Reroute Project would reroute and reconstruct a motorized section of the Highline Trail between Highway 191 and East Park Reservoir in the Vernal Ranger District.

Designated Areas

Introduction

The following section is a description of the existing conditions and trends for designated areas on the Ashley National Forest; these are national recreation areas (NRAs), wilderness areas, geologic areas, wild and scenic rivers, scenic byways, national recreation trails, IRAs, and RNAs.

Regulatory Framework

The Wilderness Act of 1964—Identifies wilderness uses and prohibited activities. To qualify for wilderness designation, an area must appear natural, must have outstanding opportunities for solitude or primitive and unconfined recreation, and must be at least 5,000 acres. The area may also contain ecological or geological features or other features of scientific, scenic, or historic value.

Public Law 90-540—Act that establishes the FGNRA to provide for public outdoor recreation benefits and conservation of scenic, scientific, historic, and other values contributing to public enjoyment.

Federal Cave Resources Protection Act of 1988 (Public Law 101-691)—Aims to "secure, protect, and preserve significant caves on Federal lands for the perpetual use, enjoyment, and benefit of all people; and to foster increased cooperation and exchange of information between governmental authorities and those who utilize caves located on Federal lands for scientific, education, or recreational purposes." Specific effects of the act prohibit disclosing the location of significant caves, removing cave resources, and vandalizing or disturbing cave resources.

John D. Dingell, Jr. Conservation, Management, and Recreation Act—Protects public lands and modifies management provisions; it designates more than 1,300,000 acres of wilderness areas, expands several national parks and other areas of the National Park System, establishes four new national monuments while redesignating others, and establishes the Ashley Karst NRGA.

Wild and Scenic Rivers Act of 1968—Directs Federal agencies to consider potential wild and scenic rivers in their land and water planning processes. To fulfill this requirement, the Forest Service's 2012 planning rule requires the agency to identify rivers eligible for inclusion in the NWSRS. This is required whenever the Forest Service undertakes the development or revision of a land and resource management plan, commonly called a forest plan. The Wild and Scenic Rivers Act seeks to protect and enhance a river's natural and cultural values and to provide for public use, consistent with its free-flowing character, its water quality, and its outstandingly remarkable values (ORVs).

Intermodal Surface Transportation Efficiency Act of 1991—Establishes the National Scenic Byways Program, as amended by the Transportation Equity Act in 1998 and subsequently with the passage in 2005 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act—A Legacy for Users. The National Scenic Byways Program is a voluntary, community-based program administered through the Federal Highway Administration to recognize, protect, and promote America's most outstanding roads.

National Trails System Act of 1968 (Public Law 90-543)—Authorizes the creation of a national system of trails, composed of national recreation trails, national scenic trails, and national historic trails. National scenic trails and national historic trails may only be designated by an act of Congress; however, national recreation trails may be designated by the Secretary of the Interior or the Secretary of Agriculture to recognize exemplary trails of local and regional significance in response to an application from the trail's managing agency or organization.

2001 Roadless Area Conservation Rule (36 CFR Part 294)—Establishes IRAs and prohibits road construction, reconstruction, and timber harvest, except under certain circumstances, in IRAs. This is because they have the greatest likelihood of altering and fragmenting landscapes, resulting in loss of IRA values, which are as follows:

- High quality of undisturbed soil, water, and air
- Sources of public drinking water
- Diversity of plant and animal communities
- Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land
- Primitive, semiprimitive nonmotorized, and semiprimitive motorized classes of dispersed recreation
- Reference landscapes
- Natural appearing landscapes with high scenic quality
- Traditional cultural properties and sacred sites
- Other locally identified unique characteristics

The Organic Act of 1897—Establishes RNAs, which include any tract of land or water that supports high quality examples of terrestrial or aquatic ecosystems, habitats, and populations of rare or endangered plant or animal species, or unique geological study of the features. RNAs are managed in a way that allows natural processes to predominate, with minimal human intervention.

Analysis Area

The analysis area consists of designated areas in the planning area.

Description of Affected Environment

Flaming Gorge National Recreation Area

Congress designated the FGNRA in 1968 to provide for public outdoor recreation use and enjoyment of the Flaming Gorge Reservoir and surrounding lands and to conserve scenic, scientific, historic, and other values contributing to public enjoyment.

The 187,000 acres of the FGNRA in the Ashley National Forest include the Flaming Gorge Reservoir. The area is known for its scenery, geology, and recreation opportunities (Forest Service GIS 2020; Forest Service 2017o). Recreation opportunities include land- and water-based motorized and nonmotorized activities on and near the Flaming Gorge Reservoir and nonmotorized water-based activities on the Green River. Upland development is concentrated in a few areas, leaving the rest of the FGNRA in a predominantly natural state. The FGNRA has the highest level of developed recreation facilities on the Ashley National Forest (Forest Service 2017o). Management for the FGNRA is currently based on direction in appendix A of the 1986 forest plan,. This direction will be superseded by the FGNRA management plan once finalized. This planning process will undergo separate NEPA analysis.

Increased access could damage archaeological sites in the FGNRA through vandalism and unauthorized collection. Although developed recreation sites are concentrated, dispersed recreation, camping, and OHV use occurs throughout the FGNRA, primarily adjacent to the reservoir in the central and northern areas

(Forest Service 2017a). See “Recreation” for further detailed information on recreational opportunities in the FGNRA.

High Uintas Wilderness Area

Congress designated the High Uintas Wilderness under the Utah Wilderness Act of 1984, pursuant to the Wilderness Act of 1964. In 1997, the High Uintas Wilderness Management Plan was completed and amended the Ashley National Forest Plan (amendment 12). The Ashley National Forest manages 60 percent (276,175 acres) of the 456,705-acre wilderness and is the lead management unit (Forest Service GIS 2020; Forest Service 2017o). The Ashley National Forest coordinates management with the Uinta-Wasatch-Cache National Forest, which manages the remainder of the wilderness area.

The High Uintas Wilderness Area comprises the core of the Uinta Mountains and provides a nearly pristine natural setting. It is the largest wilderness area in Utah, more than three and half times larger than the next largest wilderness area in the state (Forest Service 2017o).

Recommended Wilderness

As part of its forest plan revision process, the Forest Service is required to identify and evaluate lands that may be suitable for inclusion in the national wilderness preservation system and to determine whether to recommend any such lands for wilderness designation. This process includes four steps: inventory, evaluate, analyze, and possibly recommend. While the supervisor of a national forest may preliminarily recommend suitable lands for national wilderness preservation system designation, Congress has the authority to act on wilderness designations.

The Forest Service completed its Ashley National Forest Evaluation of Potential Wilderness Inventory Areas in May 2019. It has completed the first step of the process. The final inventory comprises 28 polygons over 5,000 acres, and 4 polygons less than 5,000 acres that are next to the High Uintas Wilderness, for a total of 590,788 acres (about 43 percent of the Ashley National Forest) (Forest Service 2019c). The wilderness evaluation, the second step, took a more detailed look at these inventoried areas to determine how well they meet wilderness characteristics, using a set of five criteria set forth in the Wilderness Act of 1964 and Forest Service Handbook final directives (Forest Service Handbook 1909.12, chapter 70, section 72.1). Refer to the Ashley National Forest Evaluation of Potential Wilderness Inventory Areas for the full evaluation of the inventoried areas based on the criteria referenced above (Forest Service 2019c) and see appendix G for additional information.

Sheep Creek Canyon Geologic Area

The Sheep Creek Canyon Geologic Area is located along the Flaming Gorge Scenic Byway. This area is next to the FGNRA and connects to the Uinta National Scenic Byway. It is known for its geologic value and is popular for wildlife viewing and pleasure driving. A portion of the Sheep Creek-Spirit Lake Scenic Backway also bisects the 3,600-acre area (Forest Service GIS 2020; Forest Service 2017o).

Ashley Karst National Recreation and Geologic Area

The 173,475-acre Ashley Karst NRGA is located along the southern slope of the Uinta Mountains and contains important geologic formations and karst features. The karst features capture surface water and transport it through a series of underground cave systems to springs in the valley below, where it is used for drinking water and irrigation. The Ashley Karst NRGA received special designation by Congress in March 2019 as part of the John D. Dingell, Jr., Conservation, Management, and Recreation Act. The purposes of the designation are to conserve and protect the watershed’s geological, recreational, wildlife, scenic, natural, cultural, and historic resources in the area (Forest Service 2020i).

Wild and Scenic Rivers

In 2008, the Forest Service completed its final EIS and signed the Record of Decision for its Wild and Scenic River Suitability Study for National Forest System Lands in Utah. The study evaluated the suitability of 86 eligible rivers (840 miles) on the national forests in Utah for recommendation for inclusion in the NWSRS. On the Ashley National Forest, two rivers were recommended as suitable (Forest Service GIS 2020): the Green River (6 miles, scenic classification) and the Upper Uinta River, including Gilbert Creek, Center Fork, and Painter Draw (42 miles, wild classification).

Since the 2008 suitability study, Congress has taken no action on the two rivers determined to be suitable for inclusion in the NWSRS. To date, it has not designated any rivers on the Ashley National Forest as components of the NWSRS.

As part of this plan revision, the Forest Service completed its draft wild and scenic rivers eligibility study and report in May 2019 (Forest Service 2019d). As allowed by the planning directives, the eligibility study was conducted for only those named rivers on a standard U.S. Geological Survey 7.5-minute quadrangle map that were not previously studied for eligibility.

The Forest Service made the following determinations for those rivers evaluated as part of the 2019 study:

- For Dowd Creek (3.1 miles), a cultural or historic ORV was identified, and the preliminary classification for this river is recreational.
- For Honslinger Creek (2.3 miles), a cultural or historic ORV was identified, and the preliminary classification for this river is recreational.
- For North Skull Creek (1.8 miles), a cultural or historic ORV was identified, and the preliminary classification for this river is wild.
- For Spring Creek (6.8 miles), a cultural or historic ORV was identified, and the preliminary classification for this river is recreational.

The Forest Service performed a wild and scenic river suitability study based on its 2019 wild and scenic rivers eligibility study and report in 2021. The purpose of the suitability phase is to determine whether eligible rivers are suitable for inclusion in the NWSRS, in accordance with the Wild and Scenic Rivers Act. Suitability considerations include the environmental and economic consequences of designation and the manageability of a river if Congress were to designate it. Forest Service Handbook 1909.12, chapter 80, section 83.2e identifies the various criteria that the Forest Service uses to determine suitability.

The suitability evaluation does not result in actual designation but only a determination of a river's suitability for inclusion in the NWSRS. The Forest Service cannot administratively designate a river via a planning decision or other agency decision into the NWSRS, and no segment studied is or will be automatically designated as part of the NWSRS. Only Congress can designate a wild and scenic river. Of the four eligible segments evaluated in the suitability study, none were determined to be suitable for inclusion in the National Wild and Scenic River System in the preliminary suitability determination. Suitability determinations made in a NEPA document are draft until the decision record for the NEPA document is signed. For additional information, see appendix F.

Scenic Byways

Scenic byways are federally designated roads that feature one or more archaeological, cultural, historic, natural, recreational, and scenic qualities; scenic backways are state-designated routes in Utah that are less developed rugged routes, often on National Forest System roads (Forest Service 2017a). Scenic byways on the Ashley National Forest are the Dinosaur Diamond Scenic Byway/Indian Canyon Scenic

Byway, the Flaming Gorge-Uintas National Scenic Byway, and the Flaming Gorge-Green River Basin National Scenic Byway (Forest Service 2017o); scenic backways on the Ashley National Forest are the Red Cloud Loop Scenic Backway and Sheep Creek Scenic Backway.

- **Dinosaur Diamond/Indian Canyon Scenic Byway—**The Ashley National Forest includes the 12-mile segment of U.S. Highway 191 between Duchesne and Helper, Utah. The segment is the same as the Indian Canyon Scenic Byway and crosses the South Unit of the Ashley National Forest. It follows Indian Creek through the Ashley National Forest to the 9,100-foot summit on the Ashley National Forest's southern boundary. It is managed to promote tourism along its route through Colorado and Utah.
- **Flaming Gorge-Uintas National Scenic Byway—**Also known as "The Drive through the Ages," the byway includes U.S. Highway 191 from Vernal to Dutch John, Utah, and Utah Highway 44 from U.S. Highway 191 to Manila. The 54 miles of the drive that are on the Ashley National Forest (along the eastern edge of the Uinta Mountains and the southern rim of Flaming Gorge Reservoir) affords outstanding views of the river gorge and the High Uintas. Interpretive pullouts provide roadside geology, ecology, and history information. The scenic byway is also along one of the primary routes from the national parks in Montana and Wyoming to the national parks in southern Utah.
- **Flaming Gorge-Green River Basin National Scenic Byway—**This byway is located in the southwest corner of Wyoming on two north-south roadways extending from I-80 south to the Utah state line for a total of 93 miles. Wyoming State Highway 530 parallels the west side of the FGNRA in Wyoming and is within the NRA for 4.7 miles, while U.S. Highway 191 is on the east side of the NRA. Both Wyoming State Highway 530 and U.S. Highway 191 are the highway access routes to the FGNRA, and are designated state scenic byways (an application for the federal designation is under way).[17] The scenic byway is also along one of the primary routes from the national parks in Montana and Wyoming to the national parks in southern Utah.
- **Red Cloud Loop Scenic Backway—**This backway can be accessed from Highway 131 in the Vernal area or at its junction with the Flaming Gorge-Uintas National Scenic Byway, located 15 miles north of Vernal. The backway travels through sandstone canyons, mixed conifer and aspen forests, and large meadow areas and provides views of the High Uintas mountains. Most of this backway is over unpaved roads (Forest Service 2020j).
- **Sheep Creek Scenic Backway—**This backway can be accessed from Highway 44 and crosses the Sheep Creek Canyon Geological Area next to the FGNRA. It provides views of geological formations in the area (Forest Service 2020j).

Little Hole National Recreation Trail

The Little Hole National Recreation Trail (National Forest System Trail 006) follows the Green River through the Ashley National Forest, from the Flaming Gorge Dam to the Little Hole day-use area. The 7-mile trail is open year-round to hiking and open seasonally to mountain biking. It also provides access to the Green River for fly fishing. See "Recreation" for further information on recreational opportunities.

[17] http://www.dot.state.wy.us/home/travel/scenic_byways.html

Inventoried Roadless Areas

IRAs were established under the 2001 Roadless Area Conservation Rule (36 CFR 294). These areas are a group of National Forest System lands without roads and could be suitable for IRA conservation as wilderness or other non-standard protections. Approximately 450,900 acres on the Ashley National Forest are in 36 individual IRAs (Forest Service GIS 2020; Forest Service 2017o).

Research Natural Areas

The Ashley National Forest contains seven RNAs, with a total area of 7,700 acres (Forest Service GIS 2020). These RNAs have been designated for the purposes of maintaining biological diversity, conducting non-manipulative research and monitoring, and fostering education. The seven RNAs are Ashley Gorge, Gates of Birch Creek, Lance Canyon, Pollen Lake, Sims Peak Potholes, Timber-Cow Ridge, and Uinta Shale Creek.

Table 3-89. Research Natural Areas

Research Natural Area	Year Established	Acres	Features
Ashley Gorge	1996	1,200	Blue spruce, lodgepole pine, and aspen woodlands; shrub lands with mountain mahogany and snowberry; moderate-gradient perennial stream; rare plant
Gates of Birch Creek	1988	200	Steep slope forests of Douglas-fir and lodgepole pine; hogback and water gap landforms
Lance Canyon	1996	300	Douglas-fir and pinyon pine woodlands; outstanding occurrence of Salina wildrye grassland community; big sagebrush shrubland with bluebunch wheatgrass
Pollen Lake	1987	1,100	Subalpine fir and Engelmann spruce forest and krummholz; alpine turf communities on shallow rocky soil; lake and wetlands in cirque basin; rare plants
Sims Peak Potholes	1991	700	Seral lodgepole pine with subalpine fir and Engelmann spruce understory; sedge-dominated pothole wetlands; rare plant
Timber-Cow Ridge	1996	1,200	Open Douglas-fir and ponderosa pine woodlands with abundant curlleaf mountain mahogany; juniper-pinyon pine woodlands
Uinta Shale Creek	1996	3,000	Subalpine fir and Engelmann spruce forest and krummholz; alpine turf communities; cirque basins draining into moist forest-meadow complexes

Sources: Forest Service GIS 2020; Forest Service 2017o

Environmental Consequences for Designated Areas

The analysis for designated areas is based on a review of the alternatives for the plan revision summarized in chapter 2, GIS data (Forest Service GIS 2020), and other relevant scientific literature.

Methodology and Analysis Process

The analysis in this EIS is programmatic; therefore, no direct environmental effects would result from the administrative action of developing or revising the forest plan; consequently, plan decisions (desired conditions, objectives, standards, and guidelines) and other plan direction (management areas and monitoring) will guide future planning decisions or implementing site-specific projects and activities.

Analysis Assumptions

Analysis assumptions for designated areas are as follows:

- All designated wilderness is managed according to the 1964 Wilderness Act and 1984 Utah Wilderness Act, 36 CFR 293, applicable Forest Service manuals and handbooks, any wilderness management plans, and the land management plan.
- Wilderness stewardship performance is used to measure how well the Forest Service is meeting its primary responsibility under the Wilderness Act: to preserve wilderness character. There are seven categories of wilderness stewardship performance elements for forests to choose from for each wilderness: natural quality of wilderness character; undeveloped quality of wilderness character; untrammeled quality of wilderness character; outstanding opportunities for solitude or primitive and unconfirmed recreation quality of wilderness character; other features of value quality of wilderness character; special provisions; and administration. Recommended wilderness areas are not measured against the wilderness stewardship performance.
- Additional management tools and metrics used to manage wilderness values are the SMS, the recreation opportunity spectrum, and trail classifications. Typically, the scenic integrity objective for wilderness is very high; ROS class primitive or semiprimitive nonmotorized; and trails classified as class 1 or 2 management objectives.
- Any area recommended for wilderness designation, scenic byways, or trail designation or found suitable as wild and scenic river segments through the planning process is a preliminary administrative recommendation. It will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on wilderness designation.

Indicators

The impact analysis area consists of designated areas in the planning area. Quantitative indicators for designated areas are as follows:

- Acres or miles of designated areas by alternative, including designated wilderness, recommended wilderness, special management areas (including RNAs, NRAs, and geologic areas), IRAs in recommended wilderness, and suitable wild and scenic rivers
- The acres or miles of overlap of designated areas with other allocations outlined in chapter 2, as applicable

In addition to the quantitative indicators listed above, the analysis also includes qualitative indicators to measure the degree of change from the various determinations related to designated areas. Qualitative indicators include the degree to which recommended and designated wilderness promotes the protection of wilderness character and wilderness characteristics that existed at the time of the preliminary administrative recommendation, and whether the overlapping allocations outlined in chapter 2 are compatible with the subject designation.

Environmental Consequences for Designated Areas Common to All Alternatives

Under all alternatives, there would be no changes to the FGNRA, scenic byway miles, national recreation trails, geologic areas, or wilderness areas. These areas would continue to be managed according to the enabling legislation for which they were designated. Additionally, the acres of IRAs would be the same under all alternatives (637,700 acres).

In general, management actions that protect resources, such as limitations on ground-disturbing activities, such as recreation, grazing, and facilities, would help maintain and improve the values associated with designated areas. In the same fashion, managing for resource uses could affect those values.

Environmental Consequences for Designated Areas—Alternative A

Under alternative A, the current forest plan would continue to guide management of the forest, and ongoing work or work previously planned and approved would occur under that guidance. This alternative does not recommend or establish any new designated or special management areas; no changes would occur to the plan in response to issues raised, and it would not adjust management in response to the requirements of the 2012 Planning Rule. Under alternative A, special management areas are the Sheep Creek Canyon Geologic Area and seven RNAs (Ashley Gorge, Gates of Birch Creek, Lance Canyon, Pollen Lake, Sims Peak Potholes, Timber-Cow Ridge, and Uinta Shale Creek), totaling 7,700 acres.

Alternative A would include the continuation of no new recommended wilderness, and no new wild and scenic river segments would be classified as suitable for inclusion in the NWSRS (Green River [6 miles] and Uinta River [42 miles] would continue to be managed as recommended for suitability from the 2008 wild and scenic river suitability study). Alternative A would not manage the forest to meet current demands or conditions for recreation needs in designated areas or other non-designated areas on the forest.

Environmental Consequences for Designated Areas—Alternative B

Under alternative B, all existing special areas and RNAs would remain; however, this alternative would include additional designated areas to protect special resources and the management of two recommended wilderness areas, totaling 10,300 acres. Recommended wilderness areas would not be suitable for timber production or harvest. This would help preserve wilderness characteristics, maintaining eligibility for future designation as a wilderness area. All 10,300 acres of recommended wilderness areas would be in IRAs, whereas under alternative A, there would be no IRAs in recommended wilderness areas. This action could help protect wilderness values by reducing surface disturbance from roads and vehicle use.

River segments recommended as suitable for inclusion in the NWSRS would be the same as under alternative A.

Environmental Consequences for Designated Areas—Alternative C

Compared with alternative A, alternative C would increase the percentage of the forest managed as designated areas. This alternative would include all areas meeting the requirements for wilderness under the wilderness inventory and determined to be suitable for wilderness recommendation under the wilderness review; therefore, alternative C would include the most acres managed for wilderness characteristics as recommended wilderness areas (four recommended wilderness areas, totaling 50,200 acres). No acres would be found suitable for timber harvest to maintain the option for future designation.

Continued management to the nonimpairment standard would maintain the area’s suitability for preservation as wilderness. Under this alternative, recommended wilderness areas would include 48,600 acres of IRAs, whereas under alternative A, there would be no IRAs in recommended wilderness areas. This action could help protect wilderness values by reducing surface disturbance from roads and vehicle use.

An additional RNA (Gilbert Bench, 1,400 acres) would be included under this alternative, resulting in a total of 9,100 total acres for eight RNAs. This management would emphasize habitat connectivity and maintenance of a natural setting.

This alternative would bring forward four additional segments as suitable for inclusion in the NWSRS: Dowd Creek (3.1 miles), Honslinger Creek (2.3 miles), Spring Creek 2 (6.8 miles), and North Skull Creek (1.8 miles). Under this alternative, no miles would be determined suitable for timber harvest, which would help protect and preserve relevant and important values.

Until Congress acts on suitability recommendations, stream segments will be managed under protective measures. These provisions protect streamside and riparian habitats, riparian and aquatic species, water quality, cultural and visual resources, and the recreational setting. Most notably, the protective measures would ensure that the values for which these river segments were found suitable are not compromised until Congress makes a decision regarding wild and scenic river designation. The major difference between designation and non-designation is the long-term protection afforded by legislation, instead of an administrative land use plan; decisions in this plan, however, affect suitability only.

Once a segment is determined suitable, it can be formally recommended to Congress or the Secretary of the Interior for inclusion in the NWSRS; therefore, the Forest Service would not permit any actions on eligible or suitable segments that would affect the free-flowing nature, ORVs, or tentative classification or that would reduce water quality to the extent that it would no longer support the ORVs. As such, implementing the management actions in this plan would not affect eligible or suitable segments.

Environmental Consequences for Designated Areas—Alternative D

This alternative would have the fewest restrictions on resource use and is the least protective of designated areas. There would be no new designated areas and no recommended wilderness areas. River segments recommended as suitable for inclusion in the NWSRS would be the same as under alternative A.

Cumulative Environmental Consequences for Designated Areas

There are several actions that may have minor effects on wilderness values and NRGAs. For example, the West Fork Smiths Fork Colorado River Cutthroat Trout Enhancement CE, aims to treat the streams in the West Fork Smiths Fork drainage, including some waters in the High Uintas Wilderness, with rotenone to remove nonnative fish species. This would enhance habitat for native Colorado River cutthroat trout and could result in slight impacts on wilderness values. Additionally, the High Uintas Wilderness Domestic Sheep Analysis Project to evaluate the effects of continued domestic sheep grazing in the High Uintas Wilderness could result in impacts on wilderness values in the areas.

Lastly, the Ashley Karst National Recreation and Geologic Management Plan for the congressionally designated Ashley Karst NRGA could affect the values associated with the NRGA.

Other Required Disclosures

Unavoidable Adverse Effects

The proposed land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Before any ground-disturbing actions take place, they must be authorized in a subsequent site-specific environmental analysis. Therefore, none of the alternatives causes unavoidable adverse impacts.

Relationship of Short-term uses and Long-term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16).

The revised land management plan will govern management of the Ashley National Forest's resources for the next 15 years. Although the proposed forest plan does not directly implement these uses, the potential for these uses are described in the plan goals and objectives, both at the forestwide and geographic area levels.

Long-term productivity refers to the capability of the land to provide resource outputs for a period of time beyond the planning period. Minimum management requirements, established by regulation (36 CFR 219.1(b)), provide for maintenance of long-term productivity of the land. Minimum management requirements are contained in forestwide and geographic area standards and guidelines and would be met under any alternative. They ensure that the long-term productivity of the land is not impaired by short-term uses.

Monitoring and evaluation, as described in the proposed forest plan (appendix E), applies to all alternatives. The purpose of the plan monitoring program is to monitor desired conditions and objectives to provide for sustainability. Meeting sustainability would provide for long-term productivity of the land, per 36 CFR 219.1(b). The analysis shows that management under the plan would provide for ecological sustainability (36 CFR 219.8(a)) and soil productivity (219.8(a)(2)(ii)). Although all alternatives are designed to maintain long-term productivity, there are differences among the alternatives in the long-term availability or condition of resources. There may also be differences among alternatives in long-term expenditures necessary to maintain or achieve desired conditions. The EIS discloses the analysis of effects for a range of alternatives, including no action. It considers effects on the significant issues and other resources for this time frame.

Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitments of resources are defined in Forest Service Handbook 1909.15, Environmental Policy and Procedures. Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

The decisions made in land management plans do not represent actual irreversible and irretrievable commitments of resources. This is because land management planning identifies what kinds and levels of activities are appropriate in different parts of the national forest; it does not make project decisions. Ground-disturbing activities cannot occur without further site-specific analyses and project decision documents.

Energy Requirements and Conservation Potential

Energy is consumed in the administration of natural resources from the national forests. The main activities that consume energy are timber harvest, recreation use, road construction and reconstruction, minerals and energy exploration and development, transporting and managing livestock, and administrative activities of the Forest Service and other regulatory agencies. Energy consumption is expected to vary only slightly by alternative.

Prime Farmland, Rangeland, and Forestland

No prime farmland, rangeland, or forestland has been identified in the planning area. Plan revision or the plan would not directly affect such lands; although implementation of the plan could have indirect effects. Regardless of the alternative selected for implementation, National Forest System lands would be managed with sensitivity to the values of any adjacent private or public lands.

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Chapter 4

Preparers, Consultation and Coordination, and Distribution of the Environmental Impact Statement

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Chapter 4. Preparers, Consultation and Coordination, and Distribution of the Environmental Impact Statement

Preparers and Contributors

The following individuals and Forest Service staff contributed to the development of this draft EIS.

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Name	Title and Draft EIS Contribution
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Rhett Burkman	Realty Specialist (Land Status and Ownership, and Special Uses)
Bob Christensen	Wildlife Biologist (Wildlife)
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Joseph Flores	Forest Fire Management Officer (Fire and Fuels)
Dave Herron	Forest Geologist (Energy and Minerals, and Geologic Resources and Hazards)
Nicole Hill	Landscape Architect (Scenic Resources)
Allen Huber	Ecologist (Terrestrial Vegetation and Livestock Grazing)
Shanna Kleinsmith	Writer-Editor
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Cathleen Neelan	Forest Plan Revision Team Lead
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Jeffrey Rust	Heritage Program Leader/Forest Archeologist (Areas of Tribal Importance, and Cultural and Historic Resources)

Name	Title and Draft EIS Contribution
Kristen Waltz	Economist (Social and Economic Sustainability, and Environmental Justice)
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Matthew Smith	Hydrologist
Andy Spellmeyer	Forest Ecologist
Alexis Tarantino	Air Quality and Climate Specialist
Adam Young	Heritage, Cultural, and Tribal Resources Specialist

Consultation and Coordination

During the development of this draft EIS, the Forest Service cooperated with federally recognized tribes; Federal, State, and local agencies; special interest groups; and individuals. Consultation and coordination can take multiple forms. USFWS, State Historic preservation offices, and the tribes are consulted as per the requirements of the Endangered Species Act and section 106 of the National Historic Preservation Act. In addition, Forest Service coordination with tribes occurs through formal government-to-government consultation. Finally, entities which "have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal or reasonable alternative"(40 CFR 1501.6 and 40 CFR 1508.5) are invited to participate in the planning process, with details of the participation agreement laid out in a formal Memorandum of Understanding (MOU) between the entity and the Forest Service. Entities who have coordinated with the Forest service for the development of the Forest Plan and EIS are noted below, with those having a formal MOU agreement indicated.

Federally Recognized Tribes

Ute Indian Tribe (MOU)

Eastern Shoshone Tribe

Federal and State Agencies

U.S. Fish and Wildlife Service

State of Utah, Public Lands Policy Coordinating Office (MOU)

State of Wyoming, Governor's Policy Office (MOU)

Utah State Historic Preservation Office

Wyoming State Historic Preservation Office

County and Local Governments and Agencies with MOUs

Daggett County, Utah

Duchesne County, Utah

Summit County, Utah

Utah County, Utah

Uintah County, Utah

Daggett Conservation District, Utah

Uintah Conservation District, Utah

Sweetwater County, Wyoming

Sweetwater Conservation District, Wyoming

Uinta Conservation District, Wyoming

Plan Consistency Review

The 2012 planning rule (36 CFR § 219.4(b)) requires the review of the planning and land use policies of other Federal agencies, State and local governments, and Indian tribes. This review includes (1) consideration of the objectives of these entities as expressed in their plans and policies, (2) the compatibility and interrelated impacts of these plans and policies, (3) opportunities for the plan to address the impacts identified or contribute to joint objectives, and (4) opportunities to resolve or reduce conflicts, within the context of developing the plan's desired conditions or objectives.

Engagement with cooperating agencies has occurred throughout the planning process, beginning with the assessment phase. Cooperating agency meetings have occurred throughout the assessment and planning process starting in 2016. The planning team hosted 15 formal meetings with cooperating agencies to review comments on the preliminary need for change, wilderness report, wild and scenic rivers report and the proposed land management plan. The forest planning team has also met with cooperating agencies, upon request, to review comments on a preliminary draft of the proposed plan and environmental impact statement.

In spring 2018 representatives from the Ashley National Forest requested that cooperating agencies provide current copies of County Resource Management Plans or State Resource Management Plans. In addition, the Ute Indian Tribe provided copies of several resource-specific plans for review. The forest plan revision interdisciplinary team reviewed the provided tribal, county and state resource management plans for consistency with the proposed forest plan. Consistency review findings were tracked by resource topic and review findings were discussed at interdisciplinary team meetings. Where appropriate, edits were made to the forest plan.

The Forest Service acknowledges that revisions to plans may have occurred since the initiation of plan consistency review. Where applicable, the interdisciplinary team will review updated information prior to the finalization of the FEIS and forest plan. In addition, it is recognized that new plans may be developed and additional revisions to existing state and local plans may occur over the implementation period of the plan. The consistency of these plans with the forest plan will be reviewed as a component of the monitoring process.

Distribution of the Environmental Impact Statement

When the Forest Service formally releases this draft EIS, it will be distributed to, or made electronically available to, individual and groups who specifically requested a copy of the document or commented during public involvement opportunities. In addition, the Forest Service will send copies (or in some cases make them electronically available) to Federal agencies, federally recognized tribes, State and local governments, and organizations that have requested to be involved in the development of this analysis. At the time of formal release, the distribution list will be omitted from this chapter, but it will be available upon request from the Ashley National Forest supervisor’s office. This omission is due to the anticipated size of the distribution list.

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Glossary

Glossary

Active floodplain—Flood prone area; the zone bordering a stream subject to more frequent flooding (less than 50-year recurrence interval). General field interpretation of the active floodplain is the valley bottom up to an elevation twice the stream's maximum bank-full depth, measured at the thalweg.

Active vegetation management—Active management involves using the manipulation of vegetation to meet objectives. Methods utilized may include a variety of silvicultural and forest management practices including timber harvesting, tree planting, thinning, prescribed burning, grazing, weed control, and other activities for improving wildlife habitat and watersheds, such as erosion control, fire suppression, and restoration-based fuel treatment.

Adaptive management—The general framework encompassing the three phases of planning: assessment, plan development, and monitoring (36 Code of Federal Regulations [CFR] 219.5). This framework supports decision-making that meets management objectives while simultaneously accruing information to improve future management by adjusting the plan or plan implementation. Adaptive management is a structured, cyclical process for planning and decision-making in the face of uncertainty and changing conditions with feedback from monitoring, which includes using the planning process to actively test assumptions, track relevant conditions over time, and measure management effectiveness.

Administrative site—A location or facility constructed for use primarily by government employees to facilitate the administration and management of public lands. Examples on National Forest System lands include, but are not limited to, ranger stations, warehouses, and guard stations.

Airshed—Airsheds are geographic areas that, because of topography, meteorology, and climate, are frequently affected by the same air mass. Additionally, airsheds are areas subject to similar air pollution conditions.

All-terrain vehicle—A type of off-highway vehicle that travels on three or more low pressure tires, has handle-bar steering, is less than or equal to 50 inches in width, and has a seat designed to be straddled by the operator.

Allotment—A designated area of land available for permitted livestock grazing (36 CFR 222). A grazing allotment can include National Forest System lands and lands of other ownership. Permits are issued for the use of allotments or portions of allotments. Allotments are in active status when grazing permits have been issued; allotments are in vacant status when they do not have a grazing permit issued. Allotments are in closed status when they have been closed to livestock grazing by administrative decision or action (Forest Service Manual 2205).

Alpine—High-altitude areas (above approximately 11,200 feet) found above timberline, including their associated plant communities.

Animal unit month—The amount of dry forage required by one mature cow of approximately 1,000 pounds or its equivalent, for 1 month, based on a forage allowance of 26 pounds per day. An animal unit month is not synonymous with animal month.

Aquatic organism passage—Provides the ability for fish and other aquatic creatures to move up and downstream under a road.

Aquifer—An underground layer of water-bearing permeable rock, rock fractures, or unconsolidated material (gravel, sand, or silt) from which groundwater can be extracted using a water well.

Aspen stand—Term used where numerous individual aspen clones have coalesced to form a continuous aspen community.

At-risk species—A federally recognized threatened, endangered, proposed, or candidate species, or a species of conservation concern that is relevant to the plan area and planning process (36 CFR 219.6(b)).

Bark beetle—Any beetle that feeds exclusively in the cambial region of stems, boles, or branches, and spends most of its life cycle there. The cambial region is that layer of tissue between the inner bark and the wood of the tree. While bark beetles are native to the Ashley National Forest and play important ecological roles, they can cause extensive tree mortality and negative economic and social impacts.

Basal area—The cross-sectional area of all stems of a species or all stems in a stand measured at breast height (4.5 feet above the ground) and expressed per unit of land area.

Basal cover—The basal area of a plant that extends into the soil at ground level.

Best management practice—The method(s), measure(s), or practice(s) selected by an agency to meet its nonpoint resource control needs. Best management practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Best management practices can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (35 CFR 219.19) or into the air. This term—best management practices—is also used in other resource areas to describe methods or techniques found to be the most effective and practical in achieving an objective (such as preventing or minimizing impacts from grazing, and invasive weed establishment and spread) while making use of the resources.

Biodiversity—The variety and abundance of plants, animals, and other living organisms and the ecosystem processes, functions, and structures that sustain them. Biodiversity includes the relative complexity of species and communities across the landscape at a variety of scales, connected in a way that provides for the genetic diversity to sustain species over the long term.

Biological functionality—Biological functionality or integrity is defined by the characteristics that influence the diversity and abundance of aquatic species, terrestrial vegetation, and soil productivity.

Blue Ribbon fishery—A designation made in the United States by government and other authorities to identify recreational fisheries of extremely high quality.

Broadcast burn—A management treatment where a prescribed fire is allowed to burn over a designated area within well-defined boundaries. A broadcast burn is used for a reduction of fuel hazard, as a resource management treatment, or both.

Burn severity—A qualitative assessment of the heat pulse directed toward the ground during a fire. Burn severity relates to soil heating, large fuel and duff consumption, consumption of the litter and organic layer beneath trees and isolated shrubs, and mortality of buried plant parts.

Calcareous fen—A type of fen with high (alkaline) pH due to calcium concentration in the parent materials and water. These are rare wetlands on the Ashley National Forest.

Candidate species—A status for (1) U.S. Fish and Wildlife Service candidate species, a species for which the U.S. Fish and Wildlife Service possesses sufficient information on vulnerability and threats to support a proposal to list as endangered or threatened, but for which no proposed rule has yet been published by the U.S. Fish and Wildlife Service; for (2) National Marine Fisheries Service candidate species, a species that is: (i) the subject of a petition to list and for which the National Marine Fisheries Service has determined that listing may be warranted, pursuant to section 4(b)(3)(A) of the Endangered Species Act (16 United States Code [USC] 1533(b)(3)(A)), or (ii) not the subject of a petition but for which the National Marine Fisheries Service has announced in the *Federal Register* the initiation of a status review.

Canopy base height—The average height from the ground to the lowest living foliage.

Canopy bulk density—The foliage contained per unit crown volume.

Canopy cover—The percentage of a fixed area covered by the crown of an individual tree, shrub or plant species or delimited by the vertical projection of its outermost perimeter; each vegetation canopy layer is considered independently from the others. The sum of canopy cover percentage for all species/layers/life-forms may exceed 100 percent. This term is most often used to describe non-forest vegetation in this document.

Capability—The potential of an area of land or water, or both, to produce resources, supply goods and services, and allow resource uses under a specified set of management practices and at a given level of management intensity.

Carbon density—An estimate of forest carbon stocks per unit area.

Carbon flux—The amount of carbon exchanged between earth's carbon pools: the oceans, atmosphere, crust, and terrestrial ecosystems.

Carbon pools—Reservoirs of carbon that have the capacity to both take in and release carbon. Earth's carbon pools are the oceans, atmosphere, crust, and terrestrial ecosystems. In the forest ecosystem, accumulated carbon is stored in five different pools: aboveground biomass (leaves, trunks, and limbs), below ground biomass (roots), dead wood, litter (fallen leaves and stems), and soils.

Carbon sequestration—The process of removing carbon from the atmosphere and depositing it in a carbon pool.

Carbon stocks—The quantity of carbon stored within soils, vegetation (live and dead), and wood products.

Classification—Identification of the class (wild, scenic, or recreational) that appropriately describes an eligible river or river segment, based on the criteria established in section 2(b) of the Wild and Scenic Rivers Act.

Clearcutting—An even-aged (or two-aged with reserves) regeneration harvest method that removes essentially all trees in a stand, producing a fully exposed microclimate for the development of a new single-age class of trees in one entry. A clearcut may or may not have reserve trees left to attain goals other than regeneration. Also see *Silvicultural System.*

Climax (**forest)** **—**An ecological community that represents the culminating stage of a natural forest succession for its locality (in other words, for its environment).

Coarse woody debris— Dead organic materials, including plant stems, branches, roots, and logs in all stages of decay generally using a greater than 3-inch diameter criterion.

Codominant—Tree species in a forest that are about equally numerous and exert the greatest influence.

Commercial thinning—An intermediate harvest with the objective of reducing stand density primarily to improve growth and enhance forest health and other resource objectives. Treatment can recover potential mortality while producing merchantable material.

Commercial use/activity—A use or activity on National Forest System lands (a) where an entry or participation fee is charged, or (b) where the primary purpose is the sale of a good or service, and in either case, regardless of whether the use or activity is intended to produce a profit (36 CFR 251.51).

Community wildfire protection plan—A plan developed in the collaborative framework that prioritizes areas for hazardous fuel (vegetation) reduction treatments. The plan also recommends the types and methods of treatment on Federal and non-Federal land that will protect one or more at-risk communities and essential infrastructure. The plan also recommends measures to reduce structural ignitability throughout the at-risk community. A CWPP may address issues such as wildfire response, hazard mitigation, community preparedness, or structure protection—or all of the above.

Compaction—A compression of soil resulting in an increase in soil bulk density and a decrease in soil porosity and infiltration. Compaction is commonly due to the weight and vibration of equipment or other traffic on the soil and can commonly affects soil 2 to 12 inches below the surface. Compaction changes or destroys soil structure, reduces infiltration, inhibits water movement, and lowers the soil's air and water holding capacity.

Composition—The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.

Composition (stand)—The proportion of each tree species in a stand expressed as a percentage of the total number, basal area, or volume of all tree species in the stand.

Composition (vegetation)—The proportions of various plant species in relation to the total on a given area; it may be expressed in terms of cover, density, weight, etc.

Conifer—A cone-bearing tree with needle-like or scale-like leaves that are typically evergreen.

Connectivity—The ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change (366 CFR 219.19). Connectivity needs vary by species.

Conservation—The protection, preservation, management, or restoration of natural environments, ecological communities, and species.

Control—With respect to invasive species (plant, pathogen, vertebrate, or invertebrate species), control is defined as any activity or action taken to reduce the population, contain, limit the spread, or reduce the effects of an invasive species. Control activities are generally directed at established free-living infestations, and may not necessarily be intended to eradicate the targeted infestation in all cases.

Corridor—A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries. It can also be identified for wildlife habitat connectivity or for protecting forest resources.

Cover—The elements of the environment used by an animal for hiding.

Cover type—The existing vegetation of an area described by the dominant plant species. Also see "forest type."

Critical habitat—For a threatened or endangered species: (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act (16 USC 1533), on which are found those physical or biological features (a) essential to the conservation of the species, and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with provisions of section 4 of the Endangered Species Act (16 USC 1533), upon a determination by the Secretary [of the Interior] that such areas are essential for the conservation of the species (Endangered Species Act, section 3 (5)(A) [16 USC 1532 (3)(5)(A)]. Critical habitat is designated through rulemaking by the Secretary of the Interior or Commerce (Endangered Species Act, section 4 (a)(3) and (b)(2) [16 USC 1533 (a)(3) and (b)(2)]).

Critical load—The level of atmospheric deposition below which significant harmful effects on specified sensitive elements of the environment are not expected to occur. Atmospheric deposition is the process by which particles, aerosols, dust, and gases move from the atmosphere to the earth's surface via rain, snow, fog, or dry deposition.

Crown cover—Crown cover is the percentage of a fixed area covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of plants above 4.5 feet. Crown closure can be measured from above looking down on the canopy ("bird's-eye view"). The total crown cover percentage of an area cannot exceed 100 percent. This term is most often used to describe forested vegetation in this document.

Crown fire—A crown fire burns in the elevated canopy fuels. Canopy fuels normally consumed in crown fires consist of the live and dead foliage, lichen, and very fine live and dead branch wood found in the forest canopy. There are three types of crown fire: passive, active, and independent.

> **Passive—**Also called torching or candling, this is one in which individual or small groups of trees torch out, but a solid flame is not consistently maintained in the canopy. These can encompass a wide range of fire behavior, from the occasional tree torching to a nearly active crown fire. Passive crowning is common in many forest types, especially those with an understory of shade-tolerant conifers.
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> **Active—**A crown fire in which the entire fuel complex becomes involved, but the crowning phase remains dependent on heat released from the surface fuels for continued spread. Medium- and long-range spotting associated with active crowning leads to an even greater rate of fire growth. Containment of active crown fires is very difficult.
>
> **Independent—**A crown fire that burns in canopy fields without the aid of a supporting surface fire. Independent crown fires are not addressed because they occur so rarely and because no model of their behavior is available.

Culmination of mean annual increment of growth—The age in the growth cycle of an even-aged stand at which the average annual rate of increase of volume is at a maximum.

Cultural resources—The present expressions of human culture and the physical remains of past activities, such as buildings, structures, districts, landscapes, archaeological sites, and objects. They can also include locations that can be significant in national, regional, or local history, architecture, archaeology, engineering, or culture. They include sacred sites and natural features significant to contemporary communities or peoples.

Culvert—Drain or waterway crossing under a road or railroad.

Decision document—A record of decision, decision notice, or decision memo (36 CFR 220.3).

Decommission—Demolition, dismantling, removal, obliteration, or disposal of a deteriorated or otherwise unneeded asset or component, including necessary restoration and cleanup work.

Designated area—An area or feature identified and managed to maintain its unique special character or purpose. Designated areas include congressionally designated areas, such as designed wilderness and national recreation areas. In addition, these areas include recommended wilderness, suitable and eligible wild and scenic river segments, inventoried roadless areas, and research natural areas.

Desired condition—Descriptions of specific social, economic, or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed.

Desired scenic character—Appearance of the landscape to be retained or created over time, recognizing that a landscape is a dynamic and constantly changing community of plants and animals. It is a combination of landscape design attributes and opportunities as well as biological opportunities and constraints.

Detrimental soil disturbance— A degradation of the soil condition that alters the productivity and hydrologic function of a soil. Detrimental soil disturbance is defined by soil displacement, soil compaction, soil puddling, severely burned soil, and soil erosion.

Developed recreation—Recreation use or opportunities occurring at developed sites.

Developed recreation site—An area that has been improved or developed for recreation (36 CFR 261.2). A recreation site on National Forest System lands that has a development scale of 3, 4, or 5:

- Development scale 3 (moderate site modification)—Where facilities are about equal in terms of protection of the natural site and user comfort. The contemporary/rustic design of improvements is usually based on use of native materials. Inconspicuous vehicular traffic controls are usually provided. Roads may be hard surfaced and trails formalized, with the primary access over high-standard roads. Development density is about three family units per acre. Interpretive services are informal, if offered, but generally direct.
- Development scale 4 (heavy site modification)—Where some facilities are designed strictly for users' comfort and convenience, and facility design may incorporate synthetic materials. There may be extensive use of artificial surfacing of roads and trails. Vehicular traffic control usually is obvious, with the primary access usually over paved roads. Development density is three to five family units per acre. Plant materials are usually native. Interpretive services, if offered, are often formal or structured.
- Development scale 5 (extensive site modification)—Where facilities are mostly designed for users' comfort and convenience and usually include flush toilets; they may include showers, bathhouses, laundry facilities, and electrical hookups. Synthetic materials are commonly used. Walks may be formal, and trails may be surfaced. Access is usually by high-speed highways. The development

density is five or more family units per acre. Formal interpretive services are usually available. Plant materials may be nonnative, and mowed lawns and clipped shrubs are not unusual.

Diameter at breast height—The diameter of the stem of a tree measured at breast height (4.5 feet) from the ground. Diameter at breast height in this document implies diameter outside the bark.

Dispersed camping—The practice of camping outside a developed campground, including designated dispersed camping, dispersed vehicular camping, or backcountry camping.

Dispersed recreation—General term referring to recreation use outside developed recreation sites; this includes activities such as scenic driving, hiking, backpacking, climbing, hunting, fishing, snowmobiling, horseback riding, cross-country skiing, and recreation in primitive environments.

Displacement—The movement of soil from one place to another by physical forces, including mechanical (equipment) and human or animal traffic.

Disturbance—An event that alters the structure, composition, or function of terrestrial or aquatic habitats; any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure and/or function and changes resources, substrate availability, or the physical environment. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, and insects and pathogens; human-caused disturbances include actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species (36 CFR 219.19).

Disturbance activities—Activities that result in notable vegetation removal, soil disturbance, and/or altered behavior of wildlife. Examples include, but are not limited to, road construction and timber harvest.

Disturbance regime—A description of the characteristic types of disturbance on a given landscape; the frequency, severity, size, and distribution of these characteristic disturbance types, and their interactions. The natural pattern of periodic disturbances, such as fire or flooding (36 CFR 219.19).

Ditch bill easements—Ditch bill easements are authorized under the Ditch Bill Act. This act authorizes the Secretary of Agriculture to issue permanent easements for water conveyance systems in order to resolve title claims arising under acts repealed by the Federal Land Policy and Management Act of 1976, and for other purposes.

Diversity of plant and animal communities—The distribution and relative abundance or extent of plant and animal communities and their component species, including trees in an area.

Dominant—In ecology, that component of a community (for example, tree species) that is exerting the greatest influence because of its life form or great abundance.

Driver (ecology)—A natural or human-induced factor that directly or indirectly causes a change in an ecosystem. Examples include climate change, fire events, invasive species, and flooding.

Easement—Permissions the Forest Service gives another party to use National Forest System land for a specific purpose (such as private landowners needing to build a road across National Forest System land to their property).

Ecological condition—The biological and physical environment that can affect the diversity of plant and animal communities, the persistence of native species, and the productive capacity of ecological systems. Ecological conditions include habitat and other influences on species and the environment; examples of ecological conditions include the abundance and distribution of aquatic and terrestrial habitats, connectivity, roads and other structural developments, human uses, and invasive species (35 CFR 219.19).

Ecological integrity—The quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence (36 CFR 219.19).

Ecological processes—The physical, chemical, and biological actions or events that link organisms and their environment. Processes include water cycle, nutrient cycling, disturbance response, species composition and structural succession.

Ecosystem (36 CFR 219.19)—A spatially explicit, relatively homogenous unit of the earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. The term ecosystem can be used at a variety of scales; for the forest plan, the ecosystem is referred to spatially at the forestwide and geographic area scales as well as within potential vegetation types. An ecosystem is commonly described in terms of its:

- *Composition:* The biological elements within the different levels of biological organization, from genes and individual plant and animal species to communities (such as cover types).
- *Structure:* The organization and physical arrangement of biological elements, such as snags and down woody debris; vertical (size class and structure class) and horizontal (density) distribution of vegetation; stream habitat complexity; landscape pattern; and connectivity.
- *Function:* Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods.
- *Connectivity:* See “connectivity.”

Ecosystem resilience—See “resilience.”

Ecosystem services—The benefit(s) people obtain from an ecosystem, including: (1) provisioning services, such as clean air and fresh water, energy, fuel, forage, fiber, and minerals; (2) regulating services, such as long-term storage of carbon; climate regulation; water filtration, purification, and storage; soil stabilization; flood control; and disease regulation; (3) supporting services, such as pollination, seed dispersal, soil formation, and nutrient cycling; and (4) cultural services, such as educational, aesthetic, spiritual, and cultural heritage values; recreational experiences; and tourism opportunities (36 CFR 219.19).

Ecotone—Ecotones exist where there is a gradual blending of two ecosystems across a broad area, or they may be manifested as a sharp boundary line. Without periodic disturbance processes such as fire, plants in competition extend themselves on one side of the ecotone as far as their ability to maintain themselves allows. Beyond this, competitors of the adjacent community can take over. As a result, the ecotone can represent a shift in dominance. This zone shifts in location and condition based on climate influences, successional processes, and disturbance processes. Examples include transition zones in riparian areas between terrestrial and aquatic ecosystems or between non-forested grass/shrub communities and forested communities.

Effective ground cover (soils) —For soil inventory purposes, effective ground cover is expressed as a percentage of material, other than bare soil on the land surface. It includes coarse woody debris, litter, duff, surface rocks (large gravels, cobbles, stones, boulders, and rock outcrop), biological crusts, and vegetation in contact with the soil. This estimate of ground cover differs from other resource protocols.

Eligible river—Within the Wild and Scenic River Act, eligibility is an evaluation of whether a candidate river is free flowing and possesses one or more outstandingly remarkable value(s). If found eligible, a candidate river is analyzed as to its current level of development (water resources projects, shoreline development, and accessibility), and a tentative classification is made that it be placed into one or more of three classes: wild, scenic, or recreational. Eligibility and classification represent an inventory of existing conditions.

Endangered species—A species that the Secretary of the Interior or the Secretary of Commerce has determined is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act. Endangered species are listed at 50 CFR 17.11, 17.12, and 224.101.

Energy resources—Renewable (solar, hydropower, wind, biomass, and geothermal) or nonrenewable (oil, natural gas, coal, and tar sand) resources.

Environment—All the conditions, circumstances, and influences surrounding and affecting the development of an organism or group of organisms.

Environmental impact—Used interchangeably with environmental consequence or effect.

Environmental justice community—A community with a meaningfully greater minority or low-income population, compared with the population as a whole.

Ephemeral streams—A channel or draw reach that only carries surface flow in direct response to precipitation. An ephemeral channel may have a defined bed and banks, depending on the physiographic setting, climate, and dominant weather patterns.

Erosion—The detachment and transport of individual soil particles or soil aggregates of soil by wind, water, or gravity. Different forms and levels of soil erosion include sheet wash (fairly even soil loss), rills (small channels), and gullies (channeled erosion deeper than 19 inches or the depth that can be obliterated by a plow).

Even-aged stand—A stand of trees composed of a single-age class in which the range of tree ages is usually ± 20 percent of rotation. One age class comprises greater than 90 percent of total stand basal area most of the rotation. Also see *Silvicultural System.*

Facilities—Real property assets managed for the administration of the national forest. Examples are buildings, administrative pastures and fencing, water systems, wastewater systems, campgrounds, picnic areas, and interpretive sites. For the purpose of this document, facilities do not include roads, trails, dams, or airfields.

Fens—Peat-accumulating wetland that supports marsh-like vegetation, usually fed by mineral-rich surface water or groundwater.

Final regeneration harvest—The final timber harvest in a sequence of harvests designed to regenerate a timber stand or release a regenerated stand. A final regeneration harvest could be a clearcut, removal cut of a shelterwood or seed tree system, or a selection cut.

Fire behavior—The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire control—See "fire suppression."

Fire exclusion—The disruption of a characteristic pattern of fire intensity and occurrence (primarily through fire suppression).

Fire frequency—The number of times that fires occur within a defined area and time period.

Fire intensity—The amount of energy released by a fire; however, no single metric (including reaction intensity, fire line intensity, temperature, residence time, radiant energy, and others) captures all of the relevant aspects of fire energy. Fire line intensity is most frequently used in forested ecosystems.

Fire, managed—See "managed fire."

Fire regime—Description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories get repeated, and the repetitions can be counted and measured, such as the fire return interval. The five natural fire regimes are classified based on the average number of years between fires combined with the severity of the fire (the amount of vegetation replacement) and its effect on the dominant overstory vegetation.

Fire shed—Areas of similar wildfire threat where a similar response strategy could influence the wildfire outcome; fire sheds are conceptually analogous to watersheds.

Fire risk—The probability or chance of fire starting determined by the presence and activities of causative agents.

Fire severity—Describes the immediate effects of fire on vegetation, litter, or soils. Fire severity depends not only on the amount of heat generated by a fire (intensity) but also on the duration and residence time of the fire. While a fast-moving, wind-driven fire may be intense, a long-lasting fire that creeps along in the forest underbrush could transfer more total heat to plant tissue or soil. In this way, a slow-moving, low-intensity fire could have much more severe and complex effects on something like forest soil than a faster-moving, higher-intensity fire in the same vegetation. For this reason, the terms fire intensity and fire severity are not synonymous or interchangeable.

Fire suppression—The work and activities connected with fire extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Flame length—The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface). This is an indicator of fire intensity.

Floodplain—Lowlands bordering streams that are subject to recurrent flooding. Floodplains are composed of sediments carried by streams and deposited on land during flooding.

Forage—Non-woody plants available to livestock or wildlife for feed.

Forage reserve—Allotments on which there is no current term permit obligation for some or all of the estimated livestock grazing capacity.

Forage species—Plants and animals that are food sources for fish, mammals, and birds.

Forb—A herbaceous (herb-like) plant, other than grass or grass-like plants.

Forest—An ecosystem characterized by a more or less dense and extensive tree cover, often consisting of stands varying in characteristics such as species composition, structure, age class, and associated processes.

Foreground (immediate foreground, middleground, and background)—Distance from a viewer to the National Forest landscape being viewed. Immediate foreground usually refers to up to 300 feet; foreground is up to 1/2 mile from the viewer; middleground is from 1/2 to 4 miles from a viewer; background is from 4 miles to the horizon.

Forest health—The perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence of unusual levels of insects or disease, and resilience to disturbance. *Note*, perception and interpretation of forest health are influenced by, for example, individual and cultural viewpoints, land management objectives, and the appearance of the forest at a point in time.

Forest land—An area at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest uses. Lands developed for non-forest use include areas for crops, improved pasture, residential or administrative sites, improved roads of any width and adjoining road clearing, and powerline clearings of any width (36 CFR 219.19).

Forest plan—A document that guides sustainable, integrated resource management of the resources within a plan area and within the context of the broader landscape, giving due consideration to the relative values of the various resources in particular areas (36 CFR 219.1(b)). Consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 USC 528–531), the Forest Service manages National Forest System lands to sustain the multiple use of its renewable resources in perpetuity while maintaining the long-term health and productivity of the land.

Fuels management—An act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives.

Fuels treatment—The manipulation or removal of dead or live plant materials to reduce the likelihood of ignition and/or lessen potential damage and resistance to fire control. Example treatments include lopping, chipping, crushing, piling, and burning.

Fuelwood—Wood used for conversion to some form of energy.

Function—Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods.

Functioning at risk—Wetland or riparian conditions that are in limited functioning condition; however, existing hydrologic, vegetative, or geomorphic attributes make them susceptible to degradation.

Gap (forest canopy)—The space occurring in forest stands due to individual or group tree mortality, blowdown, or removal.

Geographic area—A spatially contiguous land area identified within the plan area. A geographic area may overlap with a management area (36 CFR 219.19).

Geographic information system—A computer process that links database software to graphics (spatially explicit) software and provides database and analytic capabilities.

Geomorphic functionality or integrity—Geomorphic functionality or integrity can be defined in terms of attributes such as slope stability, soil erosion, channel morphology, and other upslope, riparian, and aquatic habitat characteristics.

Global carbon cycle—Process by which carbon moves between the oceans, atmosphere, earth's crust, and terrestrial ecosystems. It includes the places in which carbon is stored (pools), how long it resides there, and the process that transfer it from one pool to another (fluxes).

Grazing—Consumption of range or pasture forage by animals.

Grazing permit—Authorizes livestock to use National Forest System or other lands under Forest Service control for the purpose of livestock production. Term permits are issued for up to 10 years with priority for renewal at the end of the term. On-and-off grazing permits are permits with specific provisions on rangelands, only part of which is National Forest System lands or other lands under Forest Service control. Private land grazing permits are permits issued to persons who control grazing lands adjacent to or within a national forest proclaimed boundary and who waive exclusive grazing use of these lands to the United States for the full period the permit is to be issued (36 CFR 222). Temporary permits are issued for up to 1 year. Examples of temporary permits include livestock use permits for transportation livestock issued to persons engaged in commercial packing or dude ranching.

Greenline—The first perennial vegetation that forms a lineal grouping of community types on or near the water's edge. Most often it occurs at or slightly below the bankful stage.

Ground cover (soils) —Any combination of coarse woody debris, litter, duff, surface rock, vegetation basal area, and biological crusts.

Ground fire—A ground fire burns in ground fuels, such as duff, organic soils, roots, and rotten, buried logs. Ground fires are generally ignited by surface fires and have very low spread rates. For these reasons, ground fires are not predicted or further discussed in this analysis because they would be secondary to and in association with a surface fire.

Ground-disturbing activity—An activity that results in a change in the vegetation cover or topography and that may cause or contribute to sedimentation. Ground-disturbing activities include, but are not limited to, removing vegetation cover, excavating, filling, and grading.

Groundwater—Water in a saturated zone in a geologic stratum. Water stored below the water table where the soil (or other geologic material) is saturated.

Groundwater-dependent ecosystem—A community of plants, animals, and other organisms whose extent and life processes depend on groundwater. Examples include riparian areas, wetlands, groundwater-fed lakes and streams, cave and karst systems, aquifer systems, fens, springs, and seeps.

Group—In silviculture, a unit of harvest or regeneration in group selection. The size of a group depends primarily on the creation of a microclimate conducive to establishment of desired regeneration of particular tolerance. The group size is often expressed as a function of the surrounding tree height. For example, a group size is commonly approximately twice the height of the mature trees. See *patch.*

Habitat—The native environment of an animal or plant.

Habitat type—A habitat type classification provides an ecologically based system of land stratification in terms of vegetation potential. As the habitat type is the basic unit in classifying land units or sites based on their biotic potential, it emphasizes similarities and differences in ecosystems that carry implications for a variety of land management objectives. Habitat types or habitat type groups can have similar biophysical characteristics, and similar function and response to disturbances. A habitat type will produce similar plant communities at natural or near-natural conditions.

Hardened stream crossing—A trail or travel way constructed across a stream that allows livestock to cross or to drink with minimal disturbance to the streambank and channel.

Hazard tree—A tree that has the potential to cause property damage, personal injury, or fatality in the event of a failure, where failure is the mechanical breakage of a tree or tree part. Failures often result from the interaction of defects, weather factors, ice or snow loading, or exposure to wind. Tree hazards may include dead or dying trees, dead parts of live trees, or unstable live trees (due to structural defects or other factors) that are within striking distance of people or property (a target). Defects are flaws in a tree that reduce its structural strength. Trees may have single or multiple defects, which may or may not be detectable. Failures result in accidents only if they strike a target.

Headcutting—A break in slope along a stream profile, which indicates an area of active erosion.

Highly valued resources and assets—The things we care about. Features on the landscape that are influenced positively or negatively, or both, by fire. Some resources have only modest value and may not be analyzed in an assessment of risk to HVRAs. Likewise, low-value assets like outbuildings are often left unanalyzed so that efforts can be focused on the more highly valued resources or assets. Examples include life, property, structures, natural and cultural resources, community infrastructure, public support, economic opportunities such as tourism, and air quality.

Historic property—Any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register of Historic Places.

Homestead—Public land acquired through the Homestead Act of 1862, which accelerated the settlement of the Western Territory by granting 160 acres of surveyed public land for a minimal filing fee and required 5 years of continuous residence and improvements on that land.

Hydric soils—Mineral soils with characteristic features caused by oxidation and a reduction of iron and manganese compounds.

Hydrologic functionality—Hydrologic functionality or integrity relates primarily to flow, sediment, and water quality attributes.

Improvement cutting—An intermediate harvest that removes the less desirable trees of any species in a stand of poles or larger trees, primarily to improve the composition and quality.

Indian tribe—Any Indian or Alaska Native tribe, band, nation, pueblo, village, or other community that is included on a list published by the Secretary of the Interior under section 104 of the Federally Recognized Indian Tribe List Act of 1994 (25 USC 479a-1).

Infrastructure—The collection of human-built improvements such as roads, trails, airfields, facilities, and dams that serve the mission of the national forest.

Intermediate treatment—Any harvest or tending treatment designed to enhance growth, quality, vigor, and composition of the stand after establishment or regeneration and prior to final harvest. Regeneration establishment is not an objective of an intermediate treatment.

Intermittent stream—A stream that has perennial water in a discontinuous manner during all or part of the year, often in pools, longitudinally. Intermittent streamflow can be the result of a discontinuous supply from springs or groundwater seepage, or a discontinuous supply from surface sources, including runoff of rainfall and seasonal snowmelt, or both. Fish-bearing intermittent streams are distinguished from non-fish-bearing intermittent streams by the presence of any species of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams, or travel routes for fish emigrating from lakes; they also may be used as semipermanent habitat in perennial pools of intermittent streams in the pine savanna region.

Invasive plant—Native and nonnative plants that are capable of spreading into native plant communities and disrupting vital ecological processes.

Invasive species—An alien species whose introduction does, or is likely to cause, economic or environmental harm or harm to human health. A species that causes, or is likely to cause, harm and that is exotic to the ecosystem it has infested. Invasive species infest both aquatic and terrestrial areas and can be identified within any of the following four taxonomic categories: plants, vertebrates, invertebrates, and pathogens (Executive Order 13112).

Key ecosystem characteristic—The dominant ecological characteristic(s) that describes the composition, structure, function, and connectivity of terrestrial, aquatic, and riparian ecosystems that are relevant to addressing important concerns about a land management plan. Key ecosystem characteristics are important to establishing or evaluating plan components that would support ecological conditions to maintain or restore the ecological integrity of ecosystems in the plan area.

Land management plan—See “forest plan.”

Land that may be suitable for timber production—A preliminary classification in the process of determining lands that are suited for timber production. This preliminary classification excludes National Forest System lands that are not suitable for timber production based on the factors identified in 36 CFR 219.11(a)(1)(i), (ii), (iv), (v), and (vi); it is made prior to the consideration of the factor at 36 CFR 219.11(a)(iii), which identifies suitability based on objectives and desired conditions established by the plan for those lands.

Landing—A cleared area in the forest to which logs are yarded or skidded for loading onto trucks for transport.

Landscape—A defined area irrespective of ownership or other artificial boundaries, such as a spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area (36 CFR 219.19).

Landtype—A unit shown on an inventory map with relatively uniform potential for a defined set of land uses. Properties of soils landform, natural vegetation, and bedrock are commonly components of landtype delineation used to evaluate potentials and limitations for land use. Landtypes often have common drainage characteristics and patterns.

Landtype association—Map (ecological) units that are aggregates of several specific landtypes. They are defined mainly by their geomorphic processes and development and further described for their geology, landforms, soils, vegetation and climate.

Lease—A contract between the landowner and another granting the latter the right to search for and produce oil, gas, or other mineral substances (as specified in the document) or the right to conduct an activity for a payment of an agreed rental, bonus, or royalty. This right is subject to the terms, conditions, and limitations specified in the document.

Livestock—A type of domestic animal raised for commercial production purposes (for example, cattle).

Long-term persistence—Means a species "continues to exist in the plan area over a sufficiently long period that encompasses multiple generations of the species, the time interval between major disturbance events, the time interval to develop all successional stages of habitat types, or the time interval needed for the overall ecosystem to respond to management" (Forest Service Handbook 1909.12, chapter 20, section 23.13c.1c).

Maintain—In reference to an ecological condition: To keep in existence or continuance of the desired ecological condition in terms of its desired composition, structure, and processes. Depending on the circumstance, ecological conditions may be maintained by active or passive management, or both (36 CFR 219.19).

Managed fire—Selected fire strategy that is less than full suppression; this means full perimeter control regardless of the tactics meant to bring about that control. Managed fire may also be referred to as managed fire for resource benefits, managed natural ignitions, or other similar statements.

Management area—A land area identified within the plan area that has the same set of applicable plan components. A management area does not have to be spatially contiguous (36 CFR 219.19).

Mean annual increment of growth—The total increment of increase of volume of a stand (standing crop plus thinnings) up to a given age divided by that age. In land management plans, the mean annual increment of growth is expressed in cubic measure and is based on the expected growth of stands according to intensities and utilization guidelines in the plan.

Mesic—Receiving a moderate or well-balanced supply of moisture.

Minerals—The Forest Service defines three types of mineral (and energy) resources:

- *Locatable minerals:* Commodities such as gold, silver, copper, zinc, nickel, lead, and platinum, and some nonmetallic minerals such as asbestos, gypsum, and gemstones
- *Salable mineral materials:* Common varieties of sand, stone, gravel, cinders, clay, pumice, and pumicite
- *Leasable minerals:* Commodities such as oil, gas, coal, geothermal, potassium, sodium phosphates, oil shale, and sulfur. On acquired lands, solid minerals are leasable.

Minimum impact suppression tactics (also Minimum impact suppression techniques) **—**Guidelines for fire suppression and post-fire activities that use procedures, tools, and equipment that are commensurate with the fire's potential or existing behavior and produce the least impact on the environment without compromising safety or the effectiveness of suppression efforts.

Mitigate—To avoid, minimize, rectify, reduce, or compensate the adverse environmental impacts associated with an action.

Monitoring—A systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships (36 CFR 219.19).

Motorized route—A National Forest System road or trail that is designated for motorized use on a motor vehicle use map pursuant to 36 CFR 212.51.

Multiple use—Per 16 USC 531, "the management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output, consistent with the Multiple-Use Sustained-Yield Act of 1960" (16 USC 528–531; 36 CFR 219.19).

Municipal watershed—36 CFR 251.9 authorizes the Chief of the Forest Service to enter into agreements with municipalities to restrict the use of National Forest System lands from which water is derived to protect the municipal water supplies (Forest Service Manual 2542) within a given watershed area.

National ambient air quality standards—National air quality standards established by the U.S. Environmental Protection Agency under authority of the Clean Air Act (40 CFR 50) to protect public health and public and ecosystem welfare.

National Forest System—Includes national forests, national grasslands, and the National Tallgrass Prairie (36 CFR 219.19 and 219.62).

National Forest System lands—A nationally significant system of Federally owned units of forest, range, and related land consisting of national forests, purchase units, national grasslands, land utilization project areas, experimental forest areas, experimental range areas, designated experimental areas, other land areas, water areas, and interests in lands that are administered by the USDA Forest Service or designated for administration through the Forest Service.

National Forest System road—Part of a system of permanent roads determined to be needed for the use, protection, and enjoyment of the national forest.

National Forest System trail—Part of a system of permanent trails determined to be needed for the use, protection, and enjoyment of the national forest.

National Wild and Scenic Rivers System—Established in the Wild and Scenic Rivers Act of 1968 (16 USC 1271 (note), 1271–1287; 36 CFR 219.19) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

National Wilderness Preservation System—The Wilderness Act, signed into law in 1964, created the National Wilderness Preservation System and recognized wilderness as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."

Native species—An organism that was historically or is presently in a particular ecosystem as a result of natural migratory or evolutionary processes, and not as a result of an accidental or deliberate introduction into that ecosystem. An organism's presence and evolution (adaptation) in an area are determined by climate, soil, and other biotic and abiotic factors (36 CFR 219.19).

Natural range of variation—The variation of ecological characteristics and processes over scales of time and space that is appropriate for a given management application. The natural range of variation is a tool for assessing the ecological integrity and does not necessarily constitute a management target or desired condition. The natural range of variation can help identify key structural, functional, compositional, and connectivity characteristics, for which plan components may be important for either maintenance or restoration of such ecological conditions.

Natural recovery—The use of natural processes to reforest an area after a disturbance (such as fire) and the acceptance of resulting conditions, even though it may take many years to attain stocked forested conditions.

Non-forest land—Lands that do not meet the definition of forest land.

Noxious weed—A regulatory term defined through Federal and individual state statutes. Noxious weeds are invasive plants capable of successfully expanding their populations into new ecosystems beyond their natural range and can create lasting impacts on native plant communities. Fire, native pests, weather events, human actions, and environmental change can exacerbate impacts.

Nurse tree—A tree, group, or crop of trees, shrubs, or other plants, either naturally occurring or introduced, used to nurture, improve survival, or improve the form of another tree species or crop when young by protecting it from frost, insolation, wind, or insect attack.

Objective—A concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions.

Off-highway vehicle—Any motorized vehicle designed for or capable of cross-country travel.

Outfitting/outfitter guide—To rent on, or deliver to, National Forest System lands for pecuniary remuneration or other gain any saddle or pack animal, vehicle, boat, camping gear, or similar supplies or equipment (36 CFR 251.51).

Outstandingly remarkable values—Within the Wild and Scenic Rivers Act, categories of scenery, recreation, geology, fisheries, wildlife, historic/cultural, or other similar values.

Partnership—Voluntary, mutually beneficial, and desired arrangement between the Forest Service and another or others to accomplish mutually agreed-on objectives consistent with the agency's mission and serving the public's interest.

Passive vegetation management—Passive vegetation management allows for natural forest succession and relies primarily on natural processes, such as wildfire, for changes to vegetation structure.

Patch—A small part of a stand or forest that can be tens, hundreds, or even thousands of acres and a relatively homogenous part of a stand or forest that differs from the surrounding forest. See *group*.

Peatland—A generic term for any wetland that accumulates partially decayed plant matter (peat).

Perennial (streams)—A stream that flows continuously throughout most years and whose upper surface generally stands lower than the water table in the region adjoining the stream.

Permanent road—A National Forest System road intended to remain in service to highway vehicles over the long term. The prerequisite for design, construction, operation, and maintenance is for a sustained service life. For example, features such as bridges and culverts are designed with a service life of 50 years or more.

Permit (special use)—A use authorization that provides permission, without conveying an interest in land, to occupy and use National Forest System land or facilities for specified purposes, and that is both revocable and terminable (36 CFR 251.51).

Permitted grazing—Authorizes livestock use on National Forest System lands. Authorizing permits include grazing permits for commercial livestock production purposes.

Persistence—Continued existence.

Personal use—Normally used to describe the type of permit issued for removal of wood products (firewood, post, poles, and Christmas trees) from National Forest System land when the product is for home use and not to be resold for profit.

Piny**on-juniper woodland—**A common coniferous woodland type in the western United States, where pinyon pines and junipers are codominant trees.

Plan area—The National Forest System lands covered by a forest plan (36 CFR 219.19).

Plant and animal community—A naturally occurring assemblage of plant and animal species living within a defined area or habitat (36 CFR 219.19).

Pole— 1. *Tree size class*—A tree of a size between a sapling and a mature tree. On the Ashley National Forest, a pole may range from 3 to 8 inches at diameter at breast height depending on the species. **2.** *Product class*— A non-sawtimber forest product. On the Ashley National Forest, a pole is generally 2.5 to 5.5 inches in diameter and of unspecified length; lodgepole pine is a preferred species for poles.

Post—A non-sawtimber forest product. On the Ashley National Forest, a post is generally 5.6 to 6.9 inches in diameter and up to 10 feet in length; a variety of species are utilized, with lodgepole pine and juniper being a preferred species for post.

Pre-commercial thinning—An intermediate treatment in which the selective felling, deadening, or removal of trees from a young stand maintain a specific stocking or stand density range. The removal of trees is not for immediate financial return (there is no merchantable product available); rather, it is to reduce stocking to concentrate growth on the more desirable trees.

Prescribed burn or **prescribed fire**—A fire ignited via management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and National Environmental Policy Act requirements (where applicable) must be met, prior to ignition.

Prevention of significant deterioration—An Environmental Protection Agency program that applies to new major sources or major modifications of existing sources of air pollutants in areas that meet the national ambient air quality standards. Prevention of significant deterioration does not prevent sources from increasing emissions; instead, it is designed to protect public health, and ecosystem health and welfare, to preserve, protect, and enhance the air quality in class I areas, such as national parks, and class I wilderness areas to protect economic growth, and to ensure that any decision to permit an increase in air pollution undergoes careful evaluation and consideration, which includes State and Federal air regulatory agencies, land management agencies, and the general public.

Productivity—The capacity of National Forest System lands and their ecological systems to provide the various renewable resources (such as timber) in certain amounts in perpetuity. In land management, productivity is an ecological term, not an economic term (36 CFR 219.19).

Projected timber sale quantity—The estimated quantity of timber meeting applicable utilization standards that is expected to be sold during the plan period. As a subset of the projected wood sale quantity (PWSQ), the projected timber sale quantity includes volume from timber harvest for any purpose from all lands in the plan area based on expected harvests that would be consistent with the plan components. The PTSQ is also based on the planning unit's fiscal capability and organizational capacity. The PTSQ is not a target or a limitation on harvest, and is not an objective unless the responsible official chooses to make it an objective in the plan.

Projected wood sale quantity—The estimated quantity of timber and all other wood products that is expected to be sold from the plan area for the plan period. The PWSQ consists of the projected timber sale quantity as well as other woody material such as fuelwood, firewood, or biomass that is also expected to be available for sale. The PWSQ includes volume from timber harvest for any purpose based on expected harvests that would be consistent with the plan components. The PWSQ is also based on the planning unit's fiscal capability and organizational capacity. The PWSQ is not a target or a limitation on harvest, and is not an objective unless the responsible official chooses to make it an objective in the plan.

Properly functioning condition—When riparian areas have adequate vegetation, landform, or woody material present to dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality; capture sediment and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against erosion; and maintain channel characteristics. Proper functioning condition for groundwater-dependent ecosystems (for example, seeps, springs, wetlands, and shorelines) have adequate vegetation, landform, or debris present to dissipate energies associated with wind action, wave action, and overland flow from adjacent sites, thereby reducing erosion and improving water quality; filter sediment and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize islands and shoreline features against cutting action; restrict water percolation; and develop diverse ponding characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterbird breeding, and other uses. A wetland or riparian area in proper functioning condition will, in turn, provide associate values, such as fish and wildlife habitat and recreation opportunities, and support greater ecological diversity.

Proposed action—A project, activity, or action that a federal agency aims to implement or undertake, and which is the subject of an environmental analysis. Proposed action is a specific term defined under the National Environmental Policy Act.

Protection fire management area—This management area has hazardous fuel (vegetation) conditions that currently put highly valued resources and assets at risk of damage from wildfire. Wildfire is suppressed under most conditions due to the potential economic loss and public safety concerns posed by a wildfire.

Range improvements—Any activity or program on or relating to rangelands that is designed to improve production of forage, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, or provide habitat for livestock and wildlife.

Rangeland health—The degree to which the integrity of the soil, vegetation, and ecological processes are sustained.

Rangelands—Land on which the indigenous vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs and is managed as a natural ecosystem. If plants are introduced, they are managed similarly. Rangelands include natural grasslands, savannas, shrublands, many deserts, tundra, alpine communities, marshes, and meadows.

Reasonable assurance—A judgment the responsible official makes based on best available scientific information and local professional experience that practices based on existing technology and knowledge are likely to deliver the intended results. Reasonable assurance applies to average and foreseeable conditions for the area and does not constitute a guarantee to achieve the intended results.

Reclamation—The restoration of a site or resource to a desired condition to achieve management objectives or stated goals.

Recommended wilderness—An area that has been determined to meet the criteria to be designated as wilderness and that the Forest Supervisor proposes in a land management plan to be recommended to Congress for inclusion into the National Wilderness Preservation System.

Recovery—Denotes improvement in a threatened or endangered species population or viability.

Recreation—The set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations (36 CFR 219.19).

Recreation opportunity—An opportunity to participate in a specific recreational activity in a particular recreation setting to enjoy desired recreational experiences and other benefits that accrue.

Recreation opportunity spectrum—The system that the Forest Service uses to describe an opportunity to participate in a specific recreation activity in a particular recreation setting to enjoy desired recreation experiences and other benefits that accrue. Recreation opportunities include nonmotorized, motorized, developed, and dispersed recreation on land and water, and in the air (36 CFR 219.19).

Recreation setting—The social, managerial, and physical attributes of a place that, when combined, provide a distinct set of recreation opportunities. The Forest Service uses the recreation opportunity spectrum to define recreation settings and categorize them into six distinct classes: primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban. Also see "recreation opportunity spectrum" (36 CFR 219.19).

Regeneration—*Silviculture* **1.** Seedlings or saplings **2.** The act of renewing tree cover by establishing young trees naturally (for example, natural seeding through available seed tree sources or root suckering) or artificially (direct seeding or planting).

Regeneration harvest—Any removal of trees intended to assist in the regeneration of a new age class or to make regeneration of a new age class possible. Regeneration harvest may be through even-aged or uneven-aged methods.

Relative cover—The proportion that a species composes of the total plant cover. Total cover always adds up to 100 percent.

Research natural area—A physical or biological unit in which current natural conditions are maintained to the extent possible. These conditions are ordinarily achieved by allowing natural physical and biological processes to prevail without human intervention. However, under unusual circumstances, deliberate manipulation may be utilized to maintain the unique feature that the research natural area was established to protect (Forest Service Manual 4063.05).

Resilience (ecological)—The ability of a species or its habitat, or both, to recover from stresses and disturbances. Resilient ecosystems regain their fundamental structure, processes, and functioning when altered by stresses, such as increased CO_2, nitrogen deposition, and drought, and disturbances like land development and fire.

Resistance—Capacity of an ecosystem to retain its fundamental structure, processes, and functioning (or remain largely unchanged) despite stresses, disturbances, or invasive species.

Resource value rating—The value of vegetation present on an ecological site for a particular use or benefit, particularly for watershed protection and erosion control. Plants of moderate to high resource value exhibit moderate to high growth habit, plant structure, biomass and/or soil-binding root systems that are conducive to reduce soil erosion.

Response to wildland fire—The mobilization of the necessary services and responders to a fire. The mobilization is based on ecological, social, and legal consequences; the circumstances under which a fire occurs; and the likely consequences on firefighter and public safety and welfare, natural and cultural resources, and values to be protected.

Responsible official—The official with the authority and responsibility to oversee the planning process and to approve a plan, plan amendment, and plan revision (36 CFR 219.19 and 219.62).

Restocked—The condition of the growing space occupancy of trees to be achieved after a disturbance that has substantially altered the existing stocking (see definition of *Stocking*).

Restoration—The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed; ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions (36 CFR 219.19).

Restore—To renew or return to a former state by the process of restoration (see restoration) (36 CFR 219.19).

Revegetation—Establishing or reestablishing desirable plants on areas where desirable plants are absent or of inadequate density, by management alone (natural revegetation) or by seeding or transplanting (artificial revegetation) (Society for Range Management 1999).

Rights-of-way—Legal rights provided by the Forest Service to another party to pass along a specific route through National Forest System land (such as a transmission line passing through a national forest).

Riparian—Of or pertaining to the bank of a body of flowing water; the land adjacent to a river or stream that is at least periodically influenced by flooding. Riparian is sometimes also used to indicate the banks of lakes and ponds subject to periodic inundation by wave action or flooding.

Riparian area—A three-dimensional ecotone of interaction that includes terrestrial and aquatic ecosystems that extend into the groundwater, above the canopy, outward across the floodplain, up the near slopes that drain to the water, laterally into the terrestrial ecosystem, and along the watercourse at variable widths (36 CFR 219.19).

Riparian ecosystem—A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. A riparian ecosystem is identified by soil characteristics and by distinctive vegetation communities that require free or unbounded water.

Riparian management zone—A portion, or portions, of the watershed where riparian-dependent resources receive primary emphasis and management activities are subject to specific standards and guidelines (36 CFR 219.19).

Riparian (vegetation type) —The plant community adjacent to a river, stream, or spring. Riparian vegetation is typified by the presence of hydrophilic (water-loving) plants.

Risk—A combination of the likelihood that a negative outcome will occur and the severity of the subsequent negative consequences (36 CFR 219.19).

Road—A motor vehicle route more than 50 inches wide, unless identified and managed as a trail (36 CFR 212.1; Forest Service Manual 7705).

Road decommissioning—Removal from the road system and taken out of service. The unneeded road corridor would be returned to the natural landscape.

Roadless—The 2001 Roadless Rule establishes prohibitions on road construction, road reconstruction, and timber harvesting on 58.5 million acres of inventoried roadless areas on National Forest System lands. The intent of the 2001 Roadless Rule is to provide lasting protection for inventoried roadless areas within the National Forest System in the context of multiple-use management.

Rotation—The number of years (including the regeneration period) required to establish and grow timber under an even-aged management system to a specified condition or maturity for regeneration harvest.

Sacred site—Executive Order 13007, Indian Sacred Sites defines an Indian sacred site as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significant to, or ceremonial use by, an Indian religion; provided that the Indian Tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

Sagebrush—Any of several North American shrubs or sub-shrubs that are capable of forming vast communities in the semidesert, steppe, and montane regions of the western United States.

Salvage harvest— The removal of dead trees or trees damaged or dying because of injurious agents, other than competition, that recovers economic value that would otherwise be lost, or because the removal of the dead or damaged trees contributes to achieving plan desired conditions or objectives.

Sanitation (cutting)—An intermediate harvest that removes trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and disease.

Sapling—A usually young tree larger than a seedling but smaller than a pole. On the Ashley National Forest, a sapling may range from 1 to 4 inches diameter at breast height depending on the species.

Sawtimber—Trees or logs cut from trees with minimum diameter and length and with stem quality suitable for conversion to lumber. The minimum diameter and length are dependent on species and if the trees are alive or dead.

Scenery Management System— A systematic approach to inventory, analyze, manage, and monitor the scenic resources. This system provides a process to determine the relative value and importance of the national forest scenery and assist in establishing overall resource objectives. This classification system recognizes scenery as the visible expression of dynamic ecosystems functioning within "places", which have unique aesthetic and social values. It describes the existing and desired conditions of scenic character within the plan area and is structured to emphasize "natural appearing" scenery.

Scenic character—A combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity (2012 Planning Rule and 36 CFR 219.19). The scenic character description incorporates the visible natural physical and biological features, as well as the context and ways the scenery is viewed and experienced. A scenic character description also includes the viewing context and associations that viewers have with that scenery based on visible historic and cultural elements and significant and broadly relevant special places.

Scenic integrity objectives—Serve as thresholds of allowable visual dominance by landscape modifications and deviations from the valued scenic character; they describe the lowest allowable scenic integrity level for an area. They describe the degree to which a landscape is visually perceived to be complete when compared with the scenic character of that area.

> Very high scenic integrity refers to landscapes where the valued scenic character is intact with only minute, if any, deviations. Generally provides for ecological changes only.
>
> High scenic integrity refers to landscapes where the valued scenic character appears intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the scenic character so completely and at such scale that they are not evident.
>
> Moderate scenic integrity refers to landscapes where the valued scenic character appears slightly altered. Noticeable deviations must remain visually subordinate to the scenic character being viewed.
>
> Low scenic integrity refers to landscapes where the valued scenic character appears moderately altered. Deviations begin to dominate the valued scenic character being viewed, but they borrow valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetation type changes, or architectural styles outside the landscape being viewed. The deviations should not only appear as valued scenic character outside the landscape being viewed but compatible or complementary to the character within.
>
> Very low scenic integrity refers to landscapes where the valued scenic character appears heavily altered. Deviations may strongly dominate the valued scenic character. They may not borrow from valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetation type changes, or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

Scenic river—Within the Wild and Scenic River Act, a tentative classification of a river or sections of a river that are free of impoundments; shorelines or watersheds are still largely primitive, and shorelines are largely undeveloped but accessible in places by roads.

Section 106 process—Regulations implementing the National Historic Preservation Act of 1966, which describe the procedures for identifying and evaluating historic properties, assessing the impacts of Federal actions on historic properties, and project proponents consulting with appropriate agencies to avoid, reduce, or minimize adverse effects.

Secure habitat—An area with low levels of human disturbance or habitat that allows a wildlife species to remain in a defined area despite an increase in stress or disturbance. The components of secure habitat can include vegetation, topography, the size of the patches of vegetation, road density, distance from roads, intensity of the disturbance, and seasonal timing of the disturbance. This general definition covers most uses of the term secure habitat, except for elk and grizzly bear, which have specific definitions.

Sediment—Solid mineral and organic material that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice.

Sediment delivery—The delivery of sediment to a waterbody via overland flow, mass wasting, human activity, or some other means.

Seed tree (methods)—An even-aged (or two-aged with reserves) regeneration harvest method or cutting procedure that regenerates and maintains a stand with a single age class by cutting all trees except for a small number of widely dispersed trees retained for seed production and to produce a new age class in an exposed microenvironment. Seed trees are usually removed after regeneration is established. The seed tree method may or may not have reserve trees left to attain goals other than regeneration. Also see *Silvicultural System.*

Seep—A wet area where a seasonal high water table intersects with the ground surface. Seeps that meet the definition of a wetland are included in the riparian corridor.

Selection (uneven-aged methods)—An uneven-aged regeneration harvest method or cutting procedure that regenerates and maintains a multi-aged structure by removing some trees in all size classes either singly, in small groups, or in strips, allowing for a new age class to establish. Also see *Silvicultural System.*

Seral—A biotic community that is developmental; a transitory stage in an ecological succession.

Seral/structural stage—A phase of development of an ecosystem in ecological succession from a disturbed, relatively unvegetated state to a complex, mature plant community.

Shade intolerant—Having the capacity to compete for survival under direct sunlight conditions.

Shade tolerant—Having the capacity to compete for survival under shaded conditions.

Shall—Indicates mandatory direction, equal to “must.” Shall is typically used in forest plan standards.

Shelterwood (methods) —An even-aged (or two-aged with reserves) regeneration harvest method or cutting procedure in which, in order to provide a source of seed and/or protection for regeneration, the old crop (the shelterwood) is removed in two or more successive cuttings, the first of which is ordinarily the seed cutting (though it may be preceded by a preparatory cutting), and the last is the final cutting. Part of the shelterwood could be retained as reserves to attain goals other than regeneration and to create a two-aged stand. Also see *Silvicultural System.*

Should—Indicates preferred direction that should be fully considered. However, departure is allowed for specific circumstances when deviation achieves the desired results, and the purpose and intent of the direction are met. Should is typically used in forest plan guidelines.

Shrub—Perennial, multi-stemmed woody plant that is usually less than 13 to 16 feet in height. Shrubs typically have several stems arising from or near the ground, but they may be taller than 16 feet or single stemmed under certain environmental conditions.

Side-by-side off-highway vehicle—A small four-wheel drive utility terrain or recreational off-highway vehicle that can seat two to six people.

Significant cave—A cave located on National Forest System lands, managed under authority of the Cave Resource Protection Act, which has been determined to contain significant, biota, cultural, geologic, mineralogic or palaeontologic, hydrologic, recreational, educational, or scientific resources or opportunities.

Significant federal cave—A natural cave located on federal lands, which has been evaluated and found to meet the criteria for designation as a significant federal cave. The criteria for designation as a significant federal cave include biota, cultural, geologic, mineralogic, paleontologic, hydrologic, recreational, educational, or other scientific resources or opportunities.

Silviculture—The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes to meet the diverse needs and values of landowners and society on a sustainable basis.

Silvicultural System—A management process whereby forests are tended, harvested, and replaced resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration, and according to the type of forest thereby produced. The system name is based on the number of age classes (for example, even-aged, two-aged, and uneven-aged) or the regeneration method (for example, clearcutting, seed tree, shelterwood, and selection) used.

Site potential tree—The average maximum height of the tallest dominant trees for a given site class.

Skid trails—A cleared corridor used in timber harvest to transport trees by dragging them along the ground to the landing/processing area.

Slash—The residue left on the ground after felling and other silvicultural operations, or that has accumulated there as a result of storms, fire, or natural pruning.

Slash piles—Woody residue that has been moved, either mechanically or by hand, into piles for burning.

Slope distance—In terms of riparian management zones, slope distance is considered the linear distance along the ground surface, traveling directly upslope (along the steepest gradient), away from the seasonal high-water level of a waterbody (stream, pond, lake, spring, or wetland).

Snag—A standing dead tree usually greater than 5 feet in height and 6 inches in diameter at breast height.

SNOTEL—An automated system of snowpack and related climate sensors operated by the Natural Resources Conservation Service of the United States Department of Agriculture in the western United States.

Soil productivity—The ability of soil to sustain vegetation, which depends on the amount of nutrients and water the soils contain and can release to plants.

Soil quality—The capacity of soil to perform these functions: to sustain plant and animal activity and productivity; to regulate water and solute flow; to store and cycle nutrients and carbon; to provide physical support; and to filter, buffer, and degrade organic and inorganic materials.

Source water protection areas—The area delineated by a state or tribe for a public water system or including numerous public water systems—whether the source is groundwater or surface water, or both—as part of a state or tribal source water assessment and protection program approved by the Environmental Protection Agency under section 1453 of the Safe Drinking Water Act (42 USC 300h-3(e); 36 CFR 219.19) or any subsequent laws applicable to public water systems that provide water for human consumption.

Special-use permit (special-use authorization)—A written permit, term permit, lease, or easement that authorizes use or occupancy of National Forest System lands and specifies the terms and conditions under which the use or occupancy may occur (30 CFR 251.51).

Species of conservation concern—A species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the Regional Forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long term in the plan area (36 CFR 219.9(c)).

Spring—A water source located where water begins to flow from the ground due to the intersection of the water table with the ground surface. The source generally flows throughout the year. Springs that are the source of perennial or intermittent streams are included in the riparian corridor.

Spotting—Behavior of a fire producing sparks or embers that the wind carries and that start new fires beyond the zone of the main fire's direct ignition.

Stand—A community of trees occupying a specific area and sufficiently uniform in canopy composition, age, and size class to be a distinguishable unit, forming a single management entity.

Standard—A mandatory constraint on project and activity decision-making; a standard is established to help achieve or maintain the desired condition or conditions, avoid or mitigate undesirable effects, or meet applicable legal requirements.

Stand-replacing fire—A fire that is lethal to most of the dominant aboveground vegetation and substantially changes the vegetation structure. Stand-replacement fires may occur in forests, woodlands and savannas, annual grasslands, and shrublands. They may be crown fires or high-severity surface fires or ground fires.

Stocking—An indication of growing space occupancy of trees relative to plan-defined desired conditions for the stand or area. Common indices of stocking include the number of trees by size and spacing, percent occupancy, basal area, relative density, or crown completion factor.

Stressors—Factors that may directly or indirectly degrade or impair ecosystem composition, structure, or ecological process in a manner that may impair its ecological integrity; examples include an invasive species, the loss of connectivity, or the disruption of a natural disturbance regime (36 CFR 219.19).

Stubble height—The height of forage plants remaining after grazing has occurred; average stubble height includes both grazed and un-grazed plants (Forest Service Handbook 2209.13, chapter 90).

Succession/successional stage—A predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as "seral" or "successional" stages.

Suitability of lands—A determination made regarding the appropriateness of various lands in a plan area for various uses or activities, based on the desired conditions applicable to those lands. The terms suitable and suited, and not suitable and not suited can be considered the same.

Suppression—All the work of extinguishing a fire or confining fire spread.

Surface disturbing activities —– Actions that alter the vegetation, surface/near surface soil resources, and/or surface geologic features beyond natural site conditions and on a scale that affects other public land values. Examples of surface disturbing activities may include operation of heavy equipment to construct well pads, roads, pits, and reservoirs; installation of pipelines and power lines; maintenance activities; and several types of vegetation treatments (e.g., prescribed fire, etc.).

Surface fire—A fire that burns in the surface fuel layer, which lies immediately above the ground fuel but below the canopy or aerial fuels. Surface fuels consist of needles, leaves, grass, and dead and down branch wood and logs, shrubs, low brush, and short trees. Surface fire behavior varies widely, depending on the nature of the surface fuel complex. Surface fires are generally easier to contain than any type of crown fire.

Sustainability—The capacity to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For the purposes of this part, "ecological sustainability" refers to the capability of ecosystems to maintain ecological integrity; "economic sustainability" refers to the capability of society to produce and consume or otherwise benefit from goods and services, including contributions to jobs and market and nonmarket benefits; and "social sustainability" refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another, and support vibrant communities (36 CFR 219.19).

Sustainable recreation—The set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations (36 CFR 219.19).

Sustained yield limit—The amount of timber, meeting applicable utilization standards, "which can be removed from [a] forest annually in perpetuity on a sustained-yield basis" (NFMA at section 11, 16 U.S.C. 1611; 36 CFR 219.11(d)(6)). It is the volume that could be produced in perpetuity on lands that may be suitable for timber production. Calculation of the limit includes volume from lands that may be deemed not suitable for timber production after further analysis during the planning process. The calculation of the SYL is not limited by land management plan desired condition, other plan components, or the planning unit's fiscal capability and organizational capacity. The SYL is not a target but is a limitation on harvest, except when the plan allows for a departure.

Terrestrial—Term in biology generally used to describe living organisms that live and grow on land, as opposed to air or water.

Thalweg—The longitudinal profile line, or line connecting the lowest points along a streambed.

Thinning—A cutting made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality.

Threatened species—A species that the Secretary of the Interior or the Secretary of Commerce has determined is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act. Threatened species are listed at 50 CFR 17.11, 17.12, and 223.102.

Thresholds (ecological)—Points in space and time at which one or more of the primary ecological processes responsible for maintaining the sustained equilibrium of the ecological state degrades beyond the point of self-repair. Examples of thresholds include soil erosion and nutrient loss so severe that some plants cannot grow; invasion of a site by a plant that is so dominant that other plants cannot compete; and a change in the plant community structure—the arrangement of plants on the site—so that fire, a naturally occurring event that directs ecosystem change, cannot occur or occurs in a more destructive way.

Timber harvest—The removal of trees for wood fiber use and other multiple-use purposes (36 CFR 219.19).

Timber production—The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use (36 CFR 219.19).

Topography—The configuration of a land surface, including its relief, elevation, and the position of its natural and human-made features (mapping).

Total ground cover—The proportion of the soil surface covered by vascular plant parts, litter, rocks, mosses, and lichens. Vascular plant parts include both aerial (canopy and foliar cover, standing live and dead vegetation, and biomass) and basal cover.

Total maximum daily load—A pollution budget that includes a calculation of the maximum amount of a pollutant that can occur in a waterbody and allocated the necessary reductions to one or more pollutant sources (such as metals, sediment, and turbidity). A total maximum daily load serves as a planning tool and potential starting point for restoration or protection activities with the ultimate goal of attending or maintaining water quality standards.

Traditional cultural property—A subset of historic properties. Traditional cultural properties are historic properties that are in the main or in part eligible for listing on the National Register of Historic Places because of their "association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998).

Trail—A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212.1).

Trail class—A range of categories (1–5) that reflects the level of trail development, with 1 being the least developed and 5 the most developed.

Trailhead—The transfer point between a trail and a road, lake, or airfield. The area may have developments that require or facilitate the transfer from one transportation mode to another.

Transmission line—The facility in an electric power system used to move large amounts of power from one location to a distant location; a transmission line is distinguished from a distribution line by higher voltage, greater power capability, and greater length. Transmission system voltages are typically from 69 kilovolts up to 765 kilovolts.

Treaty rights—Those rights or interests reserved in treaties for the use and benefit of tribes. The nature and extent of treaty rights are defined in each treaty. Only Congress may abolish or modify treaties or treaty rights.

Two-aged stand—A growing area with trees of two distinct age classes separated in age by more than ± 20 percent of rotation. Each age class comprises greater than 10 percent of the basal area most of the rotation. Also see *Silvicultural System.*

Two-aged system—A planned sequence of treatments designed to regenerate or maintain a timber stand with two age classes. A two-aged system is a form of even-aged management.

Unauthorized road or trail—A road or trail that is not a National Forest System road or trail, or a temporary road or trail and that is not included in a forest transportation atlas.

Understory—Plant communities that live under the canopy of trees, shrubs, or the dominant plant of the community.

Uneven-aged stand—A stand of trees of three or more distinct age classes, either intimately mixed or in groups. Also see *Silvicultural System.*

Unplanned ignition—The start of a wildland fire by lightning, volcanoes, and unauthorized and accidental human-caused fires.

Untrammeled—A term defined in the context of the Wilderness Act as an area where human influence does not impede the free play of natural forces or interfere with natural processes in the ecosystem.

Utilization standards (timber)—Specifications for merchantable forest products offered in a timber sale.

Values at risk—Ecological, social, and economic assets and resources that fire or fire management actions could affect. Examples include life, property, structures, natural and cultural resources, community infrastructure, public support, economic opportunities such as tourism, and air quality.

Vegetation condition class—Depiction of the degree of departure from historical fire regimes, possibly resulting in alternations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the fire regime groups. Based on the coarse-scale national data, they serve as generalized wildfire rankings.

Vegetation management—A process that changes the composition and structure of vegetation to meet specific objectives, using such means as prescribed fire, timber harvest, or thinning. For the purposes of this document, the term does not include removing vegetation for permanent developments such as mineral operations, ski runs, trails, or roads, and it does not apply to unplanned wildland fire or permitted livestock grazing.

Vegetation management practices—Silvicultural practices such as reforestation, prescribed fire, thinning to reduce stand density, and other practices designed to facilitate growth and development of trees.

Vegetation type conversion—A change from one vegetation type to another (for example, tree to shrub) or from one tree species to another.

Vegetative structural stage—Vegetative structural stage is a generalized description of the structural stages a stand passes through as it ages. Classification into one VSS or another is based on the diameter class containing the greatest basal area (Reynolds et al. 1992). Stands can be placed into one of many stages (usually six) ranging from grass/forb to old forest. Note that the term *old* and others like it are using tree size as a proxy to age [class], as tree ages are not used to assign a stand to a stage. VSS classification is generally not appropriate to apply to uneven-aged stands.

Watershed—A region or land area drained by a single stream, river, or drainage network; a drainage basin (36 CFR 219.19).

Watershed condition—The state of a watershed based on physical and biogeochemical characteristics and processes (36 CFR 219.19).

Wetland—Those areas that are inundated by surface water or groundwater. The water has a frequency sufficient to support and that, under normal circumstances, do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, fens, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

Wild and scenic river—A river designated by Congress as part of the National Wild and Scenic Rivers System, which was established in the Wild and Scenic Rivers Act of 1968 (16 USC 1271 (note), 1271–1287; 36 USC 1131–1136).

Wild river—Within the Wild and Scenic River Act, a tentative classification of a river or sections of a river that is free of impoundments and generally inaccessible except by trail; the watersheds or shoreline are essentially primitive, and waters are unpolluted. These represent vestiges of primitive America.

Wilderness—Any area of land designated by Congress as part of the National Wilderness Preservation System that was established in the Wilderness Act of 1964.

Wildfire—A naturally caused wildland fire (for example, from lightning) or human-caused fire, and considered an emergency management situation.

Wildland—Forests, shrub lands, grasslands, and other vegetation communities that have not been significantly modified by agriculture or human development.

Wildland fire—Any non-structure fire that occurs in the wildland. There are two types of wildland fire: unplanned (natural or human-caused wildfire) and planned (prescribed fire).

Wildland-urban interface—A term as defined by the Healthy Forest Restoration Act section 101. It is the area adjacent to an at-risk community that is identified in the community wildfire protection plan. If there is no community wildfire protection plan in place, the wildland-urban interface is the area 0.5 miles from the boundary of an at-risk community, or within 1.5 miles of the boundary of an at-risk community if the terrain is steep, there is a nearby road or ridgetop that could be incorporated into a fuel break, the land is in condition class 3, or the area contains an emergency exit route needed for safe evacuations.

Without preference—A grazing permit that is waived back to the Forest Service without preference of a new permit designee.

Woodland—A forested plant community in which, in contrast to a typical forest, the trees are often small, characteristically short-boled relative to their crown depth.

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