

area that would experience significant, adverse human health impacts or environmental impacts due to management actions proposed under any of the alternatives.

Conclusions

The anticipated effects of the proposed action and alternatives would meet the purpose and need because, under all alternatives, a full suite of key forest benefits would be provided and are expected to contribute to social and economic sustainability. Under all alternatives, the well-being, health and safety of affected publics would not be significantly, negatively impacted. Conversely, under all alternatives, there would be significant contributions to the well-being, health and safety of the public. The relative size and type of contributions vary by alternative.

3.28 Livestock Grazing

3.28.1 Introduction

This section addresses livestock grazing as well as the health of associated rangelands. The scale of the analysis is the entire HLC NF plan area, focusing on the range allotments located therein.

Public comment on livestock grazing in the HLC NF plan area generated several issues during scoping. Comments centered on providing for grazing opportunities on suitable rangelands, balancing forage use by domestic livestock with ecosystem functions, regulating grazing activities by implementing more stringent standards and guidelines, or reducing or eliminating livestock grazing to allow for vegetation and riparian recovery.

Domestic livestock grazing has been, and continues to be, an important multiple use of NFS lands within the plan area. Livestock grazing has been a use of public lands since the inception of the FS and has become an important part of the culture of the rural western U.S. The objectives for FS management of rangelands include managing rangeland vegetation to provide ecosystem diversity and environmental quality while maintaining relationships with allotment permittees; meeting the public's needs for rangeland uses; providing for livestock forage; maintaining wildlife food and habitat; and providing opportunities for economic diversity. Rangeland management is an essential part of the FS multiple-use strategy. This strategy ensures that rangelands provide essential ecosystem service such as wildlife habitat and related recreation opportunities, watershed functions, and livestock forage.

Although rangelands provide a variety of ecosystem services, such as wildlife habitat, recreation, watershed functions, carbon sequestration, and biodiversity conservation, these lands have primarily been managed for forage production and livestock grazing. Forage is a provisioning service. Provisioning services include all tangible products from ecosystems that humans make use of for nutrition, materials, and energy. Forage is managed by the FS to be sustainable, ensuring that it will be available for future generations while still providing the other rangeland's ecosystem services required by their multiple use strategy. To accomplish this, the FS divides rangelands into allotments and monitors each one. Additionally, the FS manages forage in transitory ranges. Transitory range is defined as forested lands that are suitable for grazing for a limited time following a timber harvest, fire, or other landscape events (Spreitzer, 1985).

Grazing permits for each allotment are issued to eligible commercial livestock owners. To determine the carrying capacity (livestock numbers) on an allotment, which is often called the stocking rate, rangeland managers use AUMs. An AUM is defined as the amount of dry forage required by one mature cow of approximately 1,000 pounds or its equivalent, to graze for one month. The forage allowance per day has been determined to be 26 pounds. In determining the AUMs per allotment, permitted outfitters, guides, and other recreational visitors using livestock are not included.

Livestock grazing management is established through forest plans, FS grazing guidelines, and individual allotment management plans. These plans are developed to be comprehensive using sound science and incorporating public involvement. Plans are revised and updated to ensure that livestock grazing management decisions are based on existing and future ecological, social, cultural, and economic conditions.

The successful management of livestock grazing use on the HLC NF relies upon the maintenance of healthy, functioning rangelands. Please refer to the discussions for nonforested vegetation communities in the terrestrial vegetation section and the RMZ section. These sections focus on the health of those plant communities utilized for grazing purposes, and how revised forest plan components would affect livestock grazing in the plan area.

Effects indicators

The indicators and measures used to analyze effects or changes to livestock grazing opportunities on the HLC NF are:

- Expected rangeland condition and trend, measured as rangeland acres meeting, not meeting, or moving towards desired rangeland condition as a result of management actions.
- Acres of suitable rangeland, analyzed as changes in suitable acreage available for livestock grazing as well as changes in forage producing capability.
- Number of permitted livestock head months or AUMs, measured in changes of permitted livestock numbers over time based on the implementation of plan components, such as more intensive management of RMZs and aquatic threatened and endangered species habitat.

3.28.2 Regulatory framework

Federal Law

The Public Rangelands Improvement Act of 1978 recognizes the need to correct unsatisfactory conditions on public rangelands by increasing funding for maintenance and management of these lands.

The Rescission Act of 1995 directs the FS to complete site-specific NEPA analyses and decisions for grazing allotments on a regularly scheduled basis based on the permit requirements.

Regulation, policies, and guidance

The following regulations and policies have been developed to support implementation of the acts and executive orders previously presented:

USDA Environmental Compliance, Policy on Range, Departmental Regulation, Number 9500-5, April 21, 1988; This regulation sets forth Departmental Policy relating to range services and coordination of range activities among agencies of the USDA and other executive agencies, organizations, and individuals.

National Grasslands Management - A Primer (1997): a document identifying and interpreting the laws and regulations applicable to the administration of the national grasslands.

Other agreements and plans

The following agreements and plans also support the FS's rangeland management program:

Memoranda of understanding for forage reserves. Forage reserves are allotments under a term grazing permit but may be used by other permittees that have been temporarily displaced due to wild or prescribed fire, drought, or other situations that have made forage unavailable.

Non-use for resource protection agreements. These agreements may be established to provide long-term nonuse to allow rangelands to recover, provide forage on a temporary basis to allow resource recovery on other grazing units, provide temporary resolution of conflicts created by predation on livestock, or provide supplemental forage in times of drought to assist area livestock operators and lessen the resource impacts of grazing.

3.28.3 Assumptions

With all quantitative and qualitative analysis, the following assumptions are used to determine the degree of impacts on livestock grazing. These assumptions are based on previous assessments, professional judgment, and FS Range Management Directives.

- Livestock that use rangelands can remove plant material, trample soils, and alter water flow patterns. However, with proper management these impacts are not substantial when compared with the natural resilience of ecosystems (Holling, 1973).
- Livestock grazing would be managed to meet specific standards and guidelines for rangeland health, including riparian standards and guidelines. In addition, range improvements would be used to meet standards and guidelines for rangeland health and achieve rangeland management goals.
- The grazing system in each allotment would remain the same, and permitted AUMs for each allotment is not expected to increase or decrease unless changed through a site-specific analysis or allotment management plan update.
- Impacts on livestock grazing would be the result of activities that affect forage levels or the limiting of access to designated allotments such that livestock could no longer use rangelands.
- Mitigations for impacts to, or from, livestock would be addressed in a site-specific analysis.
- Grazing use would be managed similarly in all alternatives.
- Grazing allotments would remain open as long as there continues to be demand, existing permits remain in good standing, and resource conditions are meeting or moving towards desired conditions.

3.28.4 Best available scientific information used

The science of assessing rangelands is evolving as certain concepts and ecological processes are becoming better understood (Pellant et al 2005). General concepts for maintaining or moving towards desired rangeland condition will focus on aspects of ground cover, species composition and the presence or absence of invasive species as indicators.

Information sources include current scientific literature, FS reports and databases, and other documentation. Data used to analyze the existing condition for livestock grazing and the rangeland resource came from the following sources:

- FS Natural Resource Manager database (includes grazing allotment, permitted use, range capability, range improvement, and range vegetation plot data).
- Completed range analyses (includes range vegetation inventory and assessment data).

Rangeland capability and suitability

Capability is defined in the FS Manual as, “the potential of an area of land to produce resources supply goods and services and allow resource uses under an assumed set of management practices and given level of management intensity.” Capability is an inventory and remains constant throughout the planning process. The NFMA of 1976 requires the identification of the suitability of lands for resource management including grazing. Suitability is defined as, “the appropriateness of applying certain resource management practices to a particular area of land as determined by an analysis of the economic and environmental consequences and alternative uses forgone. A unit of land may be suitable for a variety of individual or combined management practices” (FSM 1905). Once capability is determined, an

assessment of suitability is conducted to address whether livestock grazing is, or is not compatible with management direction for other uses and values in that area. The assessment also decides which, if any, other uses would be foregone with livestock grazing.

Rangeland condition and trend

Rangeland health has been defined as the degree to which the integrity of the soil, vegetation, water, and air, as well as the ecological processes of the rangeland ecosystem are balanced and sustained (Pellant et al 2005). In the publication “*Indicators of Rangeland Health and Functionality in the Intermountain West*” (O’Brien et al. 2003), the authors found that four indicators were useful for describing the range condition and functionality of rangelands at many scales. The indicators include presence or absence of noxious weeds, percent ground cover, plant species composition, and percent shrub cover. Although a consistent analysis across the plan area for these rangeland health indicators is not available, these concepts are considered qualitatively along with data that has been collected, or that will be collected for future allotment management plan revisions.

Through fire and other agents there has always been a mix of ecological status classes over the landscape. Different plant and animal species are favored by vegetation in each of the classes. To maintain forest and rangeland ecosystem health, a mix of ecological status classes are desired for dominant habitat types. These resource values include: plant and animal species and structural diversity, wildlife forage and cover, soil stability and productivity, fish habitat, and palatable livestock forage. Some areas classified in “low” ecological status are composed primarily of introduced species such as Kentucky bluegrass and common timothy.

Riparian areas and annual use indicators

To sustain riparian vegetation, which protects water quality, herbaceous utilization, stubble heights that vary by vegetation type, and limiting utilization of riparian shrubs are indicators to monitor (Mosley et al. 1999). Recommendations by Clary and Webster (1990) called for residual stubble or regrowth of at least 4 to 6 inches in height to provide plant vigor maintenance, bank protection and sediment entrapment. Utilization of streamside herbaceous forage should be an additional indicator, and vary by the season of use. Improper livestock grazing can have numerous direct and indirect effects on soil infiltration by trampling, compaction and loss of vegetation cover on both upland and riparian sites. Impacts are often greater in riparian zones because livestock seek shade, water, and succulent vegetation in which these areas provide. Overuse by livestock in riparian zones can reduce bank stability through vegetation removal and bank trampling, increase soil compaction and sedimentation, cause stream widening or down cutting, and can change vegetation composition (Platt, 1991).

According to Clary and Webster (1990) the level of forage use occurring on a site, including riparian areas, is the most important consideration to manage livestock appropriately on western rangelands. Rangelands comprised of upland plant communities and the riparian areas are complex systems with many factors contributing to their development and resiliency. Physical factors such as stream type, geology, climate, and elevation greatly influence the recovery of riparian areas. Specific management action must be made to fit local conditions (Clary & Webster, 1990), which also includes selecting annual use indicators that match the resource goals of a riparian site. Riparian grazing plans should be site-specific and based upon the best research and evidence available to maintain and enhance vegetation and protect streambanks (Mosley et al. 1999).

While no one method works everywhere, stubble height has been extensively studied and is widely put in practice as a trigger for cattle movement or end of season monitoring indicator.

Two typically used grazing monitoring indicators are within grazing season trigger points and the end of season guidelines. Within season annual indicators are normally used to trigger or indicate when it is time to remove livestock from a given area so that end of season guidelines, usually in the form of an

allowable use level, can be met. End of season annual indicators are used to determine if management for that particular unit and season has been satisfactory. End of season annual indicators may also indicate that management is not meeting or moving towards desired conditions and thus changes to management should be considered prior to the next operating season.

End of season stubble height of greenline vegetation has been shown to be a good indicator of two primary factors: 1) the effect of grazing on the physiological health of herbaceous, hydrophytic plants, and 2) the ability of the vegetation to provide streambank protection and bank building function. Stubble height criteria should be used where streambank stability is dependent upon herbaceous plants.

Alternatively, woody plant utilization or streambank alteration could be used as a management guide in situations where streambank stability is controlled by substrate or the stream is deeply incised (Clary & Kinney, 2002).

3.28.5 Affected environment

Permitted livestock grazing use

Grazing is widespread across the HLC NF and occurs in each GA, as shown in Table 264 and Table 265. Active grazing allotments occupy approximately 50 percent of the NFS lands on the Lewis and Clark NF, and 65 percent on the Helena NF. Grazing allotments are more prevalent in some GAs than others.

Table 264. HLC NF grazing allotment summary

Grazing Permittees (Number of Permit Entities)	234
Active Allotments (Number)	240
Active Allotment Total Acres	1,419,085
Active Allotment NFS Acres	1,379,819
Active Allotment Waived (Private) Acres	39,266
Vacant Allotments (Number)	12
Closed Allotments	23

Table 265. Grazing allotment Acres by GA

GA	Grazing Allotment Acres	% of the GA
Big Belts	233,854	52
Castles	56,315	71
Crazies	59,539	85
Divide	134,425	58
Elkhorns	90,506	52
Highwoods	40,680	92
Little Belts	502,867	56
Rocky Mountain Range	175,547	22
Snowies	57,227	47
Upper Blackfoot	77,991	22

According to records for 2011-2013, across the active allotments permittees are authorized to graze a variety of livestock as shown in Table 266. A head month is defined as one month's use and occupancy of the range by one animal (weaned or adult cow with or without calf, bull, steer, heifer, horse, burro, or

mule, or 5 sheep or goats), and is used primarily for FS grazing fee calculations. In contrast to head months, AUMs are used for grazing capacity or stocking rate calculations since it typically includes a livestock kind and class conversion factor based on forage requirements for the particular animal unit (e.g., mature cow, cow-calf pair, yearling, or breeding bull).

Table 266. Livestock grazing use in head months on the HLC NF, based on 2011-2013 records

Livestock	Head	Average Head Month
Cattle	24,190	86,015
Horses	79	122
Sheep	5,000	8,648

Commercial livestock grazing on NFS lands is considered a privilege, and authorized through the issuance of a term (i.e., 10-year) grazing permit. Term permits include terms and conditions for grazing use and describe the responsibilities of the permit holder. These terms and conditions are also incorporated into an allotment management plan. The allotment management plan establishes site-specific goals and objectives and provides management strategies to maintain or move towards desired condition. Grazing management strategies may include allowable use levels, seasons of use, pasture rotations, and a schedule for implementing range-improvement projects such as fences and water developments. This plan also includes requirements for monitoring and inspections, payment of grazing fees, ownership of livestock and base property, livestock management, range improvement maintenance and construction, and other terms as appropriate. Once approved, the allotment management plan becomes a part of the permit.

The grazing management program helps to ensure a reliable and consistent level of native rangeland forage for permitted commercial livestock production. This resource helps local ranches maintain an economical operation that, in turn, maintain open space adjacent to the forest, which is integral to meeting desired resource conditions and maintaining the economic and social sustainability of local communities.

Rangeland capability and suitability

Rangeland specialists' estimate that timber canopy closure and conifer encroachment have reduced forage availability by at least 10 percent over the past 60 years on some grazing allotments in the planning area. Analysis of grazing allotments within the Divide and Little Belt Mountain GAs indicates grass/forb understory is decreasing in past timber harvest units due to increasing canopy closure by conifers. In some areas this forage loss is due to the restocking of these harvest units back to lodgepole pine, while in others range managers suggest that this trend in canopy closure and the resulting loss of forage may be due to fire exclusion. In either case, as tree densities and canopy cover increase these rangelands will continue to transition from being suitable to not being suitable for livestock use due to a loss of forage production and/or access to forage.

The HLC NF will use the allotment management planning process to determine additional lands that are not suitable and determine the site-specific permit actions necessary to meet forest plan desired conditions, objectives, and standards. Allotment management plans will also be used to evaluate the twelve allotments across the Forest that are vacant based on economic or other resource values. The decision whether or not to permanently close, establish a forage reserve on, or reallocate these vacant allotments will be made during the allotment management planning process, and therefore determine the site-specific suitability of rangelands for livestock grazing at that time.

Rangeland condition and trend

Intensive collection of vegetation plot data was collected prior to 2005 for several range analyses across the Forest. This data was collected on roughly 42 percent of the HLC NF, primarily on the east side of the plan area. Analysis of this data, which is believed to typify range conditions across the plan area, determined that approximately 87 percent of sampled areas retain high native species integrity (i.e., potential natural community or high ecological status). Grasslands that have lower amounts of natural community attributes and/or the substantial presence of invasive species (approximately 5 percent of samples) suggest that these plant communities have a low similarity to potential natural community ecological condition. A large portion of the assessment area is susceptible to invasive weeds, and a high risk of continued weed expansion exists.

To provide a general depiction of current rangeland condition across the plan area, allotment specific data collected through agency approved methodologies will help determine movement towards or departure from desired rangeland conditions. Historical data and photographs and new monitoring techniques should all be considered in order to develop apparent trends and effects of management changes. According to O'Brien and others, (2003), monitoring should document the following attributes in order to determine if range condition is moving towards desired condition at the allotment or pasture level:

- Noxious weeds are absent, or are a very minor component of the existing plant community.
- Ground cover provides proper watershed and soil protection for the rangeland site, and bare ground percentages are within the NRV, or spectrum of ecosystem states and processes that evolved over a long period of time from natural disturbance regimes.
- The composition of desirable shrubs, grasses, and forbs is within the NRV for the rangeland site.
- Shrub cover is within the NRV for the rangeland site.

These general concepts were used on the HLC NF to develop an estimate of ecological status of rangeland acres based off of existing information and monitoring data. Estimated acres of ecological status are shown in Table 267.

Rangeland comprises a variety of vegetation types, including many timbered plant communities, grasslands, shrublands, and riparian areas. Range condition is an assessment of the current health of the plant communities and soils, often expressed as the degree of similarity or dissimilarity of current plant composition and abundance compared to potential or natural/historic conditions. On the Lewis and Clark NF, a Range Vegetation Classification (USDA 1996) was completed from 1991-1995 to describe vegetative characteristics and their distribution to stratify herbaceous vegetation into community types and determine ecological status. An ecological status rating was assigned for each vegetative community. Ecological status is a rating of the overall condition of the vegetation, whether human forces or natural induces the condition. Ecological status was rated in four categories based on similarity of the existing species composition to that of the potential natural community. The potential natural community is the plant species composition that would naturally occur if minimally disturbed. Potential natural community is equal to 76 to 100 percent similarity, high is equal to 51 to 75 percent similarity, mid is equal to 26 to 50 percent similarity, and low is equal to zero to 25 percent similarity. Ecological status may be the result of natural succession, fire, timber harvest, introduced species, grazing, or other disturbances. For example, a community type with a tree overstory is predominantly influenced by the natural succession of trees and fire, and grazing of the understory may have some effect on the overall similarity to the potential natural community. On the other hand, grazing may have a dominant influence on the overall similarity of a grassland community type.

Table 267. Inventoried rangeland acres by ecological status

Forest	Potential natural community ecological status	High ecological status	Mid ecological status	Low ecological status
HLC NF	1,221,877	373,002	136,837	100,267
Beaverhead-Deerlodge	15,480	4,725	1,734	1,270

Table 269 represents a snapshot in time of rangeland current conditions. To effectively implement ecosystem management, a reference or benchmark to represent the conditions that fully describe functional ecosystems need to be developed (Cissel, Swanson, McKee, & Burditt, 1994); Laughlin et al., 2004). Livestock grazing is a major land use component and is one tool which can mimic natural disturbances such as grazing by large herbivores and alter changes in ecological status. Weed invasion and conifer encroachment can also rapidly change rangelands within the plan area. These conditions could be evaluated against this reference to determine movement towards or departure from desired condition, and from that information, vegetation treatments may be designed or management adjustments that would return declining ecosystems to a more natural or native condition (Hessburg, Smith, & Salter, 1999; Swetnam, Allen, & Betancourt, 1999).

Watershed condition and riparian areas

The aquatics ecosystems section analyzes current and expected conditions of watersheds, stream habitat, fisheries and soils, as well as existing riparian conditions. The 2012 WCC Framework rated the overall watershed condition across the Forest. 103 watershed were classified as functioning properly, 159 as functioning at risk, and 34 as impaired. One of the most significant drivers of the ratings in the plan area was livestock grazing. These ratings will be re-assessed in the future to assess change. Other monitoring data, including PIBO data and forest stream studies have shown livestock impacts to streams and riparian areas are occurring on many stream reaches in the planning area, which is resulting in habitats and water quality that presently do not meet desired conditions. See the aquatic ecosystems section for more details.

Livestock management and annual forage use indicators

In order to address livestock use concerns and provide triggers in which to manage livestock the 1986 Plans incorporated grazing standards that contained annual use indicators. Annual forage use levels by vegetation type and grazing system were prescribed in the Helena NF Plan and total physical bank damage on key areas were set at 30 percent in the Lewis and Clark NF Plan. The 1986 Forest Plans encouraged the incorporation of new research results and management techniques in allotment management plans to help improve riparian areas.

Revised allotment management plans in the mid-1990s up until the present time have incorporated multiple annual use indicators such as bank alteration and forage use levels to guide livestock management. Over the years, financial and personnel limitations, as well as other resource priorities, have limited the amount of range allotment NEPA project decisions as well as created inconsistencies in monitoring frequency and intensity on the HLC NF allotments. These issues have ultimately led to a wide variety of riparian conditions and inconsistencies in permittee accountability in accordance with allowable use levels.

Invasive and non-native species

The HLC NF faces two large challenges related to non-native rangeland species: noxious weeds that decreasing forage availability and native species diversity; and non-native invasive forage species such as Kentucky bluegrass, smooth brome, and timothy. All three of these forage species were intentionally introduced for hay or forage production but have escaped cultivation and have out-competed native plant communities across the HLC NF. Invasive forage species can significantly affect the structure and diversity of plant communities, as well as the seasonal palatability on some grazing allotments.

3.28.6 *Environmental consequences*

Effects common to all alternatives

For the foreseeable future, management under any of the alternatives would continue to provide forage production and productive livestock grazing. Acres available for livestock grazing and permitted head months would be the same under all alternatives. None of the alternatives change existing allotment management nor do they provide any specific direction regarding current livestock management. No allotments or portions of allotments are proposed to be formally closed to grazing due to other resource needs. Under all alternatives, changes to livestock management and allowable forage use levels at the site-specific scale would be made during allotment management plan revision.

Permitted livestock use

Plan components for the protection of the aquatic resources, particularly riparian areas, have had some of the greatest impact on the forests' grazing program. Emphasis on improving riparian conditions is expected to continue under all alternatives. Revisions of allotment management plans would continue to implement BMPs and identify allowable use levels that are expected to move riparian areas towards desired conditions. Management adjustments may result in a loss of permitted head months for some permittees. Current vacant grazing allotments would most likely be used as forage reserves for allotments affected by fire, depredation, threatened and endangered species, or riparian management issues. Therefore, it is unlikely that permitted head months would be increased through the opening of new allotments under any alternative.

Rangeland suitability

Conifer canopy closure, conifer/shrub encroachment into grasslands, and the spread of invasive weeds all have the ability to reduce available forage for livestock. The degree to which future management actions address each of these ecological processes would influence the potential loss or increase in available forage. Fire and physical manipulation of the tree overstory may help to maintain or increase forage productivity for browsing and grazing ungulates. Development of rotation grazing systems versus season long grazing can have very positive effects on establishment of desired native vegetation. Treatment of invasive weeds can allow desired natural plant communities to flourish. Resource specialists predict that permitted livestock numbers may decline in some areas due to more stringent management constraints for riparian areas as well as the loss of forage from invasive weed spread, and encroachment of conifers into some grassland communities. However, vegetation modeling (as discussed in the terrestrial vegetation section) indicates that the extent of nonforested plant communities overall would likely remain fairly constant under all alternatives, and further that forest densities may decrease. This may result in increased forage in some forested areas.

No alternative proposes to change allotment boundaries, or formally close open or vacant allotments. Therefore, existing suitable acres would not change between any of the alternatives. A suitability analysis is done during allotment management plan revision and site-specific suitability determinations would be made at that time.

Climate change

Over the life of the plan certain environmental influences may negatively impact rangeland health and forage production. If climatic temperatures continue to increase, there may be changes in vegetation where there is a shifting from more mesic (moist) plant associations to more xeric (dry) communities that are better adapted to the drier sites. As a result, it is expected that bare ground would increase within these plant communities as rangeland sites become drier during extended periods of drought (Pellant, Abbey, & Karl, 2004). Elevation will play a large role in plant species composition in conjunction with predicted climate change. High elevation, alpine or other fringe type environments may see plant species

composition change first (Murphy and Weiss 1992). Invasive weeds would likely continue to spread and increase in abundance and density. Timber canopy may continue to close in areas where wildfires or other disturbances do not occur, and some grasslands/shrublands may see additional conifer encroachment and conversion to a conifer-dominated community. Conversely, there is potential that wildfire may play a larger role in shaping vegetation in some areas, perhaps promoting non-forested vegetation communities, particularly given warmer climate regimes. Transitory range acreage may fluctuate as forested stands become more open due to harvest, insects, disease, and/or fire. Over time and through succession, forest canopies would likely close in once again.

Climate change affects vegetation, which in turn could affect livestock grazing. Potential effects include, but are not limited to, changes in type, amount, and distribution of precipitation, which directly affects type, abundance and distribution of vegetation. Lower-elevation grasslands and shrubland habitat are expected to become drier and habitat zones shift upward in elevation (Finch, 2012). The result of these potential changes could be an increase in suitable cattle forage, thereby causing increased suitable forage for cattle grazing at higher elevations within an allotment. On the other hand, lower elevation rangeland and upland plant communities would be expected to senesce earlier in the season, resulting in reduced palatability earlier in the grazing season. Reduced palatability in the uplands, combined with warmer temperatures would affect livestock distribution by concentrating livestock in riparian and wetland areas. Riparian use levels would be met earlier in the season, thus forcing livestock to be removed from an allotment or pasture earlier than the permitted off date.

Increases in atmospheric carbon levels and higher temperatures would likely make invasive species, especially annual grasses, more competitive and adaptable, which may allow some species to expand to higher elevations as well as become more difficult to control due to reduced chemical efficacy (Ziska, Faulkner, & Lydon, 2004). Not only will some species become more invasive, but the array of species would continue to change (Scott, Mahalovich, Rinehart, & Krueger, 2013).

It is possible for climate change to impact resource use within a short timeframe, which could change the suitability and utilization of forage. For example, there have been periods of increased summer temperature and decreased summer precipitation over a 15- to 20-year planning period which would indicate that the potential for changes in the suitability and utilization of forage within a grazing allotment may change within a planning period. This could cause beneficial or negative impacts to the permitted use of a grazing allotment for suitability and utilization. Annual fluctuations of temperatures and precipitation would affect forage palatability under all alternatives.

Though the impacts to livestock grazing from climate change remain to be fully understood or experienced by permittees of the HLC NF, the FS has administrative tools to adapt to unexpected conditions as well as short and long-term changes in resource conditions. Examples of administrative changes include stocking adjustments and adjusting management practices. The impact of climate change to livestock grazing could include limited use of allotments due to less available forage and/or rapid seasonal changes in palatability.

Effects of plan components associated with:

Wildlife management

Grazing livestock share habitat resources with big game species. Big game grazing and browsing is compatible with livestock grazing and browsing. There is a large dietary overlap (40 to 80 percent) between elk and cattle and a similar though smaller dietary overlap with deer (Hansen & Reid, 1975; Wallmo, Gill, Carpenter, & Reichert, 1973). Elk grazing patterns have been shown to be strongly influenced by livestock grazing, as they seek areas of forage regrowth following grazing by livestock (Crane, Mosley, Brewer, Torstenson, & Tess, 2001).

Current forest plans and allotment management plans for most HLC NF allotments identify and manage for wildlife forage needs, such as crucial winter range and limiting interactions between livestock and bighorn sheep to avoid disease transmission, and would continue to do so under all alternatives. Allotment management plans have adjusted grazing management accordingly where allotment boundaries overlap with known big game winter range by having rest pastures in the rotation or attempting to increase livestock distribution, thus decreasing livestock use in areas of concern. In certain site-specific cases, such as localized population fluctuations or a distribution shift due to habitat loss on historic winter range, future limitations could be placed on forage use by permitted livestock through the allotment management plan revision process to assure adequate forage for the wild ungulate populations. Most allotments would have the flexibility to adjust livestock distribution if needed for adequate winter range forage. Upland use levels are rarely exceeded, let alone approached on most HLC NF allotments, as riparian areas primarily drive management actions. Plan components associated with big game habitat management should not limit livestock forage opportunity and not affect permitted use, suitability, and utilization within the grazing allotments to a great degree in any of the alternatives.

Grizzly Bear Conservation Strategy

All alternatives would include the adoption of the grizzly bear conservation strategy. Potential for grizzly bear-livestock conflicts exist where grizzly bear habitat and livestock operations overlap on both NFS lands as well as outside the Forest boundary. Historically, grizzly bear and livestock conflicts have been rare under current management. The 1986 Lewis and Clark NF Plan did address livestock/grizzly bear interactions with two standards that are similar to the strategy: Management Standard D4 – livestock grazing restrictions (5) “Administer provisions of the ESA in occupied threatened and endangered species habitat will use the Interagency Wildlife Guidelines to avoid or mitigate conflicts between livestock grazing and threatened and endangered species” and (6) “Grazing which affects grizzly bears and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated.” Adoption of the grizzly bear conservation strategy would apply to allotments within the Conservation Area on both the Lincoln and Rocky Mountain Ranger Districts.

The HLC NF would continue to allow livestock grazing in the twenty five active and two inactive allotments, but no increase in cattle or sheep allotments, or permitted head months within the grizzly bear primary conservation area would occur. Within the primary conservation area, twenty four allotments are permitted for 9,241 AUMs of cattle grazing, with one allotment on the Lincoln Ranger District permitted for sheep grazing at 133 AUMs.

Potential for grizzly bear-livestock conflicts is expected to be mitigated to the best possible extent while continuing to authorize permitted livestock grazing under the action alternatives. Mitigations include implementation of standards and regulations found within the strategy, and BMPs such as capping permitted livestock numbers on allotments, removing carcasses from high concentration areas, and prohibiting boneyards on NFS lands. Implementing a range rider program and having the ability to track collared bears could be other options to be proactive at keeping separation between grizzlies and livestock. Vacant allotments could be added or used in conjunction with existing active allotments without increasing permitted numbers even though the area available to graze is greater. This would give the permittee more places to move livestock to avoid bear-livestock encounters. These strategies benefit existing permittees, even though they may not maintain AUM production.

The grizzly bear conservation strategy is primarily administrative in scope, but is a mechanism to highlight BMPs that could decrease livestock-predator interactions. Conflicts between grizzly bears and livestock on NFS lands within the plan area have been sporadic. However, no matter what the strategy or alternative selected, having a sustainable population of grizzlies in the same mountain ranges as permitted livestock will probably result in depredation of livestock at some point. This may increase operating costs and psychological stress for permittees, as some level of livestock death loss will be inevitable under all alternatives.

Recreation management

Recreation use of NFS lands in the plan area is expected to increase. Recreation management can alter livestock grazing in several ways. Achieving reasonably uniform livestock distribution across an allotment is one objective of livestock management because it allows the optimal use of available forage. Areas with concentrated human activity are generally avoided by livestock. Concentrated or frequent recreation use along roads and near popular areas can cause livestock to avoid grazing or passing through an area, and work directly against a permittee's attempts to distribute livestock evenly. People using camping or picnic sites on the forest sometimes become concerned with livestock in and around their recreation sites. Cattle are occasionally shot by mistake during hunting seasons, or struck and injured or killed by vehicles, resulting in a direct economic loss.

Archery hunting has become very popular since the 1986 Plans were signed. Archery hunting season generally coincides with the last month of the grazing season (September/first half of October). Hunting pressure has and will continue to affect livestock dispersion in both upland and riparian areas under all alternatives. Livestock on public lands may be seen as a competing use to the provision of quality archery hunting opportunities on NFS lands with some member of the general public. Livestock are generally off the Forest when the general rifle season opens in late October.

Fences are a common solution to control livestock, but require installation and maintenance and can be costly. Fencing of roadways may result in a safer travel way for motorists and livestock, but also result in a loss of forage available to permitted livestock. Right-of-way fence can either disrupt planned grazing management or it can increase the management flexibility by creating additional pastures. Higher levels of summer recreation could create increased levels of potential conflicts with livestock grazing, and oftentimes may complicate livestock management and make it more expensive (e.g., more gates may be left open and livestock inadvertently or purposely moved). Winter recreation and motorized over-snow vehicle use would not impact livestock grazing because the permitted grazing season would not occur during the winter months.

Increased recreational uses of NFS lands within the plan area would most likely make grazing on the Forest more expensive for permittees under any alternative. Livestock allotments are most often located within the roaded landscapes on the HLC NF. Increased traffic on roads and trails in these areas would make it more difficult to keep livestock in scheduled pastures as gates may get left open and cause livestock to stray. With expected increases in visitation to easily accessible NFS lands vehicle collisions with livestock on system roadways and vandalism to range improvement infrastructure are likely to increase. These effects from recreational use would be the same under all alternatives.

Cultural resources management

Livestock can contribute to the deterioration of cultural and historical resources through physical contact (e.g., hoof action, rubbing on structures) or by contributing organic matter to a site. They can remove or alter vegetation that protects sites from erosion and make these resource more visible for unauthorized collection. In cases where the level of impact is unacceptable, the impacts can be mitigated with fencing or with changes in management (intensity or timing). Under all alternatives, plan components are in place to ensure the protection of cultural and historic sites and resources. If livestock are excluded from a site or forage use levels are reduced, total AUMs on an allotment may be reduced, which limits a site's suitability and utilization. The potential for these effects is the same for all alternatives.

Fire and fuels management

Fire and fuel management can have different short-term and long-term effects on livestock grazing. Effects depend upon burning conditions and burn type, and the results and timing of a wildfire are much less predictable than from a controlled burn/prescribed fire.

Prescribed burning often results in an increase in forage production and availability, and a shrub community more compatible with a variety of wildlife species. A reduction in shrub and conifer density could potentially accelerate the recycling of nutrients and make water more accessible across the landscape, such as in springs, seeps, and intermittent streams. Both wildland and prescribed fire can increase suitable rangeland on an allotment which in turn can simplify livestock management, improve livestock or wildlife distribution, and increase available AUMs. Under-burns in conifers or other types of burns can increase forage production and accessibility. Areas that are typically grazed may have use deferred for up to two growing seasons following a prescribed burn to allow for vegetative recovery. This “resting” requires that the permittee be flexible in management and involved in considerable advance planning and coordination. If a prescribed fire does not take place on schedule, arrangements need to be made again in successive attempts, which can accrue additional costs to the permittees and/or FS.

A wildfire can have similar effects as prescribed fire, but is likely to have unplanned adverse effects as well. Wildfire may result in the entirety of an allotment being burned, resulting in forage unavailability, with permittees being forced to move livestock to other lands in their operation (e.g., private, state). On rare occasions, large, quick-moving wildfires may also overrun livestock that cannot escape, which results in direct financial loss for a permittee. Wildfire may remove trees and open forest understories to a flush of grass and forb production for many years. Similar to prescribed fire, this can have the effect of recycling nutrients and improving the quality and quantity of forage for livestock and wildlife. However, since timing, location, and burn conditions are not controllable, wildfires are less likely to provide the same amount of positive effects as prescribed burns.

To evaluate the potential impact of fire on livestock grazing, the projected acres of prescribed fire and wildfire are used to determine areas most likely to create more suitable forage. As shown in the terrestrial vegetation section, the projected acres of wildfire range from about 100,000 to 175,000 acres per decade over the next 50 years, and are similar for all alternatives. Projected prescribed burning acres on forested lands are similar for alternatives A, B, C, and D, and typically less in alternative E depending on the decade. The location of prescribed fire treatments is not known, and the model did not include nonforested plant communities.

Fire would need to be within an existing allotment to affect the amount of acres that could be considered suitable for livestock grazing. The differences in the expected acreages of wildfire and prescribed fire are negligible at the forestwide scale, and therefore the potential effects would be similar across all alternatives. All alternatives have plan components that are generally permissive to the use of prescribed fire on the landscape.

Threatened, endangered, and species of conservation concern

Protection of threatened or endangered species habitat may have the largest influence on livestock grazing on Federal lands. Some permittees could be economically affected if conditions on their federal allotment require more intensive management actions or a reduction in stocking in order to manage for improved riparian and at-risk aquatic species habitat. In many cases regarding aquatic and riparian habitat improvement needs, changes in livestock management may require constructing new range improvements, adjusting forage use levels, and/or increasing herding efforts in addition to routine management practices. All these actions cumulatively increase the overall permit administration cost for a grazing permittee. Intensive management can generally be successful in moving resource conditions towards desired condition, but instances may arise where reduced stocking levels are also needed. At this time, predicting any future reductions are outside the scope of this analysis but would be addressed with an analysis if species are listed.

Terrestrial vegetation management

Opportunities for vegetation management that include reducing Douglas-fir encroachment and restoring aspen stands would have beneficial effects on livestock grazing. The predominant understory vegetation

in Douglas-fir encroachment areas would respond favorable to conifer removal and provide forage for livestock and big game. A flush of forbs and grasses occurs especially after a prescribed burn and to a lesser extent after other conifer removal methods. The increase in production in these cases can last for many years or even decades. Aspen restoration would also increase forage, but treatments must account for the potential for heavy browsing. Cattle may be fenced from treatment areas, or pastures placed in non-use until sprouts escape the browse zone from livestock and wildlife. Once aspen stands have recovered, understory vegetation would be favorable for providing forage for livestock and wildlife.

All alternatives have similar potential to promote aspen and reduce conifer encroachment, although the action alternatives have more explicit desired conditions related to aspen and nonforested plant communities. Vegetation modeling shows similar expected trends for most attributes of terrestrial vegetation across the alternatives.

Designated wilderness

In designated wilderness, livestock grazing “and activities and the necessary facilities to support a livestock grazing program, would be permitted to continue in NF wilderness areas, when such grazing was established prior to classification of an area as wilderness” in accordance with Congressional Grazing Guidelines” (FSM 2323.2, WO Amendment 2300-90-2). There is to be “no curtailment of grazing permits or privileges in an area simply because it is designated wilderness.” Wilderness designation should not prevent the maintenance of existing fence or other livestock improvements, not the construction and maintenance of new fences or improvements which are consistent with allotment management plans and/or which are necessary for the protection of the range.” However, travel variances would need to be issued to permittees for motorized access in order to administer their allotments, and would also be subject to line officer approval. In some instances added time to receive the variance and do the job could be expected. Variances could also be denied if conflicts with other Forest users were identified, which would require permittees to conduct administration via non-motorized means.

Wilderness is designated by congress. The three designated wilderness areas on the HLC NF are the Gates of the Mountains, the Bob-Marshall, and the Scapegoat Wildernesses. These designations would be the same for all alternatives.

Recreation access

Travel planning has been completed on the HLC NF, but travel plans are designed to adapt to changing conditions and adjust as needed in order to manage motorized use in accordance with other resource needs. The impact to livestock grazing from recreation and travel management is mainly limited by the grazing permit holder’s ability to use motor vehicles to access the allotment. Motorized vehicle access to areas allocated for non-motorized settings can be authorized by line officers. These decisions are discretionary and are made on a case-by-case review of the proposal and circumstances. The intent of the non-motorized areas is not to prevent allotment management as some of the motorized vehicle access needs include transportation of fence and/or water development materials, noxious weed control, and salt distribution. During particular times of the year, or as some routes grow in with vegetation from the lack of use or maintenance; vehicle access may be more restrictive than what is currently available under all alternatives.

Invasive Species

Noxious and invasive weeds have the potential to significantly decrease livestock forage when left unchecked. The impact of noxious and invasive species management on livestock grazing is evaluated based on a qualitative assessment. Impacts are similar between all alternatives, including the no-action alternative. Noxious weed management would continue under direction of both the Helena NF Weed EIS (2006) and the Lewis and Clark NF Weed EIS (1995), until revised. Infestation levels of invasive plants would likely remain steady to slightly increasing over time. Some species may contract in density as new treatment and biological options become available, while other weeds will expand in range and density.

All action alternatives would formalize the need to adopt and authorize the best available tools for weed management, but the same tools can also be pursued under current management. Action alternatives may be more favorable in the long term for overall management direction for invasive species, but in regards to effects on livestock forage, no significant difference would be present between the alternatives.

Under all alternatives, management of invasive species is not expected to affect current permitted livestock numbers, range suitability, and forage use on grazing. Current and foreseeable treatment options for noxious and invasive species are adequate to maintain livestock forage production on grazing allotments. However, weed treatments would need to continue to evolve in order to manage new weed species, expanding infestations, and possible herbicide resistance under all alternatives.

Minor inconveniences for grazing permit administration may occur under all alternatives for weed prevention and treatments. Access to areas may be temporarily closed or delayed for weed management activities. Also mitigations, such as washing vehicles or equipment entering NFS lands, or restricting off-road travel may be used as part of the grazing permit and allotment plan. These actions may temporarily limit access but would have positive effects for rangeland vegetation and livestock forage under all alternatives.

Effects common to all action alternatives

The plan components developed for the revised forest plan are the same for all action alternatives, and are designed to protect upland and riparian resources, manage noxious weeds, and maintain adequate levels of forage (Table 268). Furthermore, there are resource mitigations and BMPs that are part of allotment plans designed to protect forest resources from potential disturbances by livestock grazing. These elements are site-specific for each allotment and not part of this analysis. No action alternatives prescribe grazing standards for allotments with outdated allotment management plans, but defer to developing these annual use indicators at the allotment management plan revision level in order to implement the best site-specific standards to move riparian areas towards desired conditions.

Table 268. Summary of plan components for livestock grazing—alternatives B, C, D, and E

Plan Component(s)	Summary of expected effects
FW-RMZ-DC, STD and GDL	RMZ standards and guidelines would impact livestock grazing, including direction regarding RMZs and certain activities within these zones. Collectively these components may limit grazing in some riparian areas.
FW-SOILS-STD and GDL	Soil standards and guidelines would place limitations on detrimental soil conditions. These measures may place limitations on grazing, but conversely would result in protecting soil productivity and therefore would help provide for better range conditions in the long term.
FW-GRAZ-DCs	Desired conditions for livestock grazing emphasize sustainable grazing, stable soils, diverse vegetation and native plant communities, as well as riparian and wetland health. Movement toward these conditions would be achieved through implementation of the standards and guidelines for grazing and the other resource areas. Necessary changes to meet DCs would be implemented at the allotment management plan/project level.
FW-GRAZ-STDs and GDLs	Generally would affect how allotment planning is implemented. Collectively with the additional RMZ plan components mentioned above, the allotment management planning process will be guided by this guidance so that future grazing will move resource conditions within allotments toward desired conditions.

Alternative A, no action

The existing 1986 forest plans, with permit and/or contract-specific terms and conditions, provide the current direction being used by the HLC NF to address livestock grazing. Forage use levels prescribed for specific grazing systems (Helena NF Plan 1986) would guide management for allotments without current allotment management plans on all other Helena NF allotments. Lewis and Clark NF allotments would follow guidance under the Lewis and Clark NF Plan (1986) which implements a 30 percent bank

alteration standard on all fish-bearing streams. On Helena NF allotments west of the Continental Divide, INFISH (1996) grazing standards which prescribe annual use indicators focused on maintaining or improving riparian conditions would continue to guide livestock management on NFS lands.

Alternative A may be the least restrictive for livestock grazing use, especially east of the Continental Divide, based on plan components associated with riparian areas.

Under the 1986 Helena and the Lewis and Clark NF Plans, management direction focused on authorizing livestock grazing on forest allotments while trying to improve rangeland and riparian condition through increasing livestock distribution. The Lewis and Clark NF plan outlined developing allotment management plans that incorporated BMPs such as off-site water developments, grazing systems, and accounted for new research and management techniques to improve riparian areas. Site-specific standards, such as total physical bank damage on key areas in excess of 30 percent, and excessive grass/forb use were identified as factors which indicated damaging livestock use to fisheries habitat. The Lewis and Clark plan identified an average annual use level at 71,000 AUMs, with the potential to increase up to 90,000 AUMs as transitory range became available post-timber harvest. Use levels have remained around the lower level of AUMs and have not increased substantially due to low timber harvest acreage and riparian and aquatic concerns. Allotment range improvements have helped maintain AUMs and aide in distribution in some areas under the current plan. AUMs would be expected to remain stable to slightly decreasing as more allotment management plans are updated and improved management systems are put in place in order to move riparian areas toward desired conditions.

Although allowable use levels were stated in existing 1986 plans, position vacancies and funding deficiencies for rangeland administration have not allowed for 100 percent compliance checks on all primary allotments every year. Therefore, it is difficult to determine as to whether or not annual use indicators need adjustment, which in some cases may be warranted, or if inadequate monitoring has resulted in desired conditions not being met. Under this alternative, livestock use and disturbance levels in the 1986 plans would continue to be implemented until site-specific use indicators determined during an allotment management plan revision, which would most likely be more stringent than current management for many allotments.

In summary, under the no-action alternative grazing management as outlined in the affected environment section would continue, with revisions of allotment management plans and associated protections for other resources following guidance from the 1986 plans. Grazing management would continue to provide the livestock head months authorized in term FS grazing permits. The 1986 plans allowed for increasing the amount of AUMs across the Forests, mainly from the transitory range being created from timber harvest, although riparian and aquatic concerns would most likely keep permitted head months stable. The quantity and size of grazing allotments could change from the current condition. Additional grazing allotments could be added if they were to meet the goals and guidelines of the existing management areas.

Effects that vary by alternative

In the short term, all alternatives are designed to maintain forage production and livestock grazing. All alternatives have similar vegetation treatment levels, which could be favorable for grazing permittees as herbaceous forage should temporarily increase after treatments. Alternative D would not reduce livestock grazing, but would have the most area in RWAs, where access for permittees could be more limited or require authorization in regards to the use of motor vehicles for permit administration.

Rangeland condition and trend

Rangeland condition and trend is measured through implementation and effectiveness monitoring of allotment management plans by methods outlined in FSH 2209.21. Monitoring determines if rangeland acres are meeting, departing from, or moving towards desired rangeland conditions in livestock grazing allotments.

Infestations of noxious weeds can substantially impact livestock grazing if they are extensive enough to reduce the amount of available forage. Any ground-disturbing activity has the potential to expose a site to noxious and invasive plants, particularly when motor vehicles are involved. Conversely, established motorized access can make noxious and invasive plant treatment much easier and cost effective. Even though grazing can be used as a noxious weed and invasive species control mechanism, risk of spreading undesired species to other areas within the forest remains an issue without the use of mitigations, such as quarantine or cleaning livestock before and after they have been in an area known to be infested with undesired species. The alternatives vary slightly in their potential for ground disturbing activities such as timber harvest and prescribed fire, with alternative E predicted to have the least amount. Similarly, the potential for motorized access also varies to a very limited extent, based primarily on whether existing motorized uses are allowed in RWAs and the number of new RWAs. However, for both ground-disturbing activities and motorized access, the differences between the alternatives are slight in respect to the potential to impact rangeland condition and trend. These differences are negligible at the programmatic scale.

Action alternatives are expected to move upland and riparian rangeland towards desired conditions. Effects pertaining to riparian areas are described below.

Effects of plan components associated with:

Recommended wilderness

If RWAs contain active grazing allotments, future grazing management could be impacted. RWA allocation would primarily be administrative in scope for administration of livestock grazing allotments. Some on-the-ground management practices, especially concerning motorized travel, may be subject to increased review for authorization. Table 269 summarizes the acres of allotments within RWA by alternative. Alternatives A and C allow for existing motorized uses in RWAs, while alternatives B and D would prohibit those uses. Therefore, a variance may need to be granted for motorized allotment administration in RWAs under alternatives B and D. Alternative E has no RWAs.

Alternative D has the most RWAs and has the most potential to change motorized uses for grazing permit administration. Therefore alternative D could affect the most grazing permittees in terms of allotment access, operability, and management. Alternative D would not lead to a decrease in permitted AUMs, but could create an increased operating expense for some affected permittees in terms of added time to manage their allotment(s). However, most of the proposed RWAs are semi-remote/primitive and would not result in significant travel or access changes as a result of a RWA allocation. Alternative D would potentially have the largest effect on livestock grazing, but would mainly be administrative in nature. Alternatives B and C could also be potentially administratively restrictive for some permittees, but less than alternative E. Alternatives A and E are the least restrictive to allotment administration.

Table 269. Allotment acreages within RWAs by alternative

Alternative	A	B	C	D	E
Number of allotments with a portion in RWA	3	24	24	47	0
Acres (%) of allotments within RWA	4, 510 (1%)	63,631 (10%)	63,631 (10%)	205,406 (20%)	0
Acres of suitable range within RWA	851	15,200	15,200	58,543	0

RWAs do not affect significant amounts of suitable rangeland acres in any alternative; however permittees that have allotments within portions of RWAs, could potentially have increased administrative terms and conditions that make it more difficult to operate as compared to alternatives with less RWA allocation.

Vegetation management

Vegetation management, such as timber harvest and prescribed fire, can provide transitory range that would be available for livestock and wildlife grazing. Transitional range forage capacity decreases over time as the forest overstory grows back and shades out the herbaceous understory. As timber is harvested, areas may open up to livestock that were not previously available thus increasing capable grazing acres. These newly accessible areas would be used as transitory range as long as the acreage occurs within an existing allotment. Timber harvest could also open up range that is inaccessible to livestock because of natural barriers. This could cause livestock control and management problems if the previously unharvested timber stands were used as natural barriers between allotments or other critical area. If this were to occur, additional range improvements would need to be installed to control livestock. In addition, if livestock use is inhibiting regeneration of trees (through trampling or grazing), livestock may need to be temporarily excluded from these areas, which would offset potential gains in transitory range for a time.

The acres suitable for timber production are the most likely to be harvested, although harvest may occur in other areas as well. Acres suitable for timber production are used to compare the relative probability of creating transitory range across alternatives. Alternative E would have the most acres suitable for timber production. However, the actual projected acres of harvest are less in alternative E than in the other alternatives, due to an emphasis on harvesting stands that yield more timber volume. Therefore, despite having more lands suitable for timber production, the impact of actual acres harvested to create transitory range may actually be greater with alternatives A, B, C, and D. Transitory rangeland is considered as capable range, but would not be considered as suitable, since conifer regeneration would slowly come back into the harvest units over the next approximately 15 years. Transitory rangeland would therefore only provide increased forage for approximately a 10-20 year timeframe. However transitory range would help grazing allotments by providing increased forage and additional foraging areas which would have been inaccessible or void of herbaceous forage prior to timber harvest. Refer to the timber section for more information on projected timber harvest by alternative.

All alternatives would still provide positive effects for rangeland capability by providing transitory range. Transitory range on some allotments could help improve riparian conditions by providing permitted livestock other areas in which to forage. Some allotments do not contain land suitable for timber production and therefore would not benefit from creation of transitory range.

Aquatic and riparian resource management

The aquatics section discusses the effects of plan components on aquatic resources, particularly riparian areas. Management and protection of riparian and wetland resources are emphasized under all alternatives. The watershed, fisheries and soils plan components, under both the no-action alternative (alternative A) and the action alternatives (alternatives B-E) have had and would continue to present some of the greatest challenges to livestock grazing. The objectives and standards for protecting riparian and wetland resources have some of the greatest influences relative to the forest grazing program achieving desired conditions. Changes have been made in grazing management and practices to protect riparian and wetland resources, which are reflected in current resource conditions. Over the last 20 years much has been accomplished through altering grazing practices to protect aquatic resources. This has occurred through allotment management plan revisions throughout the Forest as well as implementation of INFISH standards on a small number of allotments west of the Continental Divide. However, work still needs to be done on many HLC NF allotments in order to move toward desired riparian conditions while maintaining an economically viable level of permitted AUMs.

All action alternatives would adopt revised watershed components along with new RMZs plan components, which may be more limiting than current management, especially the implementation of RMZ components east of the Continental Divide. East of the Continental Divide (the majority of the HLC NF), RMZs would result in more acres being subject to riparian area plan components as compared to the no-action alternative. West of the Continental Divide, the area influenced by riparian plan components is

the same across all alternatives because RMZs would be defined the same way as riparian habitat conservation zones are in the no-action alternative.

Several components, including FW-RMZ-DC-01, 02, FW-RMZ-GDL-12, FW-GRAZ-STD-02, and FW-GRAZ-GDL-01, 07, 08, and 09, could increase the amount of management needed within allotments to meet desired conditions. Based on these components, all future allotment management plan revisions would implement some level of riparian allowable use levels and other BMPs if riparian areas are not meeting desired conditions and to mitigate livestock impacts if they are present.

Some permittees would be able to manage to meet grazing standards with the action alternatives and as a result be able to graze their permitted season and numbers. Impacts to permittees might include increased time, labor, and capital investments in order to consistently meet grazing use levels. Other permittees may not be able to meet standards and may have to reduce livestock use to comply with use levels and new management strategies. The effects of implementing grazing standards on Forest allotments for the purpose of improving aquatic habitat is hard to quantify. Many variables impact the effectiveness of action by the permittee and the agency to comply with standards. Site-specific riparian allowable use levels have been effective to move riparian condition in an upward trend. However, a strong commitment is needed by both the grazing permittee and agency to implement, monitor, and provide accountability for allowable use levels to be successful. Overall, effects of aquatic and riparian protections as they relate to livestock grazing would be similar under all action alternatives.

Effects to riparian habitat under the revised forest plan would likely not vary for livestock grazing under any action alternative. Over time, conditions in RMZs as well as aquatic habitat within grazing allotments are expected to improve over current conditions. Refer to the sections on watershed, aquatic habitat, and RMZs for more details.

Cumulative Effects

Portions of the HLC NF adjoin other NFs, each having its own forest plan. The HLC NF is also intermixed with lands of other ownerships, including private lands, other federal lands, and state lands. The GAs are island mountain ranges and are typically surrounded by private lands.

Timber harvest, grazing, or conversion of rangeland or forests on adjacent lands would affect vegetation conditions at the landscape level, changing composition and structures, and could potentially affect the lands' capability to be grazed. Most public rangelands, both Montana state and BLM lands, should remain undeveloped and suitable for livestock grazing in the foreseeable future. Private lands surrounding the plan area could potentially be affected by conversion to agricultural lands or residential development. Development of these private lands would affect wildlife connectivity and overall landscape function with NFS lands within the plan area. Future development of private lands adjacent to the Forest boundary could also affect the spread of invasive weeds, increase fire protection responsibilities and costs, as well as increasing the complexity of grazing livestock on the Forest in some areas.

The need for a formal agreement has been identified between the BLM and Forest for co-managed allotments within the plan area in order to clarify allotment administration responsibilities and formalize monitoring roles and methodology. An agreement that defines these items will likely be adopted by the BLM field offices in Lewistown, Butte, and Missoula and the HLC NF within the Plan's lifetime. A formalized approach for allotment administration between the two agencies is expected to have advantages for management consistency, and increased efficiency and effectiveness for both BLM and FS Range Management Programs. This should lead to annual increases in monitoring on more acres of Federal grazing allotments in the Plan area, which ultimately will help determine if movement towards desired conditions in both the Forest Plan and Resource Management Plans is occurring.

Some adjacent lands are subject to their own resource management plans. The cumulative effects of these plans in conjunction with the HLC NF revised forest plan are summarized in Table 270, for those plans applicable to the livestock grazing resource.

Table 270. Summary of cumulative effects to livestock grazing from other resource management plans

Resource plan	Description and Summary of effects
Adjacent National Forest Plans	The forest plans for NFS lands adjacent to the HLC NF include the Custer-Gallatin, Lolo, Flathead, and Beaverhead-Deerlodge NFs. Generally speaking, management of vegetation is consistent across all NFs due to law, regulation, and policy. The cumulative effect would be that the management of vegetation and grazing would be complementary. This includes specific adjacent landscapes that cross Forest boundaries, such as the Upper Blackfoot, Divide, Elkhorns, Crazyes, and the Rocky Mountain Range.
BLM Resource Management Plans (RMP)	BLM lands near the HLC NF are managed by the Butte, Missoula, and Lewistown field offices. The Butte plan was recently revised (2009) while the existing plans for the Missoula and Lewistown areas are under revision. These plans components related to resilient terrestrial vegetation and livestock grazing, and are complementary to the plan components for the HLC NF. Some HLC grazing allotments contain BLM lands and would also need to follow resource management plan direction for those parcels.
National Park Service - Glacier National Park General Management Plan 1999	The general management plan for Glacier National Park calls for preserving natural vegetation, landscapes, and disturbance processes. Broadly, the terrestrial vegetation characteristics in this area are therefore likely similar to the wilderness areas in the adjacent Rocky Mountain Range GA and would complement these conditions.
Montana Army National Guard – Integrated Natural Resources Management Plan for the Limestone Hills Training Area 2014	This plan is relevant to an area adjacent to NFS lands in the Elkhorns GA. The Limestone Hills area is primarily non-forested, and calls for managing for fire-resilient vegetation as well as restoration of native vegetation including mountain mahogany specifically. This plan would be generally complementary to the HLC NF most especially in promoting the health of native vegetation.
Montana State Parks and Recreation Strategic Plan 2015-2020	These plans guide the management of state parks, some of which lie nearby or adjacent to NFS lands. Terrestrial vegetation is a component of these parks, although not always the primary feature. Specific vegetation conditions would not necessarily contribute to the desired conditions as described for the HLC NF.
Montana's State Wildlife Action Plan	This plan describes a variety of vegetation conditions related to habitat for specific wildlife species. This plan would likely result in the preservation of these habitats on state lands, specifically wildlife management areas. These plans also outline the sideboards on how domestic grazing leases on wildlife management areas will be managed. This plan would complement grazing management on HLC lands.

Livestock grazing use

Livestock grazing, especially for cattle, is likely to be still desired by the local livestock industry within the plan area for the foreseeable future. Cattle, sheep, and horses that graze the NFs during the summer months are provided forage from private lands during late fall, winter, and early spring. Forage from private lands during this period is in the form of native grass pasture, irrigated pasture, irrigated and dry land hay, and fall crop residue. The availability of private lands in the surrounding area that can provide summer forage is somewhat limited. This demand for grazed forage, especially during the months June through October, is greater than NFS lands can supply. Productive lands associated with the lands surrounding the plan area are generally used for crops, including spring/winter wheat and along with other cereal grains. Demand for grazing on NFS lands should continue to be very high for livestock operators whose private lands are adjacent to NF.

Large expanses of grasslands associated with non-arable lands near the plan area are generally obligated to cattle grazing. Some of these grasslands may produce forage at less than their full potential due to the abundance of exotic annual grasses and invasive weed species. Livestock production from State of Montana trust lands is expected to stay relatively stable in the plan area for the foreseeable future. Grazing on private lands depends on the market, drought conditions, and needs of livestock owners. Grazing on these non-federal lands is expected to remain in high demand. Possible future reductions on Federal lands in the plan area due to reduced forage capacity (increases in invasive weeds and tree canopy closure) and tighter administrative constraints for protection and enhancement of TES habitat and other resource concerns will put added grazing pressure and demand on private and MTDNRC land leases.

Livestock grazing is influenced by effects that impact the allocation of forage resources between livestock and wildlife; predation and disease transmission; management adjustments to protect cultural and historical resources; fisheries; threatened and endangered species; water quality; considerations necessary due to wildfire and prescribed fire management, and recreation. All of these factors add to the complexity and expense for the ranching operations that are permitted to graze livestock on the Forest (Rimbey & Torell, 2011). Livestock management is generally considered more difficult on NFS lands than on private lands. In addition, the business of livestock management is subject to factors most often not under the control of livestock operators, such as tourism; land values and potential subdivision of ranches; labor prices and availability; domestic and foreign demand for livestock products; markets and meat prices; FS budgets and farm programs; fuel prices; predator control; social values; and federal policy.

Increasing human population

It is expected that recreational uses on NFS lands will continue to increase, and as more people nationwide continue to look for places to recreate. As more people venture onto public lands, differing societal desires and ideas of what public lands should provide will continue to influence public land management policy. Increased attention and public recreation on grazing allotments in the future may make operating on NFS lands more expensive for permittees.

Conclusions

The following key points summarize the conclusions for livestock grazing use, effects, and opportunities on the HLC NF.

Expected Rangeland Condition and Trend

Rangeland condition and trend is expected to be maintained and improved under all alternatives, as each alternative has plan components or standards and guidelines to improve grazing management. This improvement should move riparian areas and upland plant communities towards desired conditions. Livestock management may become more intensive in a quicker timeframe under the action alternatives with the incorporation of new plan components, and therefore improve riparian areas more quickly than the no-action alternative.

Acres of suitable rangeland and number of permitted livestock head months or AUMs

No alternative proposes to decrease suitable rangeland acreage or decrease head months/AUMs by formally closing allotments or portions of allotments for other resource allocations. Suitable acres and forage within the grazing allotments would continue to be available for livestock grazing.

- Invasive weeds will continue to be one of the biggest threats to desired rangeland condition under all alternatives. All alternatives have tools under the existing Weed EIS documents to effectively manage noxious weeds in a manner which should preserve forage production and permitted grazing use within allotments. Action alternatives include plan components that are more proactive in adapting to new findings and technology in weed science and management, and should have a

greater impact in slowing the spread of invasive species, which benefits herbaceous vegetation and ultimately livestock grazing in the future.

- Under all alternatives the permitted use of the existing grazing allotments would continue. Based on current rangeland and riparian conditions and the need to revise allotment management plans for many allotments, changes in the amount of permitted AUMs are difficult to predict. Project-level analysis will determine future stocking rates and other management adjustments to meet desired conditions under all alternatives. Permitted head months over the long-term could possibly decrease under all alternatives due to more intensive management of RMZs and aquatic TES habitat.
- Motorized access on allotments could become more restricted under alternatives that contain RWAs. Some allotments may be more difficult to administer if a travel variance to use motor vehicles is not authorized. However, most of the RWAs are already semi-primitive and/or roadless under current management and contain very small amounts of suitable rangeland and range infrastructure. Therefore, allocation of RWAs should be insignificant for livestock grazing within the plan area.
- All alternatives have the opportunity to implement vegetation treatments, such as timber harvest, prescribed fire, and to allow wildfire to provide resource benefits where feasible. Vegetation should move towards a desired mix of conditions from these treatments and thus provide a secondary benefit of improving forage conditions and transitory range in the future.

3.29 Timber and Other Forest Products

3.29.1 Introduction

The HLC NF contains valuable timber resources, including products in demand by the American public such as lumber, house logs, pulpwood, and fuelwood. Timber harvest may be used to supply timber products as well as move vegetation towards desired conditions and meet other resource objectives such as improving watershed condition, improving wildlife habitat, and reducing wildfire risk. Timber harvest also provides jobs and income in logging and manufacturing of wood products.

Other special forest products include plant and fungi materials that are gathered from NFS lands. The most common of these products provided by the HLC NF is Christmas trees. Other products that are commonly utilized include posts and poles and, periodically in recent fire areas, mushrooms.

Timber and other forest products are analyzed at the scale of all NFS lands across the plan area. Timber demand is evaluated across the counties associated with the HLC NF.

Key indicators that will be used to measure effects of alternatives are:

- Timber suitability (acres)
 - Lands suitable for timber production
 - Lands unsuitable for timber production where harvest may occur for purposes other than timber production
- Timber supply [million board feet (mmbf) and million cubic feet]
 - PTSQ
 - PWSQ
 - sustained yield limit
- Timber demand (qualitative)
- Acres harvested by decade (acres)
- Other forest products (qualitative)