Appendix D
Persistence Analysis

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Appendix D. Persistence Analysis for Species of Conservation Concern

Introduction

2012 Planning Rule Framework for Species Persistence Analysis

The 2012 Planning Rule[1] requires the Forest Service to include plan components,[2] to "maintain or restore": (1) "the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area," and (2) "the diversity of ecosystems and habitat types throughout the plan area." It also requires plans be based on a complementary ecosystem and species-specific approach; this approach is referred to as the coarse-filter and fine-filter approach.

Under 36 CFR 219.9(b)(1), the responsible official (here the Forest Supervisor for the Ashley National Forest) must determine whether the plan components required by 36 CFR 219.9(a) provide the ecological conditions necessary to "contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern[3] within the plan area." The 2012 Planning Rule sets forth three possible outcomes of the responsible official's analysis of plan components with respect to species of conservation concern. Additionally, a fourth outcome may arise when the responsible official has developed a set of ecosystem-level plan components they think will provide for species persistence, but the responsible official also provides supplementary species-specific plan components for greater emphasis and clarity (all four determinations are presented in the "Determination" section below).

The 2012 Planning Rule defines a "viable population" as "[a] population of a species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments."[4] The Forest Service Handbook 1909.12, section 23.13c (1)(b) notes that the preamble to the proposed planning rule[5] addresses the meaning of the word "population" for planning purposes, explaining: "the individuals of a species of conservation concern that exist in the plan area will be considered to be members of one population of that species."

This species persistence analysis documents the basis for the responsible official's determination for each species of conservation concern in the plan area.

Summary of Determination Outcomes

Determinations for each species will have one of four possible outcomes:

[1] 36 CFR 219.9(a)

[2] The 2012 Planning Rule sets forth five required plan components (desired conditions, objectives, standards, guidelines, and suitability of lands) and one optional plan component (goals) (36 CFR. 219.7(e)(1)–(2)). 36 CFR 219.7(f)(1)–(2) sets forth other required and optional content in the plan.

[3] A "species of conservation concern" is defined as 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)).

[4] 36 CFR 219.19

[5] 77 *Federal Register* 21217, April 9, 2012

The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of the [SPECIES NAME] in the plan area. No additional species-specific plan components are warranted.

The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of the [SPECIES NAME] in the plan area. Nonetheless, additional species-specific plan components have been provided for added clarity or measures of protection, or both.

The ecosystem plan components may not provide the ecological conditions necessary to maintain a viable population of the [SPECIES NAME] in the plan area. Therefore, additional species-specific plan components have been provided. The combination of ecosystem and species-specific plan components should provide the ecological conditions necessary to maintain a viable population of the [SPECIES NAME] in the plan area.

It is beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of the [SPECIES NAME] in the plan area. Nonetheless, the plan components should maintain or restore ecological conditions within the plan area to contribute to maintaining a viable population of the species within its range.

Table D-1 summarizes the responsible official's determination for each of the at-risk species with the potential to exist on the Ashley National Forest plan area over the life of the forest plan (i.e., 15 years). If it is unknown if an existing viable population exists within the plan area, the determination outcome defaulted to being beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain viable populations of the species. However, this does not mean forest plan components disregard these species' persistence or habitat needs. In most cases, forestwide or ecosystem-level components to maintain terrestrial, aquatic, and special habitats and forestwide species direction will provide the needed management to maintain or expand a local population, if one exists.

Table D-1. Summary of Determination Outcomes for the Ashley National Forest

Species	At-Risk Species	Status[1]	Determination Outcome*			
			1	2	3	4
Mammals	Canada lynx (*Lynx canadensis*)	FT				X**
	Bighorn sheep (*Ovis canadensis*)	SCC			X	
	Fringed myotis (*Myotis thysanodes*)	SCC		X		
	Pygmy rabbit (*Sylvilagus idahoensis*)	SCC		X		
Birds	Black rosy-finch (*Leucosticte atrata*)	SCC	X			
	Greater sage-grouse (*Centrocercus urophasianus*)	SCC			X	
	Peregrine falcon (*Falco peregrinus*)	SCC		X		
Fish	Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus)*	SCC			X	
Terrestrial Invertebrates	Eureka mountain snail (*Oreohelix eurekensis*)	SCC				X

Species	At-Risk Species	Status[1]	Determination Outcome*			
			1	2	3	4
Plants	Ute ladies'-tresses (*Spiranthes diluvialis*)	FT	X			
	Handsome pussytoes (*Antennaria pulcherrima*)	SCC	X			
	Graham's columbine (*Aquilegia grahamii)*	SCC	X			
	Ownbey's thistle (*Cirsium ownbeyi*)	SCC	X			
	Evert's wafer parsnip (*Cymopterus evertii*)	SCC		X		
	Clustered lady's slipper (*Cypripedium fasciculatum*)	SCC	X			
	Wasatch draba (*Draba brachystylis*)	SCC	X			
	Rockcress draba (*Draba globosa*)	SCC	X			
	Tundra draba (*Draba ventosa)*	SCC	X			
	Untermann's daisy (*Erigeron untermannii)*	SCC	X			
	Compound kobresia (*Kobresia simpliciuscula)*	SCC	X			
	Huber's pepperplant (*Lepidium huberi)*	SCC	X			
	Goodrich's blazingstar (*Mentzelia goodrichii)*	SCC	X			
	Maybell locoweed (*Oxytropis besseyi* var. *obnapiformis)*	SCC	X			
	Alpine poppy (*Papaver radicatum* var. *kluanense)*	SCC	X			
	Stemless beardtongue (*Penstemon acaulis)*	SCC	X			
	Desert phacelia (*Phacelia glandulosa* var. *deserta)*	SCC	X			
	Silvery primrose (*Primula incana)* R	SCC	X			

[1]SCC = species of conservation concern; FT = federally threatened

*Determination outcomes:

1. The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of the [SPECIES NAME] in the plan area. No additional species-specific plan components are warranted.
2. The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of the [SPECIES NAME] in the plan area. Nonetheless, additional species-specific plan components have been provided for added clarity or measures of protection, or both.
3. The ecosystem plan components may not provide the ecological conditions necessary to maintain a viable population of the [SPECIES NAME] in the plan area. Therefore, additional species-specific plan components have been provided. The combination of ecosystem and species-specific plan components should provide the ecological conditions necessary to maintain a viable population of the [SPECIES NAME] in the plan area.
4. It is beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of the [SPECIES NAME] in the plan area. Nonetheless, the plan components should maintain or restore ecological conditions within the plan area to contribute to maintaining a viable population of the species within its range

**The determination outcome for the lynx is a modification of outcome 4: It is not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of Canada lynx in the plan area. Nonetheless, the plan components should maintain or restore ecological conditions within the plan area to contribute to maintaining peripheral habitat that may support lynx dispersal.

Ecosystem-Level and Species-Specific Plan Components for Species at Risk

Several coarse-filter ecosystem-level plan components focus on at-risk species and species of conservation concern; however, these components are not necessarily species specific. They add additional emphasis to key ecological conditions for many species of conservation concern. While generally broad, these plan components provide for ecosystems and habitat conditions for resiliency to disturbance (both natural and human caused) and the effects of climate change and widespread tree mortality. They also mitigate site-specific effects that might occur during projects or forest management activities implemented under forest plans in riparian areas, watersheds, terrestrial ecosystems, recreation areas, and wilderness. The specific ecosystem-level plan components that would help alleviate threats to at-risk species are listed and discussed in the individual species evaluations below. For some species, additional species-specific components are included to further mitigate specific threats. These are also listed and discussed in the individual species evaluations below.

Individual Species Evaluations

Background

Individual evaluations summarize the key ecological conditions and risk factors for each species, and the plan components that mitigate those risk factors, provide for persistence, and contribute to maintaining a viable population within the plan area. For more information on at-risk species, such as the current distribution in the plan area, see appendix B, At-Risk Species Tables.

Key threats to persistence, the most relevant summarized plan components that alleviate those threats, and a summary of why plan components do or do not provide for viability in the plan area are described for each wildlife species of conservation concern. Plan components cannot prevent all adverse impacts on individuals of the species; the Forest Service has designed the plan components to provide for viability of the species population at the plan level only and with consideration of management activities over the duration of the forest plan (15 years).

Mammals

Canada lynx

Determination: It is not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of Canada lynx in the plan area. Nonetheless, the plan components should maintain or restore ecological conditions within the plan area to contribute to maintaining peripheral habitat that may support lynx dispersal.

General Key Ecological Conditions: Key ecological conditions include forested areas, including Engelmann spruce, subalpine fir, lodgepole pine, Douglas-fir, and aspen, and areas of dense understory cover and/or thickets of young trees and mature forests with large amounts of coarse, woody debris (Forest Service 2017a). The Ashley National Forest contains peripheral habitat for Canada lynx; this peripheral habitat is unoccupied and incapable of supporting self-sustaining populations (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).

Key Threats to Persistence: Key threats to the species' persistence are the general loss or degradation of habitat; habitat fragmentation, loss, or degradation through activities such as timber harvest and road building; insect and disease outbreaks; and climate change (Forest Service 2017a).

Summary: The Ashley National Forest is considered a peripheral area for Canada lynx that is incapable of supporting self-sustaining populations (Interagency Lynx Biology Team 2013). The Ashley National Forest is isolated from core Canada lynx areas, and there is a lack of historical evidence of reproduction of Canada lynx on the Ashley (Interagency Lynx Biology Team 2013). Between 1999 and 2007, 22 lynx from the experimental release site in Colorado were located at least once in Utah. Use density of these locations indicates the primary area of use was in the Uinta Mountains. All individuals were transient and did not take up residency in the Uinta Mountains (Forest Service 2017b).

The 2007 Northern Rockies Lynx Management Direction determined the Ashley National Forest does not support Canada lynx and only contains unoccupied lynx habitat. Thus, the plan area does not contain a viable Canada lynx population and is unlikely to ever support a breeding female lynx (Interagency Lynx Biology Team 2013). However, forest management in the form of desired conditions, goals, and standards for general wildlife, terrestrial and forest vegetation, timber, soils, watersheds and aquatic ecosystems, riparian management zones, and carbon storage and sequestration would maintain ecological conditions in the plan area to contribute to maintaining the area as peripheral lynx habitat for possible lynx dispersal movements from core Canada lynx areas.

A large portion of this species' peripheral habitat on the Ashley National Forest is remote and receives little human-related impacts. Still, forest management activities have been identified as a short-term threat to lynx peripheral habitat. Timber harvest, prescribed fire, fuels reduction treatments, road presence and construction, and recreation may cause disturbance and contribute to habitat degradation and fragmentation, which may limit the suitability and individual's use of peripheral habitat.

Threats to peripheral habitat from forest management activities are primarily addressed through forestwide plan components in Table D-2, which details plan components that address key ecological conditions for lynx habitat, such as large trees; dense, early successional coniferous stands; and structural diversity (FW-GL-WL 11). Forestwide plan components emphasize resilient, connected forests containing the complex structural attributes for dispersing lynx that could infrequently move through or reside temporarily in the area (FW-DC-TV 01 through 09; FW-GL-TV 01 through 04; FW-DC-FVA 01 and 02; FW-DC-FVC 01 and 02; FW-OB-FVC 01; FW-GL-FVA 02 through 04; FW-GL-TI 02 through 04).[6] Because a key requirement of peripheral habitat on the forest is foraging habitat (snowshoe hare and red squirrel habitat; Interagency Lynx Biology Team 2013), a specific guideline for lynx emphasizes a mosaic of multistory and dense, early successional coniferous and mixed coniferous/deciduous stands (FW-GL-WL-11). This species-specific component would support prey populations and provide lynx cover for stalking prey (Interagency Lynx Biology Team 2013). This would help maintain peripheral habitat for possible dispersal of Canada lynx onto the Ashley National Forest (FW-GL-WL 11), thereby alleviating threats from habitat loss and degradation.

Ecological stressors such as climate change and insect and disease outbreaks are another threat to lynx peripheral habitat on the Ashley National Forest (Forest Service 2017a, 2017b), but the implications of climate change are unclear (Halofsky et al. 2018a, 2018b). A reduction in deep snow would decrease winter foraging opportunities, but increases in mast-producing hardwoods may increase structural diversity and habitat features within aspen/conifer mixed stands. Increases in the rate of loss of mature

[6] The full language of the forest plan components listed here and throughout this document is provided in appendix E, Forest Plan.

trees and fragmentation from open-canopied areas caused by wildfire could reduce peripheral habitat availability by reducing habitat for prey, such as red squirrels, and therefore foraging opportunities. Currently, most of the landscape is not resilient to large, high-intensity fire, and is susceptible to drought and insect and disease outbreaks. Conifer mortality associated with insects tends to increase whenever annual precipitation is considerably less than the historical average (drought).

The beetle epidemic has already decreased some lynx peripheral habitat on the Ashley National Forest; however, the lynx peripheral habitat is likely to persist as the conifer stands affected by the beetle epidemic regenerate over time. As this occurs, young, regenerating conifer stands, as well as snags falling to the forest floor over time, are likely to increase; these components would provide temporary areas for foraging and denning that may be used by dispersing lynx that move through peripheral habitat (Forest Service 2017b). However, moisture stress and the frequency and severity of bark beetle outbreaks are projected to increase with increasing temperatures, resulting in widespread tree mortality (Halofsky et al. 2018a, 2018b).

Threats to peripheral habitat from ecological stressors are primarily addressed through the forestwide plan components in Table D-2. General guidelines for wildlife aim to maintain at-risk species' persistence on the Ashley National Forest by providing necessary habitat features and connectivity. Achieving desired conditions in terrestrial and forest vegetation would reduce threats from ecological factors by increasing the resiliency of ecosystems to stressors, such as fire, insects, pathogens, and climate variability (FW-DC-TV 01 to 09). Additionally, multiple plan components emphasize a timber harvest program that promotes ecosystem health, sustainability, and resilience by modifying the composition, density, structure, and spatial arrangement of vegetation to achieve desired conditions. Such treatments may prevent future adverse effects on lynx peripheral habitat associated with climate change, widespread tree mortality, and wildfire. A specific guideline to reduce tree susceptibility to bark beetle attack (FW-GL-FVC 01) would help reduce the loss of lynx peripheral habitat from beetle kill.

Desired conditions for diverse and productive plant communities to maintain carbon stocks (FW-DC-CS-01) may also provide habitat features used by lynx, such as resilient, connected forests with structural complexity. These desired conditions also would support carbon stability, which may ultimately help mitigate climate-related habitat changes. Incorporating best available science and guidance in forest management (FW-GO-ACC 01) would improve the resilience of habitat to climate change, thereby reducing the threat of stand-replacing fire and changes in the distribution of spruce and fir forests. This would ultimately increase forest resilience and connectivity, which would continue to provide peripheral habitat characteristics for lynx (Interagency Lynx Biology Team 2013).

Table D-2. Key Threats, Plan Components, and Expected Effects on Canada Lynx

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
General loss and degradation of lynx peripheral habitat	Wildlife (FW-DC-WL 01, 02, and 03; FW-GO-WL 01 and 02; and FW-GL-WL 11) Terrestrial Vegetation (FW-DC-TV 01 through 09; FW-GL-TV 01 through 04) Forest Vegetation (FW-DC-FV 01 and 02; FW-DC-FVC 01 and 02; FW-OB-FVC 01; and FW-GL-FVA 02 through 04) Timber (FW-DC-TI 01, 04 through 07; FW-ST-TI 02, 04 through 10; FW-GL-TI 02 through 04) Soils (FW-DC-SO 01, 04, and 05; FW-GL-SO 03) Watershed and Aquatic Ecosystems (FW-DC-WA 06 and 07) Riparian Management Zones (FW-DC-RM 01 and FW-GL-RMZ 02) Monitoring Table—Wildlife, TEPC (Threatened, Endangered, Protected, and Candidate) Species and Species of Conservation Concern; Terrestrial Ecosystems, Forested Vegetation; and Terrestrial Vegetation, Aspen Management Approach—Wildlife 02	Ecosystem-level plan components for wildlife; terrestrial vegetation; forest vegetation (aspen and conifer); timber; soils; watershed, aquatic, and riparian ecosystems; riparian management zones; and carbon storage and sequestration would emphasize maintenance of key ecological conditions that are important for many species of conservation concern, including lynx. In particular, a guideline specific to lynx would retain some dense, early successional coniferous stands that would support prey (snowshoe hare and red squirrel populations) and provide cover for stalking prey. Retention of mature, multistory conifer stands containing woody debris and snags would provide habitat for prey, such as red squirrels, and therefore increase foraging opportunities for dispersing lynx that infrequently travel through or temporarily reside on the Ashley National Forest.
Peripheral habitat loss and degradation through anthropogenic activities such as timber harvest and	Timber (FW-DC-TI 01, 04 through 07; FW-ST-TI 02, 04 through 10; FW-GL-TI 02 through 04) Soils (FW-DC-SO 04 and 05) Wildlife (FW-GO-WL 02 and FW-GL-WL 11)	In addition to the ecosystem-level plan components that would reduce general threats to lynx habitat by maintaining habitat characteristics and connectivity (see the row above), additional components for wildlife, terrestrial vegetation, forest vegetation, timber, and soils provide direction for maintaining habitat in areas where management activities take place. Standards and

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
road construction	Forest Vegetation (FW-OB-FVC 01) Terrestrial Vegetation (FW-GL-TV 01 through 04)	guidelines for timber harvest and vegetation treatments ensure retention of a mosaic of multistory mixed conifer/mixed deciduous and dense, successional stands and snags, while reducing fire intensity. Objectives provide specific and measurable strategies to move the forest composition and structure toward desired conditions, and return natural fire regimes to the landscape, which further reduces the loss of habitat and promotes ecosystem resilience.
Peripheral habitat loss and degradation from ecological stressors such as climate change and spruce and pine beetle outbreaks	Forest Vegetation (FW-GL-FVC) Timber (FW-DC-TI 04; FW-ST-TI 06, 07, and 09; FW-GI-TI 03 and 07) Terrestrial Vegetation (FW-DC-TV 04) Carbon Storage and Sequestration (FW-DC-CS 01) Adjusting to Climate Change (FW-GO-ACC 01)	Ecosystem-level plan components that include desired conditions for terrestrial ecosystems would help to maintain adequate amounts of connected, resilient forests with the structural complexity to serve as peripheral habitat for lynx dispersal. These resilient forests may otherwise be lost due to climate change and other stochastic events such as high-severity fire and insect outbreaks. Guidelines to salvage dead or dying trees and mitigate forest insects or diseases would help reduce the spread of outbreaks and their threat to lynx habitat. Over time, this would help increase stand regeneration, thereby accelerating the availability of foraging habitat; maintain the availability and condition of lynx peripheral habitat; and ensure the peripheral habitat continues to provide the complex structural attributes for dispersing lynx that could infrequently move through or reside temporarily in the area.

Rocky Mountain bighorn sheep

Determination: The ecosystem plan components may not provide the ecological conditions necessary to maintain a viable population of the Rocky Mountain bighorn sheep in the plan area. Therefore, additional species-specific plan components have been provided. The combination of ecosystem and species-specific plan components should provide the ecological conditions necessary to maintain a viable population of the Rocky Mountain bighorn sheep in the plan area.

General Key Ecological Conditions: Key ecological conditions include open habitat types (high alpine to lower grasslands) with adjacent steep, rocky areas for escape and safety. Habitat is associated with early vegetation seral stages and characterized by rugged terrain, including canyons, gulches, talus cliffs, steep slopes, mountaintops, and river benches. Connectivity of habitats may also be important to bighorn sheep (Forest Service 2017a).

Key Threats to Persistence: Key threats to the species' persistence are habitat loss and degradation from anthropogenic disturbance, conifer encroachment, and potential cheatgrass (*Bromus tectorum*) invasion; climate change effects that exacerbate the invasion of noxious weeds; and transmission of respiratory pathogens from domestic sheep and between individual bighorn sheep (Forest Service 2017a).

Summary: The current bighorn sheep population on the Ashley National Forest consists of five interconnected herds in the Uinta Mountains, which are primarily the northeast portion of the plan area, and the Avintaquin herd, which is located on the South Unit portion of the plan area. The Avintaquin herd population estimate is approximately 20 animals; the combined herd estimate for the five interconnected herds of the Uinta Mountains is 147 individuals (Forest Service 2020). These herds have fluctuated over time and are on a downward trend due primarily to disease.

Habitat conditions on the Ashley National Forest are generally in satisfactory condition; however, conifer encroachment occurs in all landtype associations (LTAs) where habitat occurs. Cheatgrass invasion has also occurred in some areas of the lower-elevation LTAs. Connectivity of open habitat associated with steep, rocky terrain is sustainable with habitat improvement projects that reduce conifer encroachment and cheatgrass invasion (Forest Service 2017a).

Ecosystem-level plan components listed in Table D-3 would maintain or restore the bighorn sheep habitat's ecological conditions by setting desired conditions for the Ashley National Forest to ensure diversity and persistence of plants, wildlife, and their habitats (FW-DC-WL 01-03 and FW-DC-TV 01-09). Components would also help maintain or restore habitat by addressing and reducing the threat of habitat degradation from ecological stressors (conifer encroachment, noxious weed invasions, and climate change). Plan components for terrestrial vegetation include numerous measures that would reduce the potential for new noxious weed establishments. Examples include using native plant materials to meet desired condition criteria, where possible; limiting the use of nonnative plant materials, seeding disturbed areas in and next to plant communities that are susceptible to invasive plants; and incorporating noxious weed and invasive species management (FW-DC-TV 05, 06, and 08; FW-GL-TV-01 through 04).

Plan components for non-forest vegetation would limit conifer encroachment and aim to improve or maintain the desired condition of areas threatened by conifer encroachment or invasive plants or that are in degraded condition (FW-DC-NFV-01; FW-DC-NFVA-01; and FW-OB-NFV-01 and 02). Reducing canopy cover in the Anthro Plateau LTA (FW-OB-NFV 02) would also improve habitat conditions for bighorn sheep by creating more open habitat areas that bighorn sheep rely on for visibility (UDWR 2018). Achieving overall desired conditions would improve habitat conditions for bighorn sheep by creating vegetation communities with low densities or an absence of noxious weeds and that are resilient to new

disturbances, and by providing necessary habitat features and connectivity (UDWR 2018). Moving fire disturbance regimes toward their natural frequency and magnitude would maintain or improve habitat conditions. This is because wildfire typically improves bighorn sheep habitat by reducing overgrowth and creating open habitat with increased visibility (UDWR 2018; Forest Service 2017a).

Anthropogenic activities, such as energy and mineral development and livestock grazing, can degrade habitat conditions for bighorn sheep by fragmenting habitat, reducing forage, and creating surface disturbance that increases the risk of noxious weed establishment. These threats are primarily addressed through forestwide plan components for wildlife, energy and minerals, and grazing (Table D-3) that would reduce or prohibit surface-disturbing activities and/or development in sensitive habitat, limit forage utilization, and ensure livestock grazing is compatible with ecological functions and processes (FW-DC-LGR-02; FW-DC-EM-02; FW-GL-LGR-01 and 02; FW-ST-EM-02; and FW-GL-EM-01, 03, and 05).

The bighorn sheep population on the Ashley National Forest has fluctuated over time. Decreases in numbers have been due to predation and disease (Forest Service 2020). Mortality by disease has primarily been due to respiratory pathogens that cause bacterial pneumonia. Respiratory pathogens can be transferred from domestic sheep to bighorn sheep if contact between the species occurs.

Forest plan components specific to bighorn sheep would help to address this threat by encouraging separation when opportunities arise. The components would include a guideline that would provide separation of domestic and bighorn sheep for permits 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 plan; 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). The plan components 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). When implemented, these measures would help reduce the risk of contact between domestic and bighorn sheep and help maintain bighorn sheep persistence in the plan area.

The forest plan components include a goal to coordinate with state agencies in wildlife management (FW-GO-WL-02); accordingly, coordination between the UDWR and the Forest Service will continue in the management of bighorn sheep and its habitat on the forest.

Table D-3. Key Threats, Plan Components, and Expected Effects on Bighorn Sheep

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss and degradation from conifer encroachment, noxious weed invasions, and climate change	Wildlife (FW-DC-WL 01, 02, and 03; FW-GO-WL 02; FW-GL-WL 01, 09, and 10) Terrestrial Vegetation (FW-DC-TV 01 through 09; FW-GL-TV 01 through 04) Non-Forest Vegetation (FW-DC-NFV 01 and FW-DC-NFVA 01; FW-OB-NFV 01 and 02) Carbon Storage and Sequestration (FW-DC-CS 01) Adjusting to Climate Change (FW-GO-ACC 01)	Ecosystem-level plan components for wildlife, terrestrial vegetation, non-forest vegetation, and carbon storage and sequestration would emphasize maintenance of key ecological conditions that are important for many species of conservation concern, including bighorn sheep. Components to maintain the ecological function of non-forest vegetation, reduce or eliminate noxious weed establishments, and increase habitat resilience to disturbances, such as nonnative plant invasions, would help alleviate the threat of habitat loss from cheatgrass invasions, conifer encroachment, and climate change.
Habitat loss and degradation from anthropogenic disturbance	Livestock Grazing (FW-DC-LGR 02; FW-GL-LGR 01 and 02) Energy and Minerals (FW-DC-EM 02; FW-ST-EM 02; FW-GL-EM 01, 03, and 05)	Forest plan components for energy and minerals would minimize disturbance to bighorn sheep and habitat loss or degradation by avoiding development in recommended wilderness areas and research natural areas; imposing timing restrictions during sensitive time periods, such as lambing; and avoiding or minimizing adverse environmental impacts. Components for grazing would further reduce habitat degradation from anthropogenic activities by limiting forage utilization, thereby maintaining forage for native ungulates such as bighorn sheep.
Respiratory pathogen transmission from domestic sheep	Wildlife (FW-GL-WL 09 and 10)	Forest plan components specific to bighorn sheep would reduce the risk of contact between domestic sheep and bighorn sheep by providing separation of domestic sheep and bighorn sheep when a permit is waived without preference.

Fringed myotis

Determination: The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of the fringed myotis in the plan area. Nonetheless, additional species-specific plan components have been provided for added clarity or measures of protection, or both.

General Key Ecological Conditions: Key ecological conditions include middle elevations in desert, riparian, grassland, and woodland habitats. The fringed myotis roosts in a variety of roosting structures, most often associated with rock crevices, conifer snags, abandoned mines, caves, and buildings (Keniath 2004). In forests, it is reliant on the availability of larger trees that provide crevices or cavities for roosting. The availability of caves (for hibernacula and maternity colonies) is key for the sustainability of this species on the landscape (Forest Service 2017a).

Key Threats to Persistence: The key threats to this species' persistence are loss of natural roost sites, such as large trees and snags, from spruce and pine beetle outbreaks and tree or snag removal; degradation of riparian habitats; climate change; human disturbance to hibernacula and maternity sites in caves; and the spread of white-nose syndrome (Forest Service 2017a).

Summary: There are eight known fringed myotis occurrences on the Ashley National Forest within the last 20 years. Like most forest-dwelling bat species, the fringed myotis mainly uses snags as roosting structures in forested habitat. Pinyon-juniper habitats are advancing in all LTAs, and conifers in all LTAs (associated with this species' habitats) have been affected by beetles. With a few exceptions, riparian habitats in associated LTAs are generally in satisfactory condition. These few exceptions are trending toward satisfactory condition. This species' habitats are likely to remain sustainable over time if satisfactory conditions are maintained (Forest Service 2017a).

Because large trees and snags are important roosting features for bats, retaining these features across the Ashley National Forest would help maintain fringed myotis habitat (Forest Service 2017a). Wildlife guideline FW-GL-WL-02 would retain an average of 60 snags per 10 acres when implementing large vegetation treatments. Ecosystem-level plan components for terrestrial vegetation would maintain or improve heterogeneity, connectivity, and retention of key structural elements of terrestrial vegetation, including large trees and snags (FW-DC-TV-01 through 09). Specifically, maintaining a variety of seral stages across the landscape and improving ecosystem resiliency would help retain roosting sites that may otherwise be lost to disturbances. Desired conditions to support native vegetation communities that provide foraging habitat for native pollinator species would increase foraging opportunities for the fringed myotis, which are insectivorous (FW-DC-TV-09 and FW-GL-TV-01).

Plan components would also help sustain habitat by helping to ensure fringed myotis habitat remains resilient to climate change. Incorporating best available science and guidance in forest management would improve the habitat's resilience to climate change. This would ultimately reduce the threat of habitat loss, particularly loss of natural roost sites such as large trees and snags. This would come about by increasing forest resilience and allowing it to continue to provide habitat characteristics for the fringed myotis, such as larger trees that provide crevices or cavities for roosting. Maintaining carbon stocks would support carbon stability, which may also help mitigate climate-related habitat changes. Desired conditions for watershed, aquatic, and riparian ecosystems would ensure that watersheds and watershed features are resilient to disturbance, including hotter and drier climates, and would continue to provide open water needed by the fringed myotis, particularly lactating females (Adams 2010).

Ecosystem-level plan components for watershed, aquatic, and riparian ecosystems; riparian management zones; and livestock grazing would help alleviate the threat of riparian habitat degradation. These

components would do this by setting desired conditions for watersheds that provide healthy and functioning aquatic, riparian, upland, and wetland ecosystems and by setting objectives for improving riparian habitat conditions through restoration projects (FW-DC-WA 01, 03, 04, and 06 through 10; FW-OB-WA 01 and 03; FW-GL-WA 02; FW-DC-RMZ 01 and 02; and FW-GL-RMZ 01 and 02). For example, projects to improve habitat conditions for priority watersheds and groundwater-dependent ecosystems would improve habitat conditions by increasing the availability of functioning riparian corridors that offer safe passageways for bats traveling from roosting sites to foraging grounds (Keinath 2004). Improving or protecting riparian and wetland habitats would increase foraging opportunities. This is because locations near water support an abundant source of insects for food.

Hibernacula and maternity sites (caves) are critical habitat components for this species (Forest Service 2017a). Caves on the Ashley National Forest are generally protected and are in satisfactory condition (Forest Service 2017a). However, disturbance from future mining operations and recreation may pose a risk factor at maternity or roosting sites. Guidelines for wildlife would alleviate the threat of disturbance to hibernacula and maternity sites by ensuring management activities avoid, minimize, or mitigate disturbance to hibernating bats and bat maternity colonies and by closing mines or caves with suitable habitat for bats using bat-friendly devices (FW-GL-WL 04 and 05; FW-DC-GRH 05).

Restricting human access at roost sites is necessary to avoid bat abandonment, as bats are sensitive to roost disturbance and human handling. This would go a long way toward maintaining the species' persistence, particularly as survival of reproductive females is the most important contributor to population viability. Potential management approaches, including restricting access to caves and mines using bat-friendly gates or other means to alleviate disturbance at hibernacula sites, would help reduce this human threat (FW-GL-WL 05).

Plan components for energy and minerals and geologic resources and hazards would further reduce the chance of disturbance to hibernating bats. These components would do this by avoiding environmental impacts by minimizing the need for storage pits, which bats might inadvertently inhabit, and protecting cave and other underground areas (e.g., by avoiding ground-disturbing activities; FW-DC-EM 02; FW-ST-EM 02; and FW-GL-EM 02,03,05). These components would ensure undisturbed habitat for native bat species during maternity and hibernation periods.

One of the greatest threats to North American myotis species is white-nose syndrome (Forest Service 2017a). White-nose syndrome is caused by a fungus that persists in cold cave environments and afflicts hibernating bats. White-nose syndrome is a potential future threat that has not yet been detected in Utah. The fringed myotis is not known to be affected by white-nose syndrome; however, white-nose syndrome has devasted other related myotis populations in eastern United States. The fringed myotis use of mines and caves for hibernacula makes it susceptible to the disease if the disease were to become established in the plan area; the disease may cause devastating impacts on this already declining species.

Since white-nose syndrome can be spread via humans entering caves, restricting human access to caves would reduce the potential for the unintentional invasion of this disease into bat populations on the Ashley National Forest (FW-GL-WL 04 and 05; FW-DC-GRH 05). Plan components to monitor for white-nose syndrome detections in bat hibernacula, restrict human access in caves, and ensure the threats of white-nose syndrome to bats are low would reduce the potential contamination of caves and mines from diseases and the introduction or spread of white-nose syndrome. Additionally, Management Approach Wildlife 01 would prevent spread onto the Ashley National Forest by considering preventative measures, such as cave closures or decontamination procedures for those entering caves, to minimize the risk of white-nosed syndrome spreading to bats on the Ashley National Forest, if the disease is detected within 50 miles or on adjacent national forests.

Table D-4. Key Threats, Plan Components, and Expected Effects on Fringed Myotis

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Loss of natural roost sites, such as large trees and snags, from spruce and pine beetle outbreaks and tree or snag removal	Wildlife (FW-DC-WL 01, 02, and 03; FW-GO-WL 02; and FW-GL-WL 02, 04 and 05) Terrestrial Vegetation (FW-DC-TV 01 through 09; FW-GL-TV 01 through 04) Forest Vegetation (FW-DC-FVPJ 01 and FW-GL-FVPJ 01) Non-Forest Vegetation (FW-DC-NF 01, FW-DC-NFS 01, FW-DC-NFS 02, FW-DC-NFDS 01, and FW-OB-NFV 01 and 02)	Ecosystem-level plan components for wildlife, terrestrial vegetation, forest vegetation, and non-forest vegetation would emphasize maintenance of key ecological conditions that are important for many species of conservation concern, including the fringed myotis. These plan components support ecosystems and habitat conditions that provide essential habitat characteristics for native species, habitat connectivity, vegetation diversity, and ecological integrity and resilience. They emphasize heterogeneity, connectivity, and retention of key structural elements, including large trees and snags, which are important roosting features for bats.
Riparian degradation	Watershed, Aquatic, and Riparian Ecosystems (FW-DC-WA 01, 03, 04, and 06 through 10; FW-OB-WA 01 and 03; and FW-GL-WA 02) Riparian Management Zones (FW-DC-RMZ 01 and 02; FW-GL-RMZ 01 and 02)	Ecosystem-level plan components for watershed, aquatic, and riparian ecosystems; riparian management zones; and livestock grazing would help alleviate the threat of riparian habitat degradation. They would do this by setting desired conditions for watersheds that provide healthy and functioning aquatic, riparian, upland, and wetland ecosystems and by setting objectives for improving riparian habitat conditions through restoration projects.
Disturbance to hibernacula and maternity sites; spread of white-nose syndrome	Wildlife (FW-GL-WL 04 and 05) Geologic Resources and Hazards (FW-DC-GRH 03 and 05; FW-GL-GRH 03 and 04) Energy and Minerals (FW-DC-EM 02; FW-ST-EM 02; and FW-GL-EM 02, 03, and 05) Monitoring Table— Wildlife, Fringed Myotis Management Approach Wildlife 01	Guidelines specific to bats would alleviate the threat of disturbance to hibernacula and maternity sites by ensuring management activities avoid, minimize, or mitigate disturbance to hibernating bats and bat maternity colonies. Guidelines would also alleviate the threat of disturbance by closing mines or caves with suitable bat habitat using bat-friendly devices.

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Climate change	Watersheds (FW-DC-WA 01 and 03) Terrestrial Vegetation (FW-DC-TV 04) Maintaining Carbon Stocks (FW-DC-CS 01) Adapting to Climate Change (FW-GO-ACC 01)	Forestwide plan components that include desired conditions for terrestrial ecosystems, carbon storage, and adapting to climate change would help to ensure fringed myotis habitat remains resilient to climate change. Incorporating best available science and guidance in forest management would improve the resilience of the habitat to climate change. This would ultimately reduce the threat of habitat loss, particularly the loss of natural roost sites such as large trees and snags.

Pygmy rabbit

Determination: The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of the pygmy rabbit in the plan area. Nonetheless, additional species-specific plan components have been provided for added clarity or measures of protection, or both.

General Key Ecological Conditions: Key ecological conditions include dense stands of big sagebrush growing in deep, loose soils. Pygmy rabbit habitat is defined in large part by the type of vegetation (sagebrush and grassland) and its distribution on the landscape. The quality of habitat is defined by the density and structure stage of big sagebrush. The size and quantity of habitat patches likely define the quality and quantity of habitat across the landscape. Connectivity of these habitat patches may be important to population expansion (Forest Service 2017a).

Key Threats to Persistence: Key threats to this species' persistence are habitat loss and degradation from grazing, energy development, wildfire, and invasive species. Climate change could exacerbate the invasion of noxious weeds, such as halogeton (*Halogeton glomeratus*) and cheatgrass. Cheatgrass may reduce habitat quality and may also increase the fire return interval, which would reduce habitat for this species (Forest Service 2017a).

Summary: There are nine known pygmy rabbit occurrences on the Ashley National Forest within the last 20 years. These occurrences have been on the Flaming Gorge National Recreation Area (Forest Service 2017a). The pygmy rabbit is associated with sagebrush ecosystems, as it is highly dependent on sagebrush for food and shelter throughout the year. Sagebrush communities within the Green River LTA have been invaded or are at risk of invasion of cheatgrass or halogeton, or both (Forest Service 2017a). This species' habitat is likely to remain sustainable over time if cheatgrass expansion is deterred or slowed (Forest Service 2017a).

Ecosystem-level plan components would help achieve habitat sustainability by including numerous measures to reduce invasive species establishment and/or expansion (e.g., by using native plant materials to meet desired condition criteria where possible, limiting use of use nonnative plant materials, seeding disturbed areas in and next to plant communities that are susceptible to invasive plants, and incorporating noxious weed and invasive species management; FW-DC-TV 05, 06, and 08; FW-GL-TV 01 through 04).

Plan components for non-forest vegetation would limit conifer encroachment and aim to improve or maintain the desired condition of areas threatened by conifer encroachment or invasive plants, or that are in degraded condition (FW-DC-NFV 01 and FW-OB-NFV 01). Management actions would also include components to improve the resistance and resiliency of ecosystems to disturbances such as wildfire and invasive species (FW-DC-TV 01 through 09; FW-GL-TV 01 through 04). These components would work in concert to reduce the threat of habitat loss from wildfire and increased invasion of nonnative grasses in burned areas; deterring cheatgrass expansion is key to sustaining pygmy rabbit habitat on the Ashley National Forest (Forest Service 2017a).

Furthermore, guidelines specific to the pygmy rabbit would design vegetation treatments to maintain interconnected patches (average of 1/2 acre in size) of tall dense sagebrush (average of 25+ percent canopy cover or the highest percent canopy cover available) (FW-GL-WL 07). Desired conditions for sagebrush and desert shrub ecosystems would ensure sagebrush landscapes consist of variable ratios of shrub canopy cover that supports habitat needs for known sagebrush-obligate wildlife species, such as pygmy rabbits (FW-DC-NFDS 01 and FW-DC-NFS 01). Desired conditions for soil quality and stability would provide a functional foundation for vegetation and burrowing sites (FW-DC-SO 01 through 04). These components would aid in the persistence of pygmy rabbit populations on the Ashley National

Forest by helping to maintain or improve habitat connectivity, which is an important habitat feature that may aid in population expansion, as well as sagebrush cover, which defines the quality of pygmy rabbit habitat (Forest Service 2017a).

Anthropogenic activities, such as energy and mineral development and livestock grazing, can degrade habitat conditions for pygmy rabbit by fragmenting habitat and creating surface disturbance, which increases the risk of noxious weed establishment and compacts soils. These threats are primarily addressed through forestwide plan components for wildlife, energy and minerals, and grazing (Table D-5) that would reduce or prohibit surface-disturbing activities or development in sensitive habitat, or both; limit forage utilization; and ensure livestock grazing is compatible with ecological functions and processes (FW-DC-LGR-02, FW-DC-EM-02, FW-GL-LGR-01 and 02, FW-ST-EM-01, and FW-GL-EM-03). Restoring or maintaining the ecological function, integrity, and resilience of non-forest vegetation would improve or maintain habitat for the pygmy rabbit by reducing the threat of invasive plants, which is key to sustaining habitat (Forest Service 2017a), and by restoring previously degraded conditions (FW-OB-NFV 01).

Table D-5. Key Threats, Plan Components, and Expected Effects on Pygmy Rabbit

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss and degradation from noxious weed invasions, conifer encroachment, wildfire, and climate change	Wildlife (FW-DC-WL-01, 02, and 03; FW-GO-WL-02; FW-GL-WL-07) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GL-TV-01 through 04) Non-Forest Vegetation (FW-DC-NFV-01, FW-DC-NFS-01, FW-DC-NFDS-01, and FW-OB-NFV- 01) Soils (FW-DC-SO-01 through 04) Carbon Storage and Sequestration (FW-DC-CS-01) Adjusting to Climate Change (FW-GO-ACC-01) Monitoring Table— Wildlife, TEPC Species and Species of Conservation Concern; and Terrestrial Vegetation, Non-Forest Vegetation	Ecosystem-level plan components for wildlife, terrestrial vegetation, non-forest vegetation, and carbon storage and sequestration would emphasize maintenance of key ecological conditions that are important for many species of conservation concern, including pygmy rabbit. Included is a guideline specific to the pygmy rabbit to maintain interconnected patches of tall, dense sagebrush. Components to maintain ecological function of non-forest vegetation, reduce or eliminate noxious weed establishments, and increase habitat resilience to disturbances, such as nonnative plant invasions, would help alleviate the threat of habitat loss from cheatgrass invasions, conifer encroachment, wildfire, and climate change.
Habitat loss and degradation from anthropogenic activities	Livestock Grazing (FW-DC-LGR-02; FW-GL-LGR-01 and 02) Energy and Minerals (FW-DC-EM-02, FW-ST-EM-01, and FW-GL-EM-03)	Forest plan components for energy and minerals would minimize habitat loss or degradation by avoiding development in recommended wilderness areas and research natural areas, imposing timing restrictions during sensitive time periods, and avoiding or minimizing adverse environmental impacts. Components for grazing would further reduce habitat degradation from anthropogenic activities by limiting forage utilization, thereby maintaining forage for native species such as pygmy rabbit.

Birds

Black rosy-finch

Determination: The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of the black rosy-finch in the plan area. No additional species-specific plan components are warranted.

General Key Ecological Conditions: Key ecological conditions include barren, rocky, or grassy areas and cliffs among glaciers and receding snow banks, or beyond timberline. Black rosy-finch habitat is defined in large part by the type of vegetation (grassy areas in alpine) and its distribution in relation to snowfields and rock. Prey species (insects) could be defined by the structure stages of vegetation (grass and forbs). The size and quantity of habitat patches likely define the quality and quantity of habitat across the landscape. Connectivity between habitat patches may also be important for this species (Forest Service 2017a).

Key Threats to Persistence: Climate change could reduce snowbanks that persist into the early summer. Another key threat is habitat loss and degradation from mining or improper grazing (Forest Service 2017a).

Summary: Within the last 20 years, there have been 85 known occurrences of black rosy-finch on the Ashley National Forest, where it is found at high elevations of associated LTAs (Forest Service 2017a). This species breeds in barren, rocky, or grassy areas and cliffs among glaciers of alpine tundra. It often feeds on open glaciers and snowfields, picking up insects or other wind-wafted animal matter. High-elevation, rocky areas are generally not threatened on the Ashley National Forest because they receive little human presence, and alpine areas within LTAs associated with this species are generally in satisfactory conditions (Forest Service 2017a).

Currently, there are few human-related activities that occur on or threaten this species' habitat; therefore, this species' habitat is likely to remain sustainable over time (Forest Service 2017a). This is especially true if its habitat continues to remain or trend toward satisfactory conditions (Forest Service 2017a). However, warming temperatures due to climate change could reduce snowbanks that persist into the early summer (Halofsky et al. 2018a, 2018b). Although the Forest Service cannot directly control the effects of climate change, plan components would help support habitat sustainability to the extent possible. Maintaining a species richness and mosaic of plant communities in alpine areas (FW-DC-NFVA 01 and FW-DC-NFV 01) would provide food sources, as this species mainly feeds on seeds and other vegetable matter. Desired conditions for alpine landscapes consist of a mosaic of plant communities controlled by topography, geology, aspect, snow accumulation and persistence, wind exposure, and other geomorphic features that help form habitable niches (FW-DC-NFVA 01); these habitat niches (grassy areas in alpine among glaciers and receding snowbanks) would continue to provide breeding and wintering grounds for finches (Forest Service 2017a).

General guidelines for wildlife aim to maintain at-risk species persistence on the Ashley National Forest by providing necessary habitat features and connectivity (FW-DC-WL 01, 02, and 03). Although the pattern of black rosy-finch migration is not documented, the species may, in part, simply shift downward in elevation to use open situations such as fields and brush. Achieving desired conditions for vegetation resources that focus on ecological integrity and connectivity would support habitat sustainability, possibly by enabling finches to migrate and winter in intact areas with diverse food sources. Achieving these desired conditions would also increase the resiliency of ecosystems to stressors such as fire, insects, pathogens, and climate variability (FW-DC-TV 01 to 09). Incorporating best available science and

guidance in forest management may improve management and therefore help improve the habitat's resilience to climate change, thereby reducing the threat of habitat loss to climate change (FW-GO-ACC-01).

Although there are few anthropogenic activities that occur on or threaten this species' habitat, plan components for energy and minerals and grazing would avoid the potential for future threats by reducing or prohibiting surface-disturbing activities or development in sensitive habitat, or both; imposing timing restrictions during sensitive time periods; limiting forage utilization; and ensuring livestock grazing is compatible with ecological functions and processes (FW-DC-LGR-02; FW-GL-LGR-01 and 02; FW-DC-EM-02; FW-GO-EM-02 and 03; and FW-GL-EM-01, 03, and 05).

Table D-6. Key Threats, Plan Components, and Expected Effects on Black Rosy-Finch

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss from climate change	Wildlife (FW-DC-WL-01, 02, and 03; FW-GO-WL-02) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GL-TV-01 through 04) Non-Forest Vegetation (FW-DC-NFV-01, FW-DC-NFVA-01, FW-OB-NFV-01 and 02) Carbon Storage and Sequestration (FW-DC-CS-01) Adjusting to Climate Change (FW-GO-ACC-01) Monitoring Table— Wildlife, TEPC Species and Species of Conservation Concern; and Terrestrial Vegetation, Non-Forest Vegetation	Ecosystem-level plan components for wildlife, terrestrial vegetation, non-forest vegetation, and carbon storage and sequestration would emphasize maintenance of key ecological conditions that are important for many species of conservation concern, including the black rosy-finch. Components to achieve desired conditions for and maintain the ecological function of non-forest vegetation, particularly alpine areas, would sustain habitat by providing habitat niches used by finches. They would also help make these areas adaptable to climate change, to the extent possible.
Habitat loss and degradation from anthropogenic activities (mining or improper grazing)	Livestock Grazing (FW-DC-LGR-02; FW-GL-LGR-01 and 02) Energy and Minerals (FW-DC-EM-02; FW-GO-EM-02 and 03; FW-GL-EM-01, 03, and 05)	Forest plan components for energy and minerals would minimize habitat loss or degradation by avoiding development in recommended sensitive areas, such as wilderness areas and research natural areas; imposing timing restrictions during sensitive time periods; protecting ecological integrity; and avoiding or minimizing adverse environmental impacts. Components for grazing would further reduce habitat degradation from anthropogenic activities by stipulating that activities are compatible with ecological functions and processes.

Greater sage-grouse

Determination: The ecosystem plan components may not provide the ecological conditions necessary to maintain a viable population of the greater sage-grouse in the plan area. Therefore, additional species-specific plan components have been provided. The combination of ecosystem and species-specific plan components should provide the ecological conditions necessary to maintain a viable population of the greater sage-grouse in the plan area.

General Key Ecological Conditions: Key ecological conditions include sagebrush and grassland habitat. Quality greater sage-grouse habitat is defined in terms of plant composition, species richness, shrub and herbaceous cover, and sagebrush seed production. The size and quantity of habitat patches likely define the quality and quantity of habitat across the landscape. Connectivity of habitats may also be important to the greater sage-grouse (Forest Service 2017a).

Key Threats to Persistence: Key threats to this species' persistence are habitat loss and fragmentation and degradation from anthropogenic disturbances, such as oil and gas development, and ecological disturbances, such as catastrophic fire and noxious weed infestations. Climate change could exacerbate the invasion of noxious weeds, such as halogeton and cheatgrass. It may also increase the fire frequency (Forest Service 2017a).

Summary: There are numerous observations of greater sage-grouse on the Ashley National Forest, where the greater sage-grouse depends on sagebrush-dominated landscapes for food and cover. Although there are many locations where greater sage-grouse has been observed on the Ashley National Forest, the greater sage-grouse exists at relatively low numbers on the Ashley National Forest when compared with other areas of its range (Forest Service 2017b). Sagebrush communities across the Ashley National Forest are generally in a satisfactory condition. Some communities within the lower-elevation/drier LTAs (South Face, Green River, and Anthro Plateau) have an invasion of cheatgrass or halogeton, or both, or are at risk of invasion (Forest Service 2017a). Conifer encroachment threatens sagebrush communities within all LTAs associated with greater sage-grouse habitat. If not deterred, cheatgrass invasion and conifer encroachment may reduce habitat quantity and quality (Forest Service 2017a).

Forest plan components would help achieve habitat sustainability and support the species' persistence by including numerous measures to reduce invasive species establishment and expansion. Examples are by using native plant materials to meet desired condition criteria where possible, limiting use of nonnative plant materials, seeding disturbed areas in and next to plant communities that are susceptible to invasive plants, and incorporating noxious weed and invasive species management (FW-DC-TV 05, 06, and 08; FW-GL-TV-01 through 04). Furthermore, management actions would include components to improve the resistance and resiliency of ecosystems to disturbances such as wildfire and invasive species (FW-DC-TV 01 through 09; FW-GL-TV-01 through 04). These components would work in concert to reduce the threat of habitat loss from wildfire and increased invasion of nonnative grasses in burned areas; deterring cheatgrass expansion is key to sustaining greater sage-grouse habitat on the Ashley National Forest (Forest Service 2017a).

Plan components for non-forest vegetation would reduce threats to habitat by improving or maintaining the desired condition of areas threatened by conifer encroachment or invasive plants (FW-DC-NFV-01 and FW-OB-NFV-01 and 02). These would maintain greater sage-grouse habitat because conifer encroachment will eventually result in the loss of sagebrush communities if not deterred (Forest Service 2017a). Reducing confer encroachment may also reduce predation of greater sage-grouse by reducing perch sites used by avian predators.

The 2015 Greater Sage-Grouse Forest Plan Amendment suggests improving habitats through a landscape-level conservation approach involving targeted restoration and habitat improvements (Forest Service 2015b). Plan components would incorporate this guidance by maintaining or improving the ecological integrity of sagebrush ecosystems. An objective to reduce mountain big sagebrush canopy cover in the Anthro Plateau LTA would enhance brood-rearing and summer habitat for greater sage-grouse (FW-OB-NFV 02). Desired conditions for sagebrush and desert shrub ecosystems would ensure sagebrush landscapes support the habitat needs for known sagebrush-obligate wildlife species and maintain canopy cover in greater sage-grouse seasonal habitat with less than 10 percent conifer canopy cover (FW-DS-NFDS 01; FW-DS-NFS 01 and 02). Also included is a component specific to greater sage-grouse that would stipulate 70 percent or more of sagebrush communities have 10 to 30 percent sagebrush canopy cover, with less than 10 percent conifer canopy cover in greater sage-grouse seasonal habitat (FW-DC-NFS 02). These components would aid in the persistence of greater sage-grouse populations; they also would maintain habitat on the Ashley National Forest by helping to maintain or improve habitat connectivity and provide suitable levels of canopy cover, which are important components of greater sage-grouse habitat (Forest Service 2015, 2017a).

Wet meadows and high-elevation riparian sites are important to many of Utah's sage-grouse populations. These areas provide cover, water, insects, and green forage, particularly during the late brood-rearing season and early fall (Arndt and Black 2011). Forest plan components would help achieve satisfactory riparian conditions by setting desired conditions for watersheds that provide healthy and functioning aquatic, riparian, upland, and wetland ecosystems. Also included are objectives for improving riparian habitat conditions through restoration projects. Improving or protecting riparian and wetland habitats would help achieve sustainability of greater sage-grouse habitat by providing food and cover used by grouse.

Anthropogenic disturbances continue to be a threat to greater sage-grouse and its habitat on the Ashley National Forest (Forest Service 2017a). Activities such as energy and mineral development and livestock grazing can degrade habitat conditions for greater sage-grouse by creating surface disturbance that increases the risk of noxious weed establishment, fragmenting habitat, and compacting soils. These threats are primarily addressed through forestwide plan components for wildlife, energy and minerals, and grazing that would reduce or prohibit surface-disturbing activities or development in sensitive habitat, or both; limit forage utilization; and ensure livestock grazing is compatible with ecological functions and processes (FW-DC-LGR-02; FW-DC-EM-02 and 03; FW-GL-LGR-01 and 02; FW-ST-EM-01 and 02; and FW-GL-EM-02, 03, and 05). New oil and gas leases would include lease stipulations required by the 2001 Roadless Rule or the 2015 Greater Sage-grouse Record of Decision (Forest Service 2015), as amended or superseded, and as appropriate (FW-ST-EM 02); stipulations would help reduce disturbance to the greater sage-grouse and sagebrush habitat.

Plan components specific to the conservation of greater sage-grouse were added to the current forest plan through a plan amendment in 2015 (Forest Service 2015). In 2017, the Forest Service began another plan amendment to change several of those plan components to incorporate new information. The purpose was also to improve the clarity, efficiency, and implementation of the 2015 amendment. This includes better alignment with the Bureau of Land Management and state plans to benefit greater sage-grouse conservation on a landscape scale. The decision on the plan amendment is expected to precede the decision for the forest plan revision. The plan amendment for greater sage-grouse will be reviewed and considered for inclusion in the proposed forest plan. Incorporating conservation measures to reduce habitat degradation from ecological and anthropogenic threats would help to maintain greater sage-grouse habitat on the Ashley National Forest. Monitoring for the amount and quality of occupied greater sage-

grouse habitat (Monitoring Table—Wildlife, Greater Sage-Grouse) would also help maintain habitat, if the Forest Service takes measures to improve habitat or reduce threats where habitat quality is declining.

Table D-7. Key Threats, Plan Components, and Expected Effects on Greater Sage-Grouse

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss and degradation from noxious weed invasions, conifer encroachment, wildfire, and climate change	Wildlife (FW-DC-WL-01, 02, and 03; FW-GO-WL-02) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GL-TV-01 through 04) Non-Forest Vegetation (FW-DC-NFV-01, FW-DC-NFS-01 and 02, FW-DC-NFDS-01, and FW-OB-NFV- 01 and 02) Riparian Management Zones (FW-DC-01) Watershed and Aquatic Ecosystems (FW-DC-WA-06 and 07) Carbon Storage and Sequestration (FW-DC-CS-01) Adjusting to Climate Change (FW-GO-ACC-01) Monitoring Table— Wildlife, TEPC Species and Species of Conservation Concern; Wildlife, Greater Sage-Grouse; and Terrestrial Vegetation, Non-Forest Vegetation Desired conditions and standards and guidelines from the revised amendment	Ecosystem-level plan components for wildlife, terrestrial vegetation, non-forest vegetation, and carbon storage and sequestration would emphasize maintenance of key ecological conditions that are important for many species of conservation concern, including the greater sage-grouse. Included is a component specific to greater sage-grouse that would stipulate 70 percent or more of sagebrush communities have 10 to 30 percent sagebrush canopy cover, with less than 10 percent conifer canopy cover in greater sage-grouse seasonal habitat. This component would maintain nesting and brood-rearing habitat in greater sage-grouse seasonal habitat. Forest plan components would achieve habitat sustainability through measures to restore, maintain, or improve the ecological integrity of sagebrush ecosystems. Reducing or eliminating noxious weed establishments, controlling conifer encroachment, and increasing habitat resistance and resilience to disturbances would help alleviate the threat of habitat loss from cheatgrass invasions, conifer encroachment, wildfire, and climate change.

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss and degradation from anthropogenic activities	Livestock Grazing (FW-DC-LGR-02; FW-GL-LGR-01 and 02) Energy and Minerals (FW-DC-EM-02 and 03; FW-ST-EM-01 and 02; and FW-GL-EM-02, 03, and 05) Desired conditions and standards and guidelines from the revised amendment	Forest plan components for energy and minerals would minimize habitat loss or degradation by avoiding development in sensitive areas, imposing timing restrictions during sensitive time periods, and avoiding or minimizing adverse environmental impacts. Including lease stipulations required by the 2001 Roadless Rule or 2015 Sage Grouse ROD would help reduce disturbance to greater sage-grouse and sagebrush habitat. Components for grazing would further reduce habitat degradation from anthropogenic activities by avoiding impacts on sensitive resources.

Peregrine falcon

Determination: The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of the peregrine falcon in the plan area. Nonetheless, additional species-specific plan components have been provided for added clarity or measures of protection, or both.

General Key Ecological Conditions: Key ecological conditions include riparian habitats that are associated with cliffs. Peregrine falcon habitat is defined in large part by the type of vegetation (riparian) and its association with nesting habitat (cliffs) on the landscape. Prey species' habitats are defined by the structure stages of vegetation. The size and quantity of foraging habitat patches in relation to cliffs likely define the quality and quantity of habitat across the landscape (Forest Service 2017a).

Key Threats to Persistence: Key threats to this species' persistence are habitat loss and degradation from ecological disturbances, such as catastrophic fire and beetle epidemics. Climate change could reduce the amount of riparian habitat. Noise disturbance to nesting birds and riparian habitat degradation are also threats (Forest Service 2017a).

Summary: There have been numerous peregrine falcon observations from the few known eyries on the Ashley National Forest. Riparian habitats in LTAs associated with this species' habitat are generally in a satisfactory condition. A few isolated areas may not be in a satisfactory condition, but they are trending in that direction. Riparian habitat would remain sustainable if it continues in a satisfactory condition or trends toward satisfactory conditions over time (Forest Service 2017a).

As proximity to water in desert habitats promotes peregrine falcon hunting success, the peregrine falcon would benefit from actions that maintain or improve riparian habitat (Forest Service 2017a). Forest plan components would help maintain or improve riparian habitat conditions by setting desired conditions for watersheds and riparian management zones that provide healthy and functioning aquatic, riparian, and wetland ecosystems and protect or enhance aquatic and riparian resource values (FW-DC-RMZ 01 and 02; FW-DC-WA-06 and 07). Also included are objectives for improving riparian habitat conditions through restoration projects. Improving or protecting riparian and wetland habitats would increase the ability of riparian areas to support healthy and diverse prey populations. This is because intact riparian ecosystems support an abundance of small birds and mammals. This would ultimately improve habitat for falcons by increasing foraging opportunities.

Nesting habitat (cliffs) are rarely threatened, if at all, and are likely to remain sustainable over time. This is because there are few, if any, threats to this habitat on the Ashley National Forest. However, noise from anthropogenic activities can threaten the species' persistence by disturbing nesting birds. Plan components would alleviate this threat by avoiding, minimizing, or mitigating human activities that may cause disturbance to peregrine falcon eyries (nest sites) (FW-GL-WL-08); by avoiding the removal of known raptor nests; and by avoiding disturbance near active nests during vegetation treatments (FW-GL-WL 03). Surveying for falcon prior to implementation of vegetation treatments would help increase the chance of successfully avoiding known nests (FW-GL-WL 03). These measures would support the peregrine falcon's persistence on the Ashley National Forest by reducing disturbances to nesting birds, potentially leading to increased reproductive success.

Although cliffs are generally not threatened because they are unsuitable areas for anthropogenic activities, such as energy development or livestock grazing, such activities could degrade habitat if carried out in riparian habitats (Forest Service 2017a). Plan components for energy and minerals and grazing would avoid or reduce the potential for threats from these activities by reducing or prohibiting surface-disturbing activities or development, or both, in sensitive habitat such as riparian management zones; including

timing restrictions; limiting forage utilization in riparian areas; and ensuring these activities are compatible with ecological functions and processes (FW-DC-LGR-02; FW-GL-LGR-01 and 02;FW-DC-EM-02; and FW-GL-EM-01, 03, 04, and 05).

Table D-8. Key Threats, Plan Components, and Expected Effects on Peregrine Falcon

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss and degradation from catastrophic fire and beetle epidemics	Wildlife (FW-DC-WL-01, 02, 03; FW-GO-WL-02; and FW-GL-WL-02, 03, and 08) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GL-TV-01 through 04) Forest Vegetation (FW-DC-FVA-01 and 02; FW-DC-FVC-01 and 02; FW-OB-FVC-01; and FW-GL-FVA-02 through 04) Non-Forest Vegetation (FW-DC-NFV-01; FW-DC-NFVA-01; FW-DC-NFS-01 and 02; FW-DC-NFDS-01; and FW-OB-NFV-01 and 02) Carbon Storage and Sequestration (FW-DC-CS-01) Adjusting to Climate Change (FW-GO-ACC-01) Monitoring Table—Wildlife, TEPC Species and Species of Conservation Concern; and Terrestrial Vegetation, Non-Forest Vegetation	Ecosystem-level plan components for wildlife, terrestrial vegetation, forest vegetation, non-forest vegetation, carbon storage and sequestration, and adapting to climate change would emphasize maintenance of key ecological conditions that are important for many species of conservation concern, including the peregrine falcon. Components to maintain the ecological function of forest and non-forest vegetation and increase habitat resilience to disturbances would alleviate the threat of habitat loss from wildfire and beetle epidemics by maintaining habitat for prey species, and thereby food sources for falcon.
Riparian habitat degradation	Soils (FW-DC-SO-01) Riparian Management Zones (FW-DC-01 and 02) Watershed and Aquatic Ecosystems (FW-DC-WA-06 and 07) Livestock Grazing (FW-DC-LGR-02; FW-GL-LGR-01 and 02) Energy and Minerals (FW-DC-EM-02; FW-GL-EM-01, 03, 04, and 05) Monitoring Table—Watersheds and Aquatics	Ecosystem-level plan components for watershed, aquatic, and riparian ecosystems; riparian management zones; and livestock grazing would help alleviate the threat of riparian habitat degradation. They would do this by setting desired conditions for watersheds that provide healthy and functioning aquatic, riparian, upland, and wetland ecosystems and by setting objectives for improving riparian habitat conditions through restoration projects. These would ultimately increase foraging opportunities for the peregrine falcon.

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Disturbance from anthropogenic activities	Wildlife (FW-GL-WL-08) Livestock Grazing (FW-DC-LGR-02; FW-GL-LGR-01 and 02) Energy and Minerals (FW-ST-EM- 02; FW-GL-EM-02, 03, 04, and 05)	Forest plan components for energy and minerals would minimize habitat loss or degradation by avoiding development in sensitive areas, imposing timing restrictions during sensitive time periods, and avoiding or minimizing adverse environmental impacts. Components for grazing would further reduce habitat degradation from anthropogenic activities by avoiding impacts on sensitive resources. A guideline specific to falcons would avoid, minimize, or mitigate human activities that may cause disturbance to peregrine falcon eyries (nest sites).

Terrestrial Invertebrates

Eureka mountainsnail

Determination: It is beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of the eureka mountainsnail in the plan area. Nonetheless, the plan components should maintain or restore ecological conditions in the plan area to contribute to maintaining a viable population of the species within its range.

General Key Ecological Conditions: Key ecological conditions include areas with sparse plant cover at elevations of approximately 7,200 to 7,900 feet. Geologies have included both limestone and yellowish sandstone. Forest cover includes aspen, spruce, pine, and fir, while the valley floors and other open areas are grassy, with interspersed stands of sagebrush and juniper and scrub oak occur sparingly (UDWR 2020a, 2020b).

Key Threats to Persistence: Since this species is endemic to a handful of small areas, its population is susceptible to catastrophic events and human disturbance. Additionally, livestock grazing could threaten snail populations via trampling and destruction of habitat. Habitat loss and degradation from mining activities and wildfire are also potential threats (UDWR 2020a, 2020b).

Summary: The population trend of eureka mountainsnails on the Ashley National Forest is unknown. There are currently four widely separated populations in Utah; there are two known sites inhabited by the species on the Ashley National Forest. These sites were reported to be fenced and monitored (Forest Service 2017s); however, there have been no known observations in the past decade (Christenson 2021). The current condition of the habitat on the Ashley National Forest sites is stable and trending toward desired conditions (Forest Service 2017a).

Because only a small number of populations are known, the eureka mountainsnail is susceptible to catastrophic events, such as wildfire (UDWR 2020a, 2020b). Achieving desired conditions for vegetation resources would reduce threats from ecological factors by increasing the resiliency of ecosystems to stressors, such as fire, insects, pathogens, and climate variability (FW-DC-TV-01 to 09). This would help support the species' persistence (if it still exists on the Ashley National Forest). This is because resistant and resilient landscapes would be less susceptible to catastrophic events that could destroy populations and habitat.

Ecosystem-level plan components would support habitat sustainability by ground cover, ecological integrity, and diversity of forested and non-forested areas that may serve as habitat for the eureka mountainsnail (FW-DC-TV-01 through 09, FW-GL-TV-01 through 04, FW-DC-NFV-01, and FW-OB-NFV-01 and 02). Further, maintaining or improving soil quality and productivity, as well as coarse, woody debris and plant litter, would sustain habitat by providing necessary features such as food and cover (FW-DC-SO-01 and 02).

The sites known to be inhabited by eureka mountainsnails are fenced and monitored, so it is unlikely that these populations would be directly threatened by anthropogenic activities such as livestock grazing and mining activities. Further, plan components include a guideline specific to the species that requires vegetation treatments avoid, minimize, or mitigate negative impacts on known eureka mountainsnail sites (FW-GL-WL-06). However, anthropogenic activities could potentially degrade suitable habitat outside the known sites.

Plan components would alleviate potential habitat degradation and help maintain suitable habitat through measures to limit or avoid disturbance from forest management activities. Examples are ensuring

livestock grazing and associated management activities are compatible with ecological functions and processes and sustain forage resources (FW-DC-LGR-02; FW-GL-LGR-01 and 02), avoiding environmental impacts from energy and mineral exploration and development activities (FW-DC-EM-02 and FW-GL-EM-03), and retaining coarse, woody debris at the completion of management activities for soil ecological function and wildlife (FW-GL-SO-03). Ultimately, plan components would help protect sites that were once, and may still be, occupied. They also would provide ecological conditions outside the known sites that may serve as potential habitat for unknown or future populations.

Table D-9. Key Threats, Plan Components, and Expected Effects on Eureka Mountainsnail

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss from ecological stressors (wildlife and climate change)	Wildlife (FW-DC-WL-01, 02, and 03; FW-GO-WL-02; FW-GL-WL-06) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GL-TV-01 through 04) Non-Forest Vegetation (FW-DC-NFV-01; FW-OB-NFV-01 and 02) Soils (FW-DC-SO-01 and 02; FW-GL-SO-03) Carbon Storage and Sequestration (FW-DC-CS-01) Adjusting to Climate Change (FW-GO-ACC-01) Monitoring Table—Wildlife, TEPC Species and Species of Conservation Concern; Terrestrial Vegetation, Non-Forest Vegetation; and Terrestrial Ecosystems, Forest Vegetation	Ecosystem-level plan components for wildlife, terrestrial vegetation, non-forest vegetation, and carbon storage and sequestration would emphasize maintenance of key ecological conditions that are important for many species of conservation concern, including the eureka mountainsnail. Components to achieve desired conditions for and restore the ecological function of terrestrial vegetation would sustain habitat by providing habitat features such as vegetation cover and coarse, woody debris. They would also help increase habitat resistance and resilience to ecological disturbances such as wildfire and climate change.
Habitat loss and degradation from anthropogenic activities (mining or improper grazing)	Livestock Grazing (FW-DC-LGR-02; FW-GL-LGR-01 and 02) Energy and Minerals (FW-DC-EM-02, FW-ST-EM-02, and FW-GL-EM-03) Soils (FW-GL-SO-03) Wildlife (FW-GL-WL-06)	Forest plan components for energy and minerals would minimize habitat loss or degradation by avoiding or minimizing adverse environmental impacts. Components for grazing would further reduce habitat degradation from anthropogenic activities by stipulating that activities are compatible with ecological functions and processes. A guideline for soil would retain coarse, woody debris at the completion of management activities, and a guideline specific to the species would require vegetation treatments to avoid, minimize, or mitigate negative impacts on known eureka mountainsnail sites.

Fish

Colorado River cutthroat trout

Determination: The ecosystem plan components may not provide the ecological conditions necessary to maintain a viable population of the Colorado River cutthroat trout in the plan area. Therefore, additional species-specific plan components have been provided. The combination of ecosystem and species-specific plan components should provide the ecological conditions necessary to maintain a viable population of the Colorado River cutthroat trout in the plan area.

General Key Ecological Conditions: Key ecological conditions for Colorado River cutthroat trout include sufficient water quality and quantity, characterized by cool, clear water and well-vegetated streambanks for cover and bank stability. The species requires spawning gravels free of fine sediment to complete its life cycle. Connectivity of habitat is required with no nonnative trout present (Forest Service 2017a).

Key Threats to Persistence: Without past, current, and ongoing conservation efforts, this species' persistence on the Ashley National Forest is at risk. This is primarily due to the presence of nonnative trout, whose presence often results in hybridization with Colorado River cutthroat trout and causes competition for resources. Other threats primarily include any sediment-causing activities, such as overgrazing, severe fire, logging, and off-highway vehicle (OHV) use, as well as climate change (Forest Service 2017a).

Summary: Colorado River cutthroat trout populations exist across the Ashley National Forest, and there are 350 miles of Colorado River cutthroat trout streams on the Ashley National Forest; these are classified as part of the "Current Population" (Forest Service GIS 2020). Its habitat is found in various LTAs, including Stream Canyon, Glacial Bottom, Strawberry Highlands, Avintaquin Canyon, Greendale Plateau, and Round Park (Forest Service 2017a). State fish and game agencies manage native and nonnative sport fish. While the Forest Service works closely with the State agencies in population management, its primary role is the management of aquatic habitat on which these species depend. Specific plan components for fish and aquatic ecosystems are identified and would work in concert with direction for watershed, aquatics, and riparian ecosystems to provide or improve habitat that supports Colorado River cutthroat trout populations.

The Colorado River cutthroat trout requires cool, clear water, deep pools and boulders, and well-vegetated streambanks for cover and bank stability (Forest Service 2017a). Although suitable habitat is abundant on the Ashley National Forest, and most is in good condition, there are areas where erosion caused by overgrazing and unauthorized OHV use have degraded habitat by adding sediment to streams (Forest Service 2017a). Additionally, the potential for climate change to cause warming temperatures and the resulting effects on seasonal stream flows could reduce habitat suitability in the long term (Forest Service 2017a).

As listed in Table D-10, plan components for fisheries/aquatics and watershed, aquatics, and riparian ecosystems would reduce these threats by setting desired conditions for maintaining or improving habitat connectivity, water quality, and hydrological features, such as pools, runs, and riffles, and reducing sediment-disturbing activities and fine silts in fish spawning habitat. Restoration projects would help improve aquatic and riparian habitat conditions and increase habitat availability. Improving riparian vegetation would help to maintain suitable water temperatures (Forest Service 2017a). Measures such as "construction of stream crossings and other channel work using heavy equipment should be avoided in streams with populations of Colorado River cutthroat trout during their spawning and incubation seasons"

would reduce the potential for sedimentation from management activities to interfere with spawning. Monitoring for changes in Colorado River cutthroat trout habitat and population trends would help identify areas were habitat improvements or protections are necessary.

Additionally, forest plan management approaches for fisheries would include specific elements that would help maintain the persistence of Colorado River cutthroat trout on the Ashley National Forest. These are:

1. Identify and protect all existing Colorado River cutthroat trout-occupied habitat.
2. Collaborate with State wildlife agencies to expand the range of Colorado River cutthroat trout on the planning unit.
3. Where appropriate, maintain or improve stream connectivity.
4. Consider upland watershed effects from various forest management activities to ensure protection for aquatic habitat and species.
5. Include design elements as part of the proposed action for all projects in the vicinity of aquatic habitat, to avoid impacts on the habitat.
6. Include project design features to restore habitat and populations of aquatic and riparian species. Incorporate mitigation measures to reduce stream impacts and protect fish populations.

One of the primary threats to Colorado River cutthroat trout populations is the existence of nonnative trout (Forest Service 2017a). Plan components for fisheries/aquatics would help alleviate this threat by including measures to prevent the introduction of aquatic invasive species (e.g., cleaning equipment that is exposed to untreated water, providing information on preventive measures related to aquatic invasive species at water-based recreation sites, and treating perennial waterbodies to remove aquatic invasive species). The plan components specify that "Habitat conditions would contribute to the long-term viability of Colorado River cutthroat trout throughout its historical range. Cutthroat trout populations are stable or increasing, protected from nonnative fish" (FW-DC-FIS 05). They also include an objective to treat perennial waterbodies to remove aquatic invasive species (FW-OB-FIS 05) and allow for barriers to preclude invasion of nonnative species, such as brook trout (FW-GL-FIS 01).

Table D-10. Key Threats, Plan Components, and Expected Effects on Colorado River Cutthroat Trout

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Hybridization, competition, and predation from nonnative trout	Fisheries/Aquatic (FW-DC-FIS 04, 05, and 06; FW-OBJ-FIS 05; and FW-GL-FIS 01, 03, and 04) Riparian Management Zones (FW-DC-RMZ 01) Monitoring Table—Aquatics; Watersheds; and Fisheries, Colorado River Cutthroat Trout Management Approaches—Fisheries 01 through 06	Ecosystem-level components would minimize the occurrence and spread of nonnative fishes to the extent possible, and thus would reduce threats to the Colorado River cutthroat trout.
Habitat loss or degradation from sediment-causing activities, such as overgrazing, severe fire, logging, and OHV use.	Watershed, Aquatic, and Riparian Ecosystems (FW-DC-WA 01 through 08; FW-OBJ-WA 01 and 02; and FW-GL-WA 02) Fisheries/Aquatic (FW-DC-FIS 01 through 07; FW-OBJ-FIS 01 through 04; and FW-GL-FIS 02) Riparian Management Zones (FW-DC-RMZ 01 and 02; FW-GL-RMZ 01 through 04) Monitoring Table—Aquatics; Watersheds; and Fisheries, Colorado River Cutthroat Trout Management Approaches—Fisheries 01 through 06	Ecosystem-level direction for water, watersheds, aquatic, and riparian areas emphasizes conservation, maintenance, and restoration of aquatic and riparian ecosystem integrity, which would help protect habitat from sediment-causing activities and restore previously damaged habitat. This would reduce the threat of fish habitat degradation, and may even improve previously impaired conditions.
Habitat loss or degradation due to climate change	Watershed, Aquatic, and Riparian Ecosystems (FW-DC-WA-01 and 03) Fisheries/Aquatic (FW-DC-FIS-03) Adapting to Climate Change (FW-GO-ACC-01) Monitoring Table—Aquatics; Watersheds; and Fisheries, Colorado River Cutthroat Trout	Ecosystem-level components designed to move toward desired conditions would aid in forest habitats being more resilient to stochastic events, including high-severity wildfire, drought, and climate change.

Plants

Riparian plants (handsome pussytoes, compound kobresia, silvery primrose, and Ute ladies'-tresses)

Determination: The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of riparian plants (handsome pussytoes, compound kobresia, silvery primrose, and Ute ladies'-tresses) in the plan area. No additional species-specific plan components are warranted.

General Key Ecological Conditions: Each riparian species is associated with at least one of the following key ecological conditions (see at-risk species tables in appendix C for individual species' habitat descriptions): rare calcareous or rich fens, intermediate to rich fens, wet meadows, floodplains, streams, and other riparian habitat (Forest Service 2017a).

Key Threats to Persistence: Key threats to persistence are habitat loss or alteration from land use, such as agriculture, development, OHV use, grazing, and climate change that leads to drier and warmer conditions. For Ute ladies'-tresses, habitat loss or alteration from competition from nonnative plants (graminoids and tamarisk) and vegetation succession appears to be the most widespread threat (Forest Service 2017a).

Summary: In general, habitat for riparian plant species is characterized by intermittent and perennial streams with surface flows and groundwater connections adequate to support riparian vegetation. Wetlands on the Ashley National Forest form in areas fed by surface water or groundwater, such as lakes, ponds, fens, and wet meadows. Fens are defined as groundwater-fed, peat-accumulating wetlands with organic soils that typically support sedges and low-stature shrubs. These types of habitats are geographically restricted and rare in the plan area. Riparian areas cover approximately 33,200 acres, or 2.4 percent, of the Ashley National Forest; wetland areas next to lakes, ponds, and other waterbodies cover approximately 22,700 acres, or 1.6 percent; and fen wetlands cover proximately 13,869 acres, or 1 percent, of the Ashley National Forest (Forest Service GIS 2020).

More specifically, Ute ladies'-tresses, which is federally listed as threatened under the Endangered Species Act, exists in floodplains of the Green River that contain satisfactory plant composition and hydrological conditions. Plants positively respond to occasional disturbances that reduce the vegetation competition (Forest Service 2017a). Periodic water discharges from the Flaming Gorge Dam that simulate high spring water flows provide a disturbance mechanism that clears or reduces floodplains of woody debris, which improves habitat conditions for the plant. Habitat sustainability within the plan area is achievable if the Forest Service implements or maintains weed control measures, or both, that reduce or eradicate invasive plant species along river floodplains. Fen-associated species (silvery primrose, compound kobresia, and handsome pussytoes) inhabit intermediate to rich fens with satisfactory plant composition, ground cover, and hydrological conditions (Forest Service 2017a). Long-term monitoring indicates sustainability of fen habitat with current stressors (Forest Service 2017a).

Habitat loss or alteration from land use, such as agriculture, development, OHV use, and grazing, are the main anthropogenic stressors for riparian plant species. Some grazing and OHV use impacts have been observed in or near fens on the Ashley National Forest. Hydrological alterations following the construction of the Flaming Gorge Dam have affected habitat for Ute ladies'-tresses (Forest Service 2017a).

Plan components would help alleviate these threats and maintain or improve habitat. Avoiding or mitigating management activities that would compromise the overall ecological integrity and resilience of calcareous fens and peatlands (FW-ST-RUH-01) would prevent future degradation of fen habitat. Maintaining or restoring habitat conditions and the natural timing and variability of water table elevation at springs, meadows, fens, and wetlands (groundwater-dependent ecosystems) (FW-OB-WA-03, FW-GL-WA-02, and FW-DC-WA-09 and 10) would improve the ability of these areas to support fen-associated at-risk species (silvery primrose, compound kobresia, and handsome pussytoes).

Desired conditions for watersheds and riparian ecosystems would maintain or improve overall watershed conditions and habitat for riparian plant species such as Ute ladies'-tresses by ensuring riparian areas are resilient to disturbance, conditions allow for the propagation of flood-dependent plants, and conditions support healthy, vigorous, and self-perpetuating plant communities (FW-DC-WA-01, 03 04, and 06–08). Managing riparian management zones to maintain, protect, or enhance aquatic and riparian resource values (FW-GL-RMZ-01) would help protect riparian plant species from future habitat degradation and improve previously impaired conditions. Additional components for livestock grazing (FW-DC-LGR-01 and FW-GL-LGR-02), and energy and minerals (FW-GL-EM-04) would ensure these activities are compatible with ecological functions and processes and avoid ground-disturbing activities in riparian management zones.

Ecological stressors for riparian plants include competition from nonnative plants, vegetation succession, and climate change. Invasive, nonnative woody and herbaceous plants have been introduced to the Ashley National Forest or have spread through natural pathways, while native encroaching species (typically coniferous trees and shrubs) have increased in cover and abundance along the mesic fringes of wetland meadows (Forest Service 2017a). Both nonnative, invasive plants and native encroaching species have the potential to displace riparian plants. If the climate becomes consistently warmer and drier, riparian and fen habitat integrity may be compromised.

Plan components would help alleviate these threats through restoration that reduces conifer encroachment, increases heterogeneity in riparian areas, and moves riparian vegetation composition and structure toward the natural range of variation (FW-DC-WA-01, 03, 04, and 06–10; FW-OB-WA-03; FW-GL-WA-02; FW-DC-RMZ-01 and 02; FW-GL-RMZ-01 and 02; FW-DC-NFV-01; and FW-OB-NFV-01). These would improve growing conditions for riparian hardwoods and shrubs that are often shaded out by upland trees and shrubs (Forest Service 2017a). Prescribed fire and wildfire managed to meet resource objectives would improve the condition, vigor, and health of most native riparian plants.

Implementing weed control measures that reduce or eradicate invasive plant species along river floodplains would alleviate competition from invasive plants (Forest Service 2017a), such as tamarisk, and improve habitat sustainability in the plan area (FW-GO-TV-01 and 02). Habitat enhancements and incorporating best available science in forest management would improve the resilience of riparian habitat to disturbances such as drought and climate change (FW-GO-ACC-01; FW-DC-WA-01, 03, and 07). This would help maintain the Ashley National Forest's ability to support at-risk riparian species under potential drier and warmer future conditions.

Overall, plan components would support the persistence of and maintain habitat for at-risk riparian plant species by ensuring that ecological processes are present and functioning in a manner that sustains long-term persistence, supports recovery, and maintains viable populations of at-risk plant species (FW-DC-TVAR-01).

Table D-11. Key Threats, Plan Components, and Expected Effects on Riparian Plants

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss or alteration from anthropogenic stressors such as agriculture, development, and grazing	At-Risk Plant Species (FW-DC-TVAR-01 and FW-GO-TVAR-01) Watershed and Aquatic Ecosystems (FW-DC-WA-01, 03 04, and 06 through 10; FW-OB-WA-03; and FW-GL-WA-02) Riparian Management Zones (FW-DC-RMZ-01 and 02; FW-GL-RMZ-01 and 02) Rare and Unique Habitats (FW-DC-RUH-01 and 02; FW-ST-RUH-01) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GO-TV-01 through 03) Non-Forest Vegetation (FW-DC-NFVA-01) Soils (FW-DC-SO-01, 02, 04, and 05; FW-GL-SO-05) Livestock Grazing (FW-DC-LGR-01; FW-GL-LGR-02) Energy and Minerals (FW-GL-EM-04) Climate Change (FW-GO-ACC-01) Monitoring Table— Terrestrial Vegetation; Aquatics; and Soils	Ecosystem-level direction for water, watersheds, aquatic, and riparian areas emphasizes conservation, maintenance, and restoration of aquatic and riparian ecosystem integrity. Along with the other components listed in the previous column, plan components would reduce the threat of riparian habitat degradation from future anthropogenic disturbances and restore previously damaged habitat.

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss or alteration from ecological stressors such as nonnative plants, vegetation succession, drought, wildfire, and climate change	At-Risk Plant Species (FW-DC-TVAR-01 and FW-GO-TVAR-01) Watershed and Aquatic Ecosystems (FW-DC-WA-01, 03 04, and 06 through 10; FW-OB-WA-03; FW-GL-WA-02) Riparian Management Zones (FW-DC-RMZ-01 and 02; FW-GL-RMZ-01 and 02) Rare and Unique Habitats (FW-DC-RUH-01 and 02; FW-ST-RUH-01) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GO-TV-01 through 03) Non-Forest Vegetation (FW-DC-NFVA-01) Soils (FW-DC-SO-01, 02, 04, and 05; FW-GL-SO-05) Climate Change (FW-GO-ACC-01) Monitoring Table— Terrestrial Vegetation; Aquatics; and Soils	Ecosystem-level components would minimize the occurrence and spread of nonnative plants, reduce vegetation succession to the extent possible, and increase habitat resilience to stochastic events, including high-severity wildfire, drought, and climate change. In areas where riparian enhancement projects are implemented, previously degraded habitat would be restored.

Upland plants (Graham's columbine, Owenby's thistle, Evert's wafer parsnip, clustered lady's slipper, Wasatch draba, rockcress draba, tundra draba, Untermann's daisy, Huber's pepperplant, Goodrich's blazingstar, Maybell locoweed, alpine poppy, stemless beardtongue, and desert phacelia)

Determination: For Graham's columbine, Owenby's thistle, clustered lady's slipper, Wasatch draba, rockcress draba, tundra draba, Untermann's daisy, Huber's pepperplant, Goodrich's blazingstar, Maybell locoweed, alpine poppy, stemless beardtongue, and desert phacelia: The ecosystem plan components should provide the ecological conditions necessary to maintain viable populations of upland plants (Graham's columbine, Owenby's thistle, clustered lady's slipper, Wasatch draba, rockcress draba, tundra draba, Untermann's daisy, Huber's pepperplant, Goodrich's blazingstar, Maybell locoweed, alpine poppy, stemless beardtongue, and desert phacelia) in the plan area. No additional species-specific plan components are warranted.

For Evert's wafer parsnip: The ecosystem plan components should provide the ecological conditions necessary to maintain a viable population of Evert's wafer parsnip in the plan area. Nonetheless, additional species-specific plan components have been provided for added clarity or measures of protection, or both.

General Key Ecological Conditions: Each upland species is associated with at least one of the following key ecological conditions (see at-risk species tables in appendix C for individual species' habitat descriptions): canyons, cliffs, ledges, seeps, alpine tundra, talus, scree slopes, escarpments, eroding slopes, semi-barrens, pinyon-juniper, sagebrush, desert shrub communities, or coniferous forests (Forest Service 2017a).

Key Threats to Persistence: Stressors include some or all of the following: habitat loss or alteration from land use such as agriculture, development, grazing, climate change, herbicide and pesticide use, nonnative plant invasions, conifer encroachment, OHV use, mineral exploration, timber harvest, bark beetle infestations, and wildfire (Forest Service 2017a).

Summary: Most at-risk upland plant species are associated with non-forest vegetation types on the Ashley National Forest, including alpine tundra, sagebrush, pinyon and juniper woodlands, and desert scrub. Clustered lady's slipper is the only species associated with forested vegetation (coniferous forests) in the plan area. A few species, such as Wasatch draba and Graham's columbine, are restricted to rare or specialized habitat, which limits their distribution in the plan area (Forest Service 2017a).

Anthropogenic stressors, such as agriculture, development, grazing, herbicide and pesticide use, OHV use, mineral exploration, and timber harvest, can lead to loss or alteration of upland habitat (Forest Service 2017a). Plan components would help alleviate these stressors by setting desired conditions to maintain essential ecosystem components, processes, and functions (FW-DC-TV-01 through 09, FW-DC-FVC-01 and 02, FW-DC-NFV-01, FW-DC-NFVA-01, FW-DC-NFDS-01, and FW-DC-NFS-01 and 02). 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). The reduced frequency and/or severity of wildfire would maintain habitat for upland plant species by reducing habitat loss to burning (Forest Service 2017a).

Additional components 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 by restoring these areas.

Climate change, nonnative plant invasions, conifer encroachment, bark beetle infestations, and wildfire are ecological stressors for upland at-risk plants. Invasive, nonnative woody and herbaceous plants have been introduced to the Ashley National Forest or have spread through natural pathways, while native encroaching species (typically coniferous trees and shrubs) have increased in cover and abundance in uplands (sagebrush/mountainbrush and grass/forb meadows) (Forest Service 2017a). Both nonnative, invasive plants and native encroaching species have the potential to displace upland plants. Predicted warmer and drier conditions from climate change may increase vegetation stress as well as wildfire intensity and frequency. Added effects from these stresses would help establish and spread invasive species (Halofsky et al. 2018a, 2018b).

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). The plan components include a standard to maintain persistence of Evert's wafer parsnip on semi-barren habitat, by stipulating that total tree and shrub canopy cover shall not exceed 10 percent within the plant's habitat (FW-ST-TVAR-01). This would alleviate the threat of conifer encroachment for Evert's wafer parsnip and other at-risk plant species found in unvegetated habitat types by improving growing conditions for species associated with non-forest vegetation that are often shaded out by upland trees and shrubs. Completing forested vegetation management treatments, such as timber harvest, planned ignitions, thinning, and planting (FW-OB-FVC-01), would improve habitat conditions for clustered lady's slipper, which inhabits moderately dense to dense lodgepole pine forests with sparse understory species (Goodrich 2013).

Prescribed fire and wildfire managed to meet resource objectives would improve the condition, vigor, and health of most native upland plants. Implementing weed control measures that reduce or eradicate invasive plant species would alleviate competition from invasive plants, such as cheatgrass, and improve habitat sustainability in the plan area (FW-GO-TV-01 and 02). This would ultimately improve or maintain pollinator habitat and plant species richness, composition, and diversity. Desired conditions for terrestrial vegetation would maintain essential ecosystem components, processes, and functions (FW-DC-TV-01 through 09; FW-DC-FVC-01 and 02; FW-DC-NFV-01; FW-DC-NFVA-01; FW-DC-NFDS-01; and FW-DC-NFS-01 and 02). This would result in ecosystems that are resilient or adaptive to stressors, such as fire, insects, pathogens, and climate variability.

Overall, plan components would support the persistence of and maintain habitat for at-risk upland plant species by ensuring that ecological processes are present and functioning in a manner that sustains long-term persistence, supports recovery, and maintains viable populations of at-risk plant species (FW-DC-TVAR-01).

Table D-12. Key Threats, Plan Components, and Expected Effects on Upland Plants

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss or alteration from anthropogenic stressors such as agriculture, development, grazing, herbicide and pesticide use, OHV use, mineral exploration, and timber harvest	At-Risk Plant Species (FW-DC-TVAR-01; FW-GO-TVAR-01; and FW-ST-TVAR-01) Watershed and Aquatic Ecosystems (FW-DC-WA-07 and FW-OB-WA-01) Rare and Unique Habitats (FW-ST-RUH-01) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GO-TV-01 through 04; and FW-GL-TV-01 through 04) Coniferous Forests (FW-DC-FVC-01 and 02) Non-Forest Vegetation (FW-DC-NFV-01; FW-DC-NFVA-01; FW-DC-NFDS-01; FW-DC-NFS-01 and 02; and FW-OB-NFV-01) Soils (FW-DC-SO-01 through 05; FW-GL-SO-03 and 05) Fire (FW-DC-FI-02 and 03; FW-GL-FI- 03) Livestock Grazing (FW-DC-LGR-02 and FW-GL-LGR-01) Monitoring Table—Terrestrial Vegetation and Soils	Ecosystem-level plan components for at-risk plant species, terrestrial vegetation, and other resources would emphasize maintenance of essential ecosystem components, processes, and functions for terrestrial ecosystems. These plan components support ecosystems and conditions that provide essential habitat characteristics for native species, vegetation diversity, and ecological integrity and resilience. In areas where habitat enhancement projects are implemented, previously degraded habitat would be restored.

Key Threats to Persistence	Plan Components that Alleviate or Eliminate Key Threats (See appendix E, Forest Plan)	Effects Summary
Habitat loss or alteration from ecological stressors such as climate change, nonnative plant invasions, conifer encroachment, bark beetle infestations, and wildfire	At-Risk Plant Species (FW-DC-TVAR-01; FW-GO-TVAR-01; FW-ST-TVAR-01) Watershed and Aquatic Ecosystems (FW-DC-WA-07 and FW-OB-WA-01) Rare and Unique Habitats (FW-ST-RUH-01) Terrestrial Vegetation (FW-DC-TV-01 through 09; FW-GO-TV-01 through 04; and FW-GL-TV-01 through 04) Coniferous Forests (FW-DC-FVC-01 and 02) Non-Forest Vegetation (FW-DC-NFV-01; FW-DC-NFVA-01; FW-DC-NFDS-01; FW-DC-NFS-01 and 02; and FW-OB-NFV-01) Soils (FW-DC-SO-01 through 05; FW-GL-SO-03 and 05) Carbon Storage and Sequestration (FW-DC-CS-01) Adapting to Climate Change (FW-GO-ACC-01) Monitoring Table—Terrestrial Vegetation and Soils	Ecosystem-level components designed to move toward desired conditions would aid in forest habitats being more resilient to ecological stressors, including high-severity wildfire, drought, beetle infestations, and climate change.

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