

CHAPTER 4: IMPACTS

This “Impacts” chapter analyzes both beneficial and adverse impacts that would result from implementing any of the alternatives considered in this Trails Plan / Environmental Assessment (plan/EA). This chapter also includes a summary of laws and policies relevant to each impact topic, definitions of impact thresholds (e.g., negligible, minor, moderate, and major), methods used to analyze impacts, and the analysis methods used for determining cumulative effects. As required by the Council on Environmental Quality (CEQ) regulations implementing the *National Environmental Policy Act* (NEPA), a summary of the environmental consequences for each alternative is provided in Table 2.3, which can be found at the end of Chapter 2. The resource topics presented in this chapter, and the organization of the topics, correspond to the resource discussions contained in chapter 3.

Introduction

General Methodology for Establishing Impact Thresholds and Measuring Effects by Resource

The following elements were used in the general approach for establishing impact thresholds and measuring the effects of the alternatives on each resource category:

- general analysis methods as described in guiding regulations
- basic assumptions used to formulate the specific methods used in this analysis
- thresholds used to define the level of impact resulting from each alternative
- methods used to evaluate the cumulative effects of each alternative in combination with unrelated factors or actions affecting park resources
- methods and thresholds used to determine if impairment of specific resources would occur under any alternative

These elements are described in the following sections.

General Analysis Methods

The analysis of impacts follows CEQ guidelines and *Director's Order 12* procedures (NPS 2001) and is based on the underlying goal of providing a comprehensive, well-designed, sustainable trail system that offers reasonable access and a variety of visitor trail recreation experiences, consistent with the purpose and significance of the park. This analysis incorporates the best available scientific literature applicable to the region and setting and the actions being considered in the alternatives. As described in chapter 1, the NPS created an interdisciplinary team to provide important input to the impact analysis.

Assumptions

Several guiding assumptions were made to provide context for this analysis. These assumptions are described below.

Analysis Period

Goals, objectives, and specific implementation actions needed to manage trails at Bighorn Canyon National Recreation Area are established for the next 25 years; therefore, the analysis period used for assessing impacts is up to 25 years.

Geographic Area Evaluated for Impacts

The geographic study area for this plan includes Bighorn Canyon National Recreation Area in its entirety.

Duration of Impacts

The following assumptions are used for all impact topics (the terms “impact” and “effect” are used interchangeably throughout this document):

- **Short-term impacts** — Impacts that are temporary, lasting for a year or less following an action.
- **Long-term impacts** — Impacts lasting longer than one year and that could be permanent.

Future Trends

Visitor use and demand are anticipated to follow trends similar to recent years. In the absence of notable anticipated changes in facilities or access, a slight increase in visitation is expected over the life of this plan.

Impact Thresholds

Determining impact thresholds is a key component in applying NPS *Management Policies* and the *Director's Order 12*. These thresholds provide the reader with an idea of the intensity of a given impact within a specific topic. The impact threshold is determined primarily by comparing the effect to a relevant standard based on regulations, scientific literature and research, or best professional judgment. Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this document. Intensity definitions are provided throughout the analysis for negligible, minor, moderate, and major impacts. In all cases, the impact thresholds are defined for adverse impacts. Beneficial impacts are addressed qualitatively.

Cumulative Effects Analysis Method

The CEQ regulations for implementing the NEPA require an assessment of cumulative effects in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). These actions were identified, and cumulative impacts were determined, by combining the impacts of alternatives with those of the other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at Bighorn Canyon and, if applicable, the surrounding region. The geographic scope for this analysis includes elements mostly within the park's boundaries, while the temporal scope includes projects within a range of approximately 25 years. Given this, the following projects were identified for the purpose of conducting the cumulative effects analysis, listed from past to future.

Past Actions in and around Bighorn Canyon NRA

Effects of Grazing

Prior to establishment in 1966, much of the park was used for grazing of domestic livestock. Several local land owners still obtain permits to trail cattle through portions of the park and these families work collaboratively with Bighorn Canyon to maintain fences and watering facilities. Land owner are required to provide weed-free feed and must produce certification upon request.

Past and present use of the park by domestic livestock and wild horses, and fluctuating drought conditions, have left parts of Bighorn Canyon overgrazed. This has led to loss of vegetation cover, soil erosion and an increase in invasive weeds.

Invasive Plants

Bighorn Canyon is managing several invasive species of concern. Among the most prevalent and problematic: Russian olive (*Elaeagnus angustifolia*), cheatgrass (*Bromus tectorum*), Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), Russian knapweed (*Centaurea repens*), spotted knapweed (*Centaurea maculosa*), puncturevine (*Tribulus terrestris*), and houndstongue (*Cynoglossum officinale*). Invasive species create problems not only by reducing habitat for native species, but may also pose health risks to grazing wildlife.

Effects of Power Development

The effects of the Yellowtail Dam are typical of reservoirs in the west, changing flood regimes, raising water levels and leaving exposed, disturbed areas as levels in the reservoir drop. In addition, power lines and maintenance roads leading out from the dam have had a direct and lasting impact on vegetation and soils, particularly in areas where road scars remain.

Effects of Mining History

During the 1950's extensive exploration for uranium mining occurred on what is now Bighorn Canyon. No uranium mining occurred in the park, but the roads and small test pits are scattered across the landscape. BICA is slowly re-contouring the pits and reclaiming the mines (FONSI for Reclamation of Abandon Uranium Exploration Sites signed 2003). However, many of existing and proposed trails in this plan had their origins as mining roads.

Effects of 4WD and Off-Road Vehicles

Prior to park designation, 4WD vehicles and ORVs created many paths throughout the park, creating impacted areas where vegetation was removed, soils have become subject to erosion and invasive weeds have taken hold. In this high desert environment, natural reclamation is a very slow process and some damage has yet to repair itself.

Current Actions, Projects and Plans within Bighorn Canyon NRA

Livestock facilities upgrade

During the winter of 2009-2010 the Common Corral facilities near the Ewing Snell ranch were completely rebuilt, largely using rancher volunteer labor. This project has reduced stray and trespass cows.

Integrated Weeds Management Plan 2004

The general goal of the 2004 WMP was to establish a plan to monitor and control invasive and noxious weeds in the park. Trail clearing and building open new opportunities for invasive weeds, especially those that prefer disturbed areas, to colonize. The WMP will be an integral part of trail planning and maintenance. The park hires seasonal staff as part of their weed management team, which has had an overall positive impact. The reduction and control of invasive weed populations, which will continue, is beneficial to protecting native flora in areas of new disturbance.

Fire management

Under Bighorn Canyon's fire management plan, prescribed burns are conducted, primarily to reduce juniper density and improve bighorn sheep habitat. The plan also provided for the suppression of wildfires. This habitat improvement is a long term, ongoing project. In the past 10 years Fires have occurred at East Trail Creek, Barry's Island and Yellowhill, with burns planned for Yellow Hill and Chain Canyon.

Foreseeable Future Actions and Plans

WAPA Lovell-Yellowtail Transmission Lines Rebuild

A draft proposal has been submitted for a 2-part project to upgrade existing power transmission lines and facilities. An EA is being done to include sections of both the North and South Districts of Bighorn Canyon NRA. Within the park, WAPA plans to replace 13 miles of existing transmission lines with larger ones and upgrade maintenance roads. WAPA has also proposed to reclaim unnecessary roads that will not be used for maintenance once the project is completed. Impacts are wide ranging and will include impacts to cultural resource sites, sensitive soils, vegetation and scenery.

Hillsboro Restoration and Habitat Improvement Plan

The formerly farmed land around the Hillsboro Ranch has become very weed infested. A combination of tilling, seeding, herbicide and water would be used to return a native grassy community which would be congruent with both the natural and cultural landscape. The Hillsboro trail crosses through this area.

Impairment of National Park Resources

Chapter 1 describes the related federal acts and policies regarding the prohibition against impairing park resources and values in units of the national park system. According to *NPS Management Policies 2006*, an action constitutes an impairment when an impact "would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006f). To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts" (NPS 2006f).

National park system units vary based on their enabling legislation, natural and cultural resources present, and park missions; likewise, the activities appropriate for each unit and for areas in each unit also vary. For example, an action appropriate in one unit could impair resources in another unit. Thus, this document analyzes the context, duration, and intensity of impacts of the alternatives, as well as the potential for resource impairment, as required by *Director's Order 12* (NPS 2001). As stated in *NPS Management Policies 2006*, an impact on any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park

- key to the natural or cultural integrity of the park
- identified as a goal in the park's general management plan or other relevant NPS planning documents

The impact analysis includes findings of impairment of park resources for each of the management alternatives. Impairment findings are made for park resources affected by the alternatives. Wilderness values, visitor use and experience, and park management and operations are not considered park resources; therefore, impairment findings are not included as part of the impact analysis for these topics.

Natural Resources

Vegetation

Methodology

This impact analysis was based on the existing assessment of vegetation types by district and was based on the knowledge and best professional judgment of planners and biologists; data from park records; and studies of similar actions and effects, when applicable.

Intensity Thresholds

Within this analysis, impacts on vegetation in the park were assessed based on the type of action proposed. Impacts were compared to the available scientific literature and general ecology. Proposed actions were rated using two sets of criteria: type and intensity.

Type determination included the following criteria:

- Effect (beneficial, adverse, or no discernable effect),
- Context (site-specific, local, or regional),
- Duration (short-term, lasting less than one year; or long-term, lasting more than one year).

Intensity thresholds of an impact on vegetation range from negligible to major and can be positive or negative. These thresholds are briefly described below.

- **Negligible:** The action might result in a change in vegetation, but the change would not be measurable or would be at the lowest level of detection.
- **Minor:** The action might result in a detectable change, but the change would be slight and have a local effect on a population. This could include changes in the abundance or distribution of individuals in a local area but not changes that would affect the viability of local populations. Changes to local ecological processes would be minimal.
- **Moderate:** The action would result in a clearly detectable change in a population and could have an appreciable effect. This could include changes in the abundance or distribution of local populations but not changes that would affect the viability of regional populations. Changes to local ecological processes would be of limited extent.
- **Major:** The action would be severely adverse or exceptionally beneficial to a population. The effects would be substantial and highly noticeable, and they could result in widespread change and be permanent. This could include changes in the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Important ecological processes would be altered, and "landscape-level" (regional) changes would be expected.

No Action Alternative

Under the No Action Alternative, existing trails would continue to receive brush removal and weed management to keep paths reasonably clear.

North District

Under the No Action Alternative, the current trail conditions would remain the same. As described in Chapter 3, vegetation in the North District is characterized by grasslands, sage/juniper forests and Douglas fir/Ponderosa pine forests. Meadows are interspersed throughout and riparian canyons occur along the perimeter of Bighorn Lake and the Yellowtail Dam. Below the dam is a long riparian corridor, bordered by grassland and private agriculture/ranch land.

Reservoir Planning Area

There would be no maintenance of the Om-Ne-A trail and it would remain closed to visitors. Reclamation would be allowed to occur naturally, which could mean some colonization by invasive weeds. Erosion could also continue on the trail scar, making establishment of native plants and recovery without assistance difficult. Effects on vegetation would be beneficial and adverse, local, short- and long-term and moderate.

Headquarters Planning Area

The Beaver Pond trail would continue to receive minimal brush removal and weed management to keep the trail clear. Impacts would have no discernable effect, local, short- and long-term and negligible.

3-mile Planning Area

Path would have minimal maintenance and weed control. Spurs leading off trail to the river would continue to increase, leading to vegetation damage along the stream bank as numerous river entry points emerge. The impacts would be adverse, site-specific, short- and long-term and minor.

South District

The South District contains Great Basin Desert characteristics of desert scrub, grasslands, and sage juniper forests. Side canyons near the lake and small springs contain riparian areas. Wetlands border the lake in the southern parts of the park.

Horseshoe Bend Planning Area

Trails would continue to have brush removed and weeds monitored for, however minimal maintenance would mean that trails would be less discernable, causing visitors to go off trail. This off-trail travel would have a direct impact on vegetation through trampling and have potential to spread invasive weeds beyond the impacted areas of trail. Roadside parking near trailheads could also lead to the destruction of vegetation as well as the spread of invasive weeds. Effects on vegetation would be adverse, local, short- and long-term and minor.

Canyon Rim Planning Area

Trail impacts would be the same as in the Horseshoe Bend planning area. Available parking for these trails eliminates impact at roadsides. Effects on trails would be adverse, local, short- and long-term and minor.

Proposed Wilderness Planning Area

With no action the road scar left by WAPA maintenance roads would be left unmonitored for invasive weeds and left to naturally degrade. Exposed soil would be vulnerable to erosion making establishment difficult for native plants and available to invasive plants adapted to colonize impacted areas. Effects would be adverse, local, short- and long-term and minor.

Ranch/Landing Planning Area

Improper trail construction at Upper Layout Creek would leave problems with erosion unchecked, damaging vegetation. Sensitive areas like the spring would continue to receive unrestricted foot traffic, damaging an abundance of plants. Trail re-routing may become even more necessary, with site-specific, minor impact to vegetation. The Barry's Island trail would not receive the maintenance it needs on the south side wash, which would lead to further erosion, reducing soils available to native plants. All other trails would continue to receive brush removal and weeds management, but no measures to control erosion. Overall impact would be adverse, site-specific, short- and long-term and minor.

Yellowtail Wildlife Habitat Management Area

This area contains abundant wetland areas, cottonwood riparian areas, sage scrubland and characteristics of low elevation Great Basin Desert.

Habitat Planning Area

Roads would not be designated for use and damage by motorized vehicles would continue unabated. Trucks avoiding muddy areas would continue to drive over roadside vegetation. The spread of invasive weeds would continue. There would be no action to re-establish native plants. Effects would be adverse, local, short- and long-term and minor to moderate.

South and Southeast Lake Planning Area

Roads would continue to see vegetation damage and the spread of invasive weeds by motorized vehicles. Effects would be adverse, local, short- and long-term and minor.

Cumulative Impacts

The past, present, and reasonably foreseeable future impacts are primarily related to cattle grazing and dirt roads. The presence of these factors has led to the permanent loss of surface soils in some areas creating gullies caused by water channeling into tire and livestock trails. The loss of soils and continued erosion have opened up avenues for invasive weed colonization and made the natural re-establishment of native plants extremely difficult. Left unchecked, these impacts could worsen and expand. Other cumulative impacts such as fire management, invasive weeds management and re-vegetation projects are intended to improve vegetation in the park which may offset the effects of neglect in localized areas.

Conclusion

No Action would continue to result in an overall degradation of vegetation near existing trails. Although impacts have already occurred to vegetation, continued neglect could lead to larger impacts in areas of the Yellowtail Habitat, Horseshoe Bend, Upper Layout Creek and in the Proposed Wilderness. In certain areas such as the Reservoir planning area vegetation would

eventually benefit but only after an indeterminate amount of time. Past soil compaction, erosion and disturbance have left the trail vulnerable to invasive weed colonization and created less than ideal circumstances for natural re-vegetation. Without assistance this area may not see re-vegetation with native plants for some time.

However, because there would be no adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Bighorn Canyon National Recreation Area; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP or other relevant NPS planning documents, there would be no impairment of the park's resources or values. There would also be no unacceptable impacts as defined in the "Unacceptable Impacts" section of this chapter.

Alternative A

Alternative A would establish new trails in the park and improve existing trails. Mountain bike trails would be introduced and trails would be designated for user groups. Roads would be closed to public use in some areas.

North District

Under Alternative A, a closed trail would be re-opened, one new trail would be developed and two existing trails would receive improved maintenance. As described in Chapter 3, vegetation in the North District is characterized by grasslands, sage/juniper forests and Douglas fir/Ponderosa pine forests. Meadows are interspersed throughout and riparian canyons occur along the perimeter of Bighorn Lake and the Yellowtail Dam. Below the dam is a long riparian corridor, bordered by grassland and private agriculture/ranch land.

Reservoir Planning Area

The Om-Ne-A trail would be re-opened (pending BOR approval) and brush overgrowth would be cleared. Clearing would take place only in previously impacted areas. Trail maintenance would prevent further erosion, benefiting site-specific locations. Invasive plants would be more easily monitored and eliminated however, increased traffic could counter these benefits by increasing the spread of weeds that may have become established. Impact would be adverse, site-specific, short-term and negligible. If trail re-routing were to become necessary, trail building would impact formerly unaffected areas, having an adverse, site-specific, long-term and minor impact on plant communities in the proposed area.

Headquarters Planning Area

A new trail would be established as the Fort Smith Loop Trail using an existing social/game trail. Vegetation would be impacted and removed as the trail were widened and developed but the resulting trail would reduce the social spur trails through both native and invasive plants. Although trail work would initially have an adverse effect on plants the path would positively impact vegetation and reduce the spread of invasive species as visitors have a distinct path to stay on. Overall impacts for the new trail would be adverse, site-specific, short- and long-term and minor.

3-mile Planning Area

The foot path used for fishing access would be more thoroughly cleared and better maintained, redundant spur trails would be eliminated to better protect the stream bank vegetation. Impacts would be beneficial, site-specific, short- and long-term and minor.

South District

New trails would be developed throughout the South District under Alternative A, introducing mountain bike trails for the first time in Bighorn Canyon. Roads along the north boundary would be closed and the road past Chain Canyon would be designated for service vehicles and non-motorized recreational users only. The South District contains Great Basin Desert characteristics of desert scrub, grasslands, and sage juniper forests. Side canyons near the lake and small springs contain riparian areas. Wetlands border the lake in the southern parts of the park.

Horseshoe Bend Planning Area

Two of the trails proposed in this area, the Sykes Mountain trail and the Mouth of the Canyon trail would see improved brushing but would not cause further impact to vegetation. On these two trails there would be no discernable effect. The Crooked Creek Nature Trail would also be improved, and re-signed, providing an easy interpretive trail for visitors. Three new trails would be developed, the Sykes Notch and Rim trails and the Crooked Creek Fishing Access. The latter would make a small fishing access path down to the lake from an established parking area. Several social trails wander through this area and a path would be established, utilizing already impacted areas. A graveled path to the shore would reduce the need for various social paths, allowing plants to grow again. Impacts would be beneficial, site-specific, short- and long-term and minor. The other 2 new trails would require some vegetation removal and introduction of human disturbance, with the possibility of spreading non-native species to formerly untraveled areas. Impact would be adverse, local, long-term and minor.

Canyon Rim Planning Area

A new trail would be developed in this area, the Balcony Trail. Trail building would require vegetation removal and introduce visitor impacts of soil compaction, erosion and the potential to spread invasive weeds. However, a trail would also direct visitors to a specific trail rather than allowing numerous social trails to develop from visitors who want to walk the canyon rim past the Devil Canyon Overlook. The impact of this new trail would therefore be adverse and beneficial, local, short- and long-term and minor. ADA improvements at the Overlook would follow an established path, and therefore not create new impact, defined paths could be beneficial to vegetation in the area. The Two Eagle Trail would also primarily follow an existing road scar, and would involve some direct impact to vegetation, though rock is the primary ground cover in the area. All other proposed action in this area would similarly define trails for visitors, reducing impacts from visitors wandering off trail, benefiting plants near trails. Additional brushing would have site-specific impacts on vegetation, which would be minor. Overall impacts to vegetation would be beneficial, local, short- and long-term and minor.

Proposed Wilderness Planning Area

Under Alternative A, existing maintenance roads would be used to establish a trail. Exposed soil would be vulnerable to erosion making establishment difficult for native plants and available to invasive plants adapted to colonize impacted areas. A trail would also mean regular maintenance and increased monitoring for invasive weeds and erosion, which would help mitigate the impacts of a road scar. With this in mind, the impacts of using this established road would be adverse, local, short- and long-term and minor.

Impacts of closing and reclaiming other roads in the proposed wilderness would be beneficial, local, long-term and minor.

Ranch/Landing Planning Area

Improving trail construction at Upper Layout Creek would address problems with erosion and vegetation damage currently taking place. Sensitive areas like the spring, where unrestricted foot traffic is damaging the localized ecosystem, would have educational signs posted to help visitors understand resource impacts. Effects on vegetation would be beneficial, local, short- and long-term and moderate.

Proposed action for the Lower Layout Creek trail and both historic ranches would have no discernable effect on vegetation from the current impacts. Action on the Barry's Island trail would also have little impact, however trail improvement could decrease erosion impacts which would benefit plants at the point of improvement. Introducing mountain bikes to Barry's Island could increase erosion impact and possibly increase the spread of invasive weeds. Effects on Barry's Island would be adverse, site-specific, short- and long-term and minor.

The development of the South Pasture trail would reduce a 2-track road to a single track for a majority of the trail's length. Rehabilitating half of the road scar would be beneficial for plants, but use by bicycles could increase erosion, potentially spread invasive weeds and may result in a wider trail in sections where pools collect and bikers avoid water by riding on vegetation. Since road scars already exist, part of which would benefit from trail establishment, the impacts would be adverse and beneficial, local, short- and long-term and minor.

Yellowtail Wildlife Habitat Management Area

Alternative A would take an active approach to closing and rehabilitating unnecessary roads. This area contains abundant wetland areas, cottonwood riparian areas, sage scrubland and characteristics of low elevation Great Basin Desert.

Habitat Planning Area

Roads could be closed and actively rehabilitated, increasing native plant populations and seed sources and limiting the spread of invasive weeds in that area. Seasonal closures could mitigate vegetation damage during wet periods when vehicles drive on plants to avoid muddy roads. Impacts would be beneficial, local, long-term and moderate.

South and Southeast Lake Planning Area

Roads could be closed and actively rehabilitated, increasing native plant populations and seed sources and limiting the spread of invasive weeds in that area. Impacts would be beneficial, local, long-term and minor.

Cumulative Impacts

The past impacts related to cattle grazing and dirt roads allow some new trails to be developed without causing noticeable new impact. The presence of these factors however have led to the permanent loss of surface soils in some areas creating gullies caused by water channeling into tire and livestock trails. The loss of soils and continued erosion have opened up avenues for invasive weed colonization and made the natural re-establishment of native plants extremely difficult. Increased trail maintenance and monitoring done under Alternative A would help mitigate these impacts and reduce further vegetation loss.

Other cumulative impacts such as fire management, invasive weeds management and re-vegetation projects are intended to improve vegetation in the park which would help to mitigate impact from

trail improvement and development. Wildfire policy and prescribed burn planning are important in rare species conservation.

Conclusion

As new trail sections are opened and used, potential for the spread of invasive species is increased. The increased attention paid to trails in Alternative A would help in monitoring efforts to control the spread of invasive plant species and additional efforts to monitor and control negative impacts would be used as needed. Certain areas would benefit from well defined trails that would keep visitors contained within impacted areas, rather than wandering across vegetated areas. Trail alignment would be planned to minimize long-term impacts to vegetation, and as most trails follow existing two-track roads, new impacts would be small. Vegetation would be beneficially impacted by the restoration of old two-track roads not identified as travel routes in this plan. Trail re-routing would address negative impacts already occurring on those trails that were not sustainably designed in the beginning. Parking area improvements would involve leveling and clearing areas that are currently used for parking, having no noticeable impact on vegetation and increasing monitoring of these areas. Overall impacts to vegetation under Alternative A would be adverse and beneficial, local, short- and long-term, and minor to moderate.

There would be no adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Bighorn Canyon National Recreation Area; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP or other relevant NPS planning documents. Therefore, there would be no unacceptable impacts as defined in the "Unacceptable Impacts" section of this chapter.

Alternative B

Alternative B would improve existing trails without building any new trails. Redundant or unnecessary roads would be reclaimed and some trails would be re-routed to address resource damage. Mountain bikes would not be allowed on trails.

North District

Under Alternative B, a closed trail would be re-opened and two existing trails would receive improved maintenance. As described in Chapter 3, vegetation in the North District is characterized by grasslands, sage/juniper forests and Douglas fir/Ponderosa pine forests. Meadows are interspersed throughout and riparian canyons occur along the perimeter of Bighorn Lake and the Yellowtail Dam. Below the dam is a long riparian corridor, bordered by grassland and private agriculture/ranch land.

Reservoir Planning Area

The Om-Ne-A trail would be re-opened(pending BOR approval) and brush overgrowth would be cleared. Clearing would take place only in previously impacted areas. Trail maintenance would prevent further erosion, benefiting site-specific locations. Invasive plants would be more easily monitored and eliminated however, increased traffic could counter these benefits by increasing the spread of weeds that has occurred in the interim. Impact would be adverse, site-specific, short-term and negligible. If trail re-routing were to

become necessary, trail building would impact formerly unaffected areas, having an adverse, site-specific, long-term and minor impact on plant communities in the proposed area.

Headquarters Planning Area

Same as no action alternative.

3-mile Planning Area

The foot path used for fishing access would be more thoroughly cleared and better maintained, redundant spur trails would be eliminated to better protect the stream bank vegetation. Impacts would be beneficial, local, short- and long-term and minor.

South District

Under Alternative B, most trails would have improved maintenance and one trail would be re-routed to better protect resources. Unnecessary roads would be reclaimed. The South District contains Great Basin Desert characteristics of desert scrub, grasslands, and sage juniper forests. Side canyons near the lake and small springs contain riparian areas. Wetlands border the lake in the southern parts of the park.

Horseshoe Bend Planning Area

Two of the trails in this area, the Sykes Mountain Trail and the Mouth of the Canyon trail would see improved brushing but would not cause further impact to vegetation. On these two trails there would be no discernable effect. Crooked Creek Fishing Access would utilize existing social trails, creating no new impact. The establishment on a defined gravel path would reduce the use of several social trails, allowing plants to grow in those areas. Impacts would be beneficial, site-specific, short- and long-term and minor.

Canyon Rim Planning Area

ADA access would be improved at the Devil Canyon Overlook using an area that is already heavily impacted. A defined path would guide people to points of interest, lessening broad impact to the area. The impact on vegetation would be beneficial, site-specific, long-term and minor. Improved brushing on the Stateline and Sullivan's Knob trails would similarly define trails for visitors, reducing impacts from visitors wandering off trail, benefiting plants near trails. Continued minimal brushing on the Ranger's Delight trail and the connector to Stateline would have no discernable effect. Overall impacts to vegetation would be beneficial, local, short- and long-term and minor.

Proposed Wilderness Planning Area

Western Area Power's reconstruction of the powerline access roads and the subsequent revegetation of the roads would have an impact on the roads in this area. Exposed soil would be vulnerable to erosion making establishment difficult for native plants and available to invasive plants adapted to colonize impacted areas. This would be mitigated by revegetation and restoration efforts. No plans would be made to incorporate new uses to these roads. Effects would be adverse, local, short- and long-term and minor.

Ranch/Landing Planning Area

Improving trail construction at Upper Layout Creek would address problems with erosion and vegetation damage currently taking place. Sensitive areas like the spring, where unrestricted foot

traffic is damaging the localized ecosystem, would have educational signs posted to help visitors understand resource impacts. Effects on vegetation would be beneficial, local, short- and long-term and moderate.

Proposed action for the Lower Layout Creek trail and both historic ranches would have no discernable effect on vegetation from the current impacts. Action on the Barry's Island trail would also have little impact however trail improvement could decrease erosion, which would benefit plants at the point of improvement. Effects on Barry's Island would be beneficial, site-specific, short- and long-term and minor.

Reclaimed roads would have beneficial impacts on vegetation, especially if re-seeded with native plants. Impacts would be beneficial, local, short- and long-term and minor.

Yellowtail Wildlife Habitat Management Area

Alternative B would allow the closing of unnecessary roads. This area contains abundant wetland areas, cottonwood riparian areas, sage scrubland and characteristics of low elevation Great Basin Desert.

Habitat Planning Area

Unofficial roads could be closed and actively rehabilitated (if a budget allowed), increasing native plant populations and seed sources and limiting the spread of invasive weeds in that area. Seasonal closures could mitigate vegetation damage during wet periods when vehicles drive on plants to avoid muddy roads. Impacts would be beneficial, local, long-term and minor.

South and Southeast Lake Planning Area

Unofficial roads could be closed allowing the native plant populations and seed sources to gradually increase and limiting the spread of invasive weeds in that area. Impacts would be beneficial, local, long-term and minor.

Cumulative Impacts

The past impacts related to cattle grazing and dirt roads have led to the permanent loss of surface soils in some areas creating gullies caused by water channeling into tire and livestock trails. The loss of soils and continued erosion have opened up avenues for invasive weed colonization and made the natural re-establishment of native plants extremely difficult. Increased trail maintenance and monitoring done under Alternative B would help mitigate these impacts and reduce further vegetation loss. Road closures would also improve vegetation conditions by stopping further degradation and potential re-vegetation projects would contribute to the recovery of these areas. Other cumulative impacts such as fire management and invasive weeds management are intended to improve vegetation in the park.

Conclusion

The increased attention given to trails in Alternative B would help in monitoring efforts to control the spread of invasive plant species and additional efforts to monitor and control negative impacts would be used as needed. Certain areas would benefit from well defined trails that would keep visitors contained within impacted areas, rather than wandering across vegetated areas. Trail re-routing would address negative impacts already occurring on those trails that were not sustainably designed in the beginning. Trail alignment would be planned to minimize long-term impacts to vegetation. Vegetation would be beneficially impacted by the restoration of old two-track roads not identified as travel routes in this plan. Overall impacts to vegetation under Alternative B would be adverse and beneficial, local, short- and long-term, and minor.

There would be no adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Bighorn Canyon National Recreation Area; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP or other relevant NPS planning documents. Therefore, there would be no unacceptable impacts as defined in the "Unacceptable Impacts" section of this chapter.

Wildlife

Methodology

While there are numerous studies on the effect of roads on wildlife, studies on the effect of trails on wildlife are less well documented in the scientific literature. Some species may not be as affected by new trails and/or increased human pressure because they are generally more tolerant of such disturbance or are active at night. While smaller animals may suffer few or no adverse impacts from the creation of an additional trail, larger animals may tend to avoid the area; thus for those species, potential suitable habitat may decrease.

Effects on wildlife include both direct and indirect effects and can be considered in terms of whether they are temporary or permanent. Direct impacts on wildlife include the accidental or intentional mortality of an individual or population, injury, or stress from species flight. Direct contact with certain species may induce injury, leading to death of the animal.

Intensity Thresholds

Within this analysis, impacts on wildlife in the park were assessed based on the type of action proposed and were compared to the available scientific literature, known animal behaviors, and general ecology. Proposed actions were rated using two sets of criteria: type and intensity.

Type determination included the following criteria:

- Effect (beneficial, adverse, or no discernable effect),
- Context (site-specific, local, or regional),
- Duration (short-term, lasting less than one year; or long-term, lasting more than one year).

Intensity thresholds of an impact on wildlife range from negligible to major and can be positive or negative. These thresholds are briefly described below.

- **Negligible:** The action might result in a change in wildlife, but the change would not be measurable or would be at the lowest level of detection. No species of special concern would be affected.
- **Minor:** The action might result in a detectable change, but the change would be slight and have a local effect on a population. This could include changes in the abundance or distribution of individuals in a local area but not changes that would affect the viability of local populations. Changes to local ecological processes would be minimal. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.
- **Moderate:** The action would result in a clearly detectable change in a population and could have an appreciable effect. This could include changes in the abundance or distribution of local populations but not changes that would affect the viability of regional populations. Changes to local ecological processes would be of limited extent. Mitigation to offset adverse

effects could be extensive, but would likely be successful. Some species of special concern could also be affected.

- **Major:** The action would be severely adverse or exceptionally beneficial to a population. The effects would be substantial and highly noticeable, and they could result in widespread change and be permanent. This could include changes in the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Important ecological processes would be altered, and “landscape-level” (regional) changes would be expected. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

No Action Alternative

Under the No Action Alternative, existing trails would continue to receive brush removal and weed management to keep paths reasonably clear.

North District

Under the No Action Alternative, the current trail conditions would remain the same. As described in Chapter 3, wildlife include but are not limited to black bear, mountain lion, deer, elk, bighorn sheep, a wide variety of smaller mammals, reptiles, amphibians, fish, raptors and other birds.

Reservoir Planning Area

There would be no maintenance of the Om-Ne-A trail and it would remain closed to visitors. Lack of human presence on the trail would positively impact wildlife, especially land animals trying to access the reservoir who would otherwise avoid those areas. Nesting species may also benefit from less disturbed sites and a quiet soundscape. Effects on wildlife would be beneficial, local, short- and long-term and moderate.

Headquarters Planning Area

The Beaver Pond trail would continue to receive minimal brush removal and weed management to keep the trail clear. Some species would avoid the trail, especially when in use or being maintained. Impacts would be adverse, site-specific, short-term and negligible.

3-mile Planning Area

The path would have minimal maintenance and weed control. Spurs leading off trail to the river would continue to increase, and stream bank erosion would follow as numerous river entry points emerge. Although these points may benefit animals using the river, impacts may be negative for fish as stream bank damage occurs. Other animals may avoid these areas of excessive human disturbance. The impacts would be adverse, site-specific, short- and long-term and minor.

South District

The South District contains a large diversity of animals associated with Great Basin Desert characteristics, juniper forests, springs, riparian areas and wetlands. Most noticeable in the South

District are the bighorn sheep and Pryor Mountain wild horses. Many of the animals seen in the North District are also present here.

Horseshoe Bend Planning Area

Trails would continue to have minimal maintenance, leaving some trails less discernable and causing visitors to go off trail. Off-trail travel can lead to unintended habitat disturbance and increases potential for dangerous interactions with surprised wildlife. Impacts would be adverse, site-specific, short-term and minor.

Canyon Rim Planning Area

Trail impacts would be the same as in the Horseshoe Bend planning area. Off-trail hiking near the cliffs can have a negative impact on bighorn sheep, particularly in known lambing areas. Unrestricted human use of the area could cause the sheep to abandon prime lambing areas and move to less ideal habitat to avoid human interaction, making them more susceptible to lion predation. Impacts would be adverse, site-specific, short- and long-term and minor.

Proposed Wilderness Planning Area

With no trails or motorized vehicles allowed in the proposed wilderness habitat fragmentation would be reduced and wilderness values would be improved. Impacts would therefore be beneficial, local, long-term and negligible when compared to current status.

Ranch/Landing Planning Area

Without improvement and interpretive information, the spring at Upper Layout canyon would continue to see habitat damage, reducing vegetation and degrading the spring, making it less appealing to local wildlife. Impacts on this trail would be adverse, site-specific, short- and long-term and minor. Other trails in this planning area would receive the same maintenance and impacts they currently have which would have no discernable effect on wildlife, at a local level.

Yellowtail Wildlife Habitat Management Area

This area contains animals and an abundance of mammals, reptiles, amphibians, insects, and bird species which utilize wetland areas, cottonwood riparian areas, sage scrubland and characteristics of low elevation Great Basin Desert.

Habitat Planning Area

Roads would not be designated for use and damage by motorized vehicles would continue unabated. Trucks avoiding muddy areas would continue to drive over roadside vegetation, impacting graze and habitat. The spread of invasive weeds would continue, crowding out native vegetation preferred by wildlife. Effects would be adverse, local, short- and long-term and minor.

South and Southeast Lake Planning Area

Roads would continue to see vegetation damage and the spread of invasive weeds by motorized vehicles, reducing food and habitat for wildlife. Increased social roads would also further fragment habitats. Effects would be adverse, local, short- and long-term and minor.

Cumulative Impacts

The past impacts are primarily related to cattle grazing and dirt roads. Although some large mammals use abandoned roads for ease of travel, cattle trails and roads fragment wildlife habitat and have left some areas less appealing to wildlife species. Other projects such as fire management would have an adverse, site-specific impact in the short-term, but would lead to improved habitat in the long-term. Weeds management and re-vegetation projects would also have adverse short-term impacts but would decrease invasive weed populations, opening up opportunities for the native vegetation that many animal species prefer.

Conclusion

The minimum trail maintenance of a No Action Alternative would leave many trails less visibly defined, resulting in more off-trail use by visitors. Besides damaging the vegetation that many species depend on, off-trail hiking can also disturb nesting sites, increase habitat fragmentation and may disturb breeding areas. Although some species may already avoid trail areas, increased off-trail use may widen the corridor that some animals avoid. Most human disturbance is site-specific and temporary but in some cases, disturbance may induce wildlife to avoid breeding and nesting areas, which could have more long-term impacts. Combined with cumulative impacts, the overall impacts could be adverse, local and site-specific, short- and long-term and minor.

Because there would be no adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Bighorn Canyon National Recreation Area; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP or other relevant NPS planning documents, there would be no impairment of the park's resources or values. There would also be no unacceptable impacts as defined in the "Unacceptable Impacts" section of this chapter.

Alternative A

Alternative A would establish new trails in the park and improve existing trails. Mountain bike trails would be introduced and trails would be designated for user groups. Roads would be closed to public use in some areas.

North District

Under Alternative A, a closed trail would be re-opened, one new trail would be developed and two existing trails would receive improved maintenance. As described in Chapter 3, wildlife include but are not limited to black bear, mountain lion, bats, deer, elk, bighorn sheep, a wide variety of smaller mammals, reptiles, amphibians, insects, fish, raptors and other birds.

Reservoir Planning Area

The Om-Ne-A trail would be re-opened and brush overgrowth would be cleared. Clearing would take place only in previously impacted areas, but may cause temporary wildlife disturbance. Increased foot traffic would be minimal but may impact nesting or breeding sites that have developed during the 9 year closure; impact would be negligible. Increased use may also have a negligible impact on habitat use close to the trail. Overall impact to this area would be adverse, site-specific, short- and long-term and negligible.

Headquarters Planning Area

A new trail would be established as the Fort Smith Loop Trail using an existing social/game trail. Trail development would have short-term impacts on reptiles, birds and mammals but the resulting trail would reduce the social spur trails, lessening impact to off-trail habitat. Trail development would use an existing social trail, creating very little impact to vegetation and negligible impact to wildlife. Increased use would also cause negligible impacts to wildlife using the area. Overall impacts for the new trail would be adverse, site-specific, short- and long-term and negligible.

3-mile Planning Area

The foot path used for fishing access would be more thoroughly cleared and better maintained, redundant spur trails would be eliminated to better protect the stream bank vegetation. Fish stand to benefit from stream bank protection and rehabilitation. Visitor use is not expected to increase due to improved maintenance and control of spur trails would help reduce impact to small, site-specific habitats. Impacts would be beneficial, site-specific, short- and long-term and negligible.

South District

New trails would be developed throughout the South District under Alternative A, introducing mountain bike trails for the first time in Bighorn Canyon. The South District contains a large diversity of animals associated with Great Basin Desert characteristics, juniper forests, springs, riparian areas and wetlands. Most noticeable in the South District are the bighorn sheep and Pryor Mountain wild horses. Many of the animals seen in the North District are also present here.

Horseshoe Bend Planning Area

Two of the trails proposed in this area, the Sykes Mountain Trail and the Mouth of the Canyon trail would have improved brushing and maintenance work which have no discernable impact on wildlife. Three new trails would be developed, the Sykes notch and Rim trails and the Crooked Creek Fishing Access. The latter would make a small fishing access path down to the lake from an established parking area. Several social trails wander through this area and a path would be established, utilizing already impacted areas. A graveled path to the shore would reduce the need for various social paths, allowing plants to grow again and lessening habitat impact and fragmentation. Impacts would be beneficial, site-specific, short- and long-term and minor. The other 2 new trails would introduce hikers to areas where little to no human impact is felt. The effect could cause some large mammals such as deer, bighorn sheep and mountain lions to avoid habitat near trails. Impact would therefore be adverse, local, short- and long-term and minor.

Canyon Rim Planning Area

A new trail would be developed in this area, the Balcony Trail. Trail building would require disturbing wildlife habitat during construction. Lambing areas for bighorn sheep have been mapped and the currently proposed path avoids these areas. Sensitivity would be used when building trails to avoid cliff nesting and lambing seasons. An established trail would direct visitors to a specific trail rather than allowing numerous social trails to develop from visitors who want to walk the canyon rim past the Devil Canyon Overlook. The impact of this new trail would therefore be adverse and beneficial, site-specific, short- and long-term and negligible to minor.

ADA improvements at the Overlook would follow an established path, and have no discernable effect on wildlife.

The Two Eagles trail would be a new trail, however it would be very short (less than ½ mile) and in an area immediately adjacent to the paved road way. No sensitive habitat is found in the area.

All other proposed action in this area would similarly define trails for visitors, reducing impacts and encounters with wildlife while walking off trail. Additional brushing would have short-term, site-specific impacts on habitat and habitat use. Overall impacts to wildlife would be beneficial and adverse, site-specific, short-term and negligible.

Proposed Wilderness Planning Area

Under Alternative A, existing maintenance roads would be used to establish a trail. Trail establishment would use an already impacted area and would have short-term, negligible effects on wildlife.

Impacts of closing and reclaiming other roads in the proposed wilderness would reduce habitat fragmentation and improve wilderness attributes. Impacts would be beneficial, local, long-term and minor.

Ranch/Landing Planning Area

Improving trail construction at Upper Layout Creek would address problems with erosion and vegetation damage currently taking place. Sensitive areas like the spring, where unrestricted foot traffic is damaging the localized ecosystem, would have educational signs posted to help visitors understand resource impacts. Effects on wildlife habitat would be beneficial, site-specific, short- and long-term and moderate. Proposed action for the Lower Layout Creek trail and both historic ranches would have no discernable effect on wildlife.

Improvement of the Barry's Island trail would also have no discernable effect on wildlife but introducing mountain bikes could have adverse impacts. This area also has more black bear activity than other planning areas, increasing the potential for dangerous bear encounters by fast-moving mountain bikes. Mountain lions may be similarly impacted. Negative interaction between humans and top predators can put predators at risk to be destroyed under park management. Impacts of mountain bikes in these areas would be adverse, site-specific, short- and long-term and minor.

Yellowtail Wildlife Habitat Management Area

Alternative A would take an active approach to closing and rehabilitating unnecessary roads. This area contains an abundance of mammals, reptiles, amphibians, insects, and bird species which utilize wetland areas, cottonwood riparian areas, sage scrubland and characteristics of low elevation Great Basin Desert.

Habitat Planning Area

Roads could be closed and actively rehabilitated, increasing native plant populations, improving browse and habitat. Reduction in the number of roads would also lessen habitat fragmentation and restore natural conditions and soundscape. Seasonal closures to protect vegetation during wet seasons may also improve and increase nesting locations and lessen disturbance to migrating bird species. Impacts would be beneficial, local, short- and long-term and minor.

South and Southeast Lake Planning Area

Roads could be closed and actively rehabilitated, increasing native plant populations, which would increase browse and reduce habitat fragmentation. Impacts would be beneficial, local, long-term and minor.

Cumulative Impacts

The past impacts related to cattle grazing and dirt roads allow some new trails to be developed without causing noticeable new impact or further increasing habitat fragmentation. Other projects such as fire management would have an adverse, site-specific impact in the short-term, but would

lead to improved habitat in the long-term. Weeds management and re-vegetation projects would also have adverse short-term impacts but would decrease invasive weed populations, opening up opportunities for the native vegetation that many animal species prefer.

Conclusion

As new trail sections are opened and used, potential for adverse impacts on wildlife are increased. Certain areas would benefit from well defined trails that would keep visitors contained within impacted areas, rather than creating new social trails that would have a broader impact on wildlife. The closure and active restoration of abandoned 2-track roads would benefit wildlife by reducing habitat fragmentation and improving site-specific habitat. Trail re-routing would address negative impacts to habitat and sensitive riparian areas, which are vital to desert species. The introduction of mountain bikes could have a minor, negative impact on wildlife, through both direct mortality and indirect disturbance.

There would be no adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Bighorn Canyon National Recreation Area; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP or other relevant NPS planning documents. Therefore, there would be no unacceptable impacts.

Alternative B

Alternative B would improve existing trails without building any new trails. Redundant or unnecessary roads would be reclaimed and some trails would be re-routed to address resource damage. Mountain bikes would not be allowed on trails.

North District

Under Alternative A, a closed trail would be re-opened and two existing trails would receive improved maintenance. As described in Chapter 3, wildlife include but are not limited to black bear, mountain lion, deer, elk, bighorn sheep, a wide variety of smaller mammals, reptiles, amphibians, fish, raptors and other birds.

Reservoir Planning Area

Would have the same impacts as in Alternative A

Headquarters Planning Area

The Beaver Pond trail would continue to receive minimal brush removal and weed management to keep the trail clear. Wildlife impacts would be adverse, local, short- and long-term and negligible.

3-mile Planning Area

Impacts would be the same as in Alternative A.

South District

Under Alternative B, most trails would have improved maintenance and one trail would be re-routed to better protect resources. Unnecessary roads would be reclaimed. The South District contains a large diversity of animals associated with Great Basin Desert characteristics, juniper forests, springs,

riparian areas and wetlands. Most noticeable in the South District are the bighorn sheep and Pryor Mountain wild horses. Many of the animals seen in the North District are also present here.

Horseshoe Bend Planning Area

With the exception of the Sykes Notch and Rim Loop trails, which would not be developed under Alternative B, impacts would be the same as in Alternative A; adverse, local, short- and long-term and minor.

Canyon Rim Planning Area

ADA access would be improved at the Devil Canyon Overlook using an area that is already heavily impacted. A defined path would guide people to points of interest, lessening broad impact to the area. There would be no discernable effect on wildlife. Improved brushing on the Stateline and Sullivan's Knob trails would similarly define trails for visitors, reducing impacts from visitors wandering off trail, benefiting animal habitat off trails. Continued minimal brushing on the Ranger's Delight trail and the connector to Stateline would have no discernable effect. Overall impacts to wildlife would be beneficial or have no discernable impact, local, short- and long-term and negligible.

Proposed Wilderness Planning Area

The road scar left by WAPA maintenance roads would be used solely by WAPA for emergency access maintenance and other two-track roads would continue to naturally revegetate and/or erode. If budget allows, some roads could be rehabilitated, reducing habitat fragmentation and enhancing wilderness attributes. Effects to wildlife would be beneficial, local, short- and long-term and minor.

Ranch/Landing Planning Area

Improving trail construction at Upper Layout Creek would address problems with erosion and vegetation damage currently taking place. Sensitive areas like the spring, where unrestricted foot traffic is damaging the localized ecosystem, would have educational signs posted to help visitors understand resource impacts. Education and trail re-routing would indirectly impact animals and macro-invertebrates that utilize the spring and nearby habitat. Effects on wildlife habitat would be beneficial, site-specific, short- and long-term and minor. Proposed action for the Lower Layout Creek, Barry's Island and both historic ranches would have no discernable effect on wildlife.

Yellowtail Wildlife Habitat Management Area

Alternative B would take an active approach to closing and rehabilitating unnecessary roads. This area contains an abundance of mammals, reptiles, amphibians, insects, and bird species which utilize wetland areas, cottonwood riparian areas, sage scrubland and characteristics of low elevation Great Basin Desert.

Habitat Planning Area

Roads could be closed and actively rehabilitated, increasing native plant populations, improving browse and habitat. Reduction in the number of roads would also lessen habitat fragmentation and restore natural conditions and soundscape. Seasonal closures to protect vegetation during wet seasons may also improve and increase nesting locations and lessen disturbance to migrating bird species. Impacts would be beneficial, local, short- and long-term and minor.

South and Southeast Lake Planning Area

Roads could be closed and actively rehabilitated, increasing native plant populations, which would increase browse and reduce habitat fragmentation. Impacts would be beneficial, local, long-term and minor.

Cumulative Impacts

Projects such as fire management would have an adverse, site-specific impact in the short-term, but would lead to improved habitat in the long-term. Weeds management and re-vegetation projects would also have adverse short-term impacts but would decrease invasive weed populations, opening up opportunities for the native vegetation that many animal species prefer. Past damage done by 4WD vehicles and cattle grazing could be rehabilitated under Alternative B, improving habitat, decreasing fragmentation and improving wilderness values. Since proposed improvements take place on established trails, new impacts would, for the most part, have no discernable impact on wildlife. Past damage done to wildlife habitat, by visitors unable to distinguish trails, could be improved by clearly designated trails.

Conclusion

The increased attention given to trails in Alternative B would help in monitoring efforts to control the spread of invasive plant species, improving habitat for native plants preferred by wildlife. Certain areas would benefit from well defined trails that would keep visitors contained within impacted areas, rather than encroaching upon undisturbed animal habitat. Trail re-routing would address negative impacts already occurring on those trails that were not sustainably designed in the beginning. This improvement could directly and positively benefit macro-invertebrates and improve habitat for wildlife using springs, seeps and streams. The closure and rehabilitation of 2-track roads would improve large areas of habitat that have been fragmented. In areas where roads are bypassed during muddy periods, roadside habitats would be better protected by road closures, whether permanent or seasonal. Overall impacts to wildlife under Alternative B would be beneficial or have no discernable impact and would be local, short- and long-term, and negligible to minor.

There would be no adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Bighorn Canyon National Recreation Area; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP or other relevant NPS planning documents. Therefore, there would be no unacceptable impacts as defined in the "Unacceptable Impacts" section of this chapter.

Special Status Species

Methodology

Information regarding federally threatened and endangered species and information regarding rare and protected species was compiled and compared with the locations of proposed trails and other actions. The impact analysis was based on the knowledge and best professional judgment of planners and biologists, data from park records, and studies of similar actions and effects where applicable. Intensity impacts on threatened and endangered species fall into three categories: no effect, may affect but not likely to adversely affect, and may affect and likely to adversely affect.

Potential impacts on rare and protected species are described in terms of type (are effects beneficial or adverse?), context (are the effects site-specific, local, or regional?), duration (are the effects short-term, lasting less than one year; or long-term, lasting more than one year?).

Intensity Thresholds

Analyses of the potential intensity impacts were based on information that was compiled on known threatened and endangered species. Predictions about short- and long-term site impacts were based on current knowledge of trail use and territory.

The intensity thresholds of an impact on threatened and endangered species are defined as follows:

- **No Effect:** The action would not cause any discernable effect on the species or critical habitat if present.
- **May affect but not likely to adversely affect:** The action would be expected to result in discountable effects on a species or critical habitat (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated), or the effect would be completely beneficial.
- **May affect and likely to adversely affect:** The action would result in a direct or indirect adverse effect on a species or critical habitat, and the effect would not be discountable or completely beneficial.

The intensity thresholds of an impact on rare and protected wildlife species are defined as follows:

- **Negligible:** Impacts would result in no measurable or perceptible changes to a population or individuals of a species or resource regarding size, integrity, or continuity.
- **Minor:** Impacts would be measurable or perceptible but would be localized within a relatively small area. The overall viability of the species would not be affected, and if left alone, the species would recover.
- **Moderate:** Impacts would cause a change to a population or individuals of a species or resource (e.g., abundance, distribution, quantity, or quality). The change would be measurable and of consequence to the species or resource; however, the impact would remain localized.
- **Major:** Impacts on a population or large number of individuals of a species or resource would be substantial, highly noticeable, and permanent. The change would be measurable, and impacts would occur over a widespread geographic area.

Although undocumented and unlikely due to habitat restrictions, two federally threatened or endangered plant species could potentially grow in the park; the endangered Blowout penstemon (*Penstemon haydenii*) and threatened Ute ladies-tresses (*Spiranthes divialis*).

In addition, Bighorn Canyon National Recreation Area is home to several plant species of state concern in Wyoming and/or Montana, documented in a 2000 rare plant survey by Heidel and Fertig (see references). Plant locations and habitats have been considered during the planning process (see table below).

Table 4.1 Special Status Plant Species in BICA.

Common name	Latin name	Habitat Preferences
Blowout penstemon (Federally endangered)	<i>Penstemon haydenii</i>	In Wyoming it occurs on northwest facing slopes of active blow-out like sand dunes with sparse cover at 7200-7440 ft. elevation. In 2001 two populations were documented in Wyoming, both in northwestern Carbon County.
Ute ladies-tresses (Federally threatened)	<i>Spiranthes divialis</i>	Moist, subirrigated or seasonally flooded soils in valley bottoms, gravel bars, old oxbows, or floodplains bordering springs, lakes, rivers, or perennial streams at elevations between 1800-6800 ft.
Wyoming sullivantia	<i>Sullivantia hapemanii</i>	Rock walls and boulders at seeps, waterfalls and streambanks
Persistentsepel yellowcress	<i>Rorippa calycina</i>	Mudflats and drying shorelines of riverbanks and ponds, usually on sandy soils near high water
Bighorn fleabane	<i>Erigeron allocotus</i>	Stony sparsely vegetated limestone or limestone derived soils
Hairy prince's plume	<i>Stanleya tomentosa</i>	Open, gravelly soil of slopes and flats in sagebrush grassland, desert shrubland, and juniper woodland in the valley and foothill zones
Wind River milkvetch	<i>Astragalus oregonos</i>	Sandy soil below 5,000 ft and is commonly associated with <i>Artemisia tridentata</i> and <i>Stipa comata</i> . It most often occurs on the Chugwater geologic formation
Rabbit buckwheat	<i>Eriogonum brevicaulis</i> var. <i>canum</i>	Sparsely vegetated, stony, sandy or clay soils of grasslands or shrub steppe in the valleys and lower montane zone

Several wildlife species are listed as state species of concern in Wyoming and/or Montana and could potentially be affected by trail construction and use:

Table 4.2 Special Status Wildlife Potentially Affected by Trails Plan.

Common name	Latin name	Habitat Preferences
American peregrine falcon	<i>Falco peregrinus</i>	Nests on steep cliffs and hunts nearby.
Yellow billed cuckoo	<i>Coccyzus americanus</i>	Nests primarily in large stands of cottonwood-riparian habitat below 7000 ft. It is a riparian obligate species that prefers extensive areas of dense thickets and mature deciduous forests near water, and requires low, dense, shrubby vegetation for nest sites.
Pallid bat	<i>Antrozous pallidus</i>	Arid deserts, juniper woodlands, sagebrush shrub-steppe, and grasslands, often with rocky outcrops and water nearby. Roost in rock crevice or buildings, less often in caves, tree hollows, under bridges, and in abandoned mines.
Spotted bat	<i>Euderma maculatum</i>	Arid habitats dominated by Utah juniper and sagebrush sometimes intermixed with limber pine or Douglas-fir, or in grassy meadows in ponderosa pine savannah. Roost in caves, and in cracks and crevices in cliffs and canyons.
Fringe-tailed myotis	<i>Myotis thysanodes</i>	Ponderosa pine and Douglas-fir forest. Forages over willow/cottonwood areas along creeks and over pools. Roosts in caves, mines, rock crevices, buildings, and other protected sites.
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Douglas-fir and lodgepole pine forests, ponderosa pine woodlands, Utah juniper-sagebrush scrub, and cottonwood bottomland. Roost in crevices and old buildings, particularly wooden structures with little disturbance.
northern leopard frog	<i>Rana pipiens</i>	Springs, bogs, ponds and other areas of slow moving or shallow water.
plains spadefoot toad	<i>Spea bombifrons</i>	Soft sandy/gravelly soils near permanent or temporary bodies of water. Estivate in deep underground burrows during dry periods.

No Action Alternative

Under the No Action Alternative, existing trails would continue to receive brush removal and weed management to keep paths reasonably clear.

Federally Rare and Endangered Species

Blowout Penstemon (*Penstemon haydenii*)- No populations have been documented in Bighorn Canyon NRA, therefore this action is expected to have no effect on this species.

Ute Ladies-Tresses (*Spiranthes divialis*)- No populations have been documented in Bighorn Canyon NRA, therefore this action is expected to have no effect on this species.

Federal and State Special Status Species

Plants:

Wyoming sullivanthia (*Sullivantia hapemani*)- Is a regional endemic of the Bighorn Mountains in north-central Wyoming and the contiguous Bighorn Canyon area of south-central Montana. It grows at calcareous springs and seeps on canyon walls and stream banks, plus boulder-lined stream courses and at waterfalls with waters rich in calcium bicarbonate. Habitat sites in Bighorn Canyon include seeps near the Upper Layout Creek trail, Hillsboro ranch, Trail Creek and the Om-Ne-Ah trail. Wyoming Sullivanthia is often in remote settings that have few direct threats. The primary threat to this species is change in water quality and flow. It has a narrow ecological amplitude and occupies a fragile habitat that is directly affected by any changes in the groundwater discharge and stream flow conditions, with unconsolidated substrate that is vulnerable to the slightest amount of trampling. Under the No Action Alternative, some areas of sensitivity would continue to see visitor impact, particularly Upper Layout Creek. Impacts would be adverse, site-specific, short and long-term and minor.

Persistentsepal yellowcress (*Rorippa calycina*)- This species is found primarily along moist sandy to muddy banks of streams, stock ponds, and man-made reservoirs near the high-water line. The typical shoreline zone is a broad flat and includes sandy parent material. Most populations are in sparsely vegetated settings that are semi-disturbed or recently flooded openings in small inlets or bays. At Bighorn Canyon, it occurs on moist, reddish sandy clay soils lining small inlets along the shore of the lake. The Crooked Creek fishing access is the most likely trail area where this species could be impacted. Under the No Action Alternative, visitors would continue to make social trails across the Crooked Creek access area, with the potential to negatively impact this species. Impacts would be adverse, site-specific, short and long-term and minor.

Bighorn fleabane (*Erigeron allocotus*)- Found primarily on limestone and calcareous sandstone tablelands, rims, cliffs, and talus slopes. It also grows in crevices of otherwise unvegetated outcrops. Bighorn fleabane is consistently found on the Madison, Amsden, and Tensleep geologic formations, although large colonies have also been found on outcrops of the Chugwater Formation within sagebrush grasslands plains. Bighorn Canyon NRA harbors 3 of the 11 protected populations for this species rangewide. Most populations are thought to be stable under present management, as they are widespread and locally common within suitable habitats of the Bighorn Canyon NRA and adjoining Pryor Mountains. Plants are protected by their remote and often difficult to access habitat. However, it also occurs in cushion plant communities and it is not impossible it could be found near the Stateline and Ranger's Delight trails. Continued maintenance of these trails is not expected to impact this species, and at present no discernable impact is anticipated.

Hairy prince's plume (*Stanleya tomentosa*)- In the Wyoming portion of Bighorn Canyon NRA, Hairy prince's-plume is found mostly on slopes of fissured, white, limey-sandstone boulders and bedrock outcrops of Tensleep Sandstone in openings within *Pinus flexilis*/Juniperus woodlands. The understory of these sites is usually dominated by cushion plants and bunchgrasses that provide a total cover of at least 50%. In the Montana portion of Bighorn Canyon NRA, Hairy prince's-plume is most often found on Juniper Woodland ridges on the Chugwater Formation. Bighorn Canyon is one of the few locations in Montana or Wyoming where Hairy Prince's-plume is afforded any protection, and maintenance of healthy populations in the NRA is important from a range-wide perspective. Although impact has not currently been noted on or near existing trails, further surveys of off trail impact in the Canyon Rim and Ranch/Landing planning areas may help in management. At present, continued maintenance is expected to have no discernable effect on this species.

Wind River milkvetch (*Astragalus oreganus*)- In Bighorn Canyon NRA it is restricted to sparsely vegetated "red beds" of the Chugwater formation. In a 2001 rare plant survey it was located close to a gravel road on the western border of the NRA. No trails exist in the vicinity of the discovered population and restrictions on the use of ATV's in the park, allow for protection without action. The No Action Alternative would have no discernable effect on this species.

Rabbit buckwheat (*Eriogonum brevicaulle* var. *canum*)- Rabbit buckwheat is a regional endemic of southern Montana and north-central Wyoming. Across its range, Rabbit buckwheat occurs commonly on barren to sparsely vegetated "redbed" clay or sandy soils in cushion plant, juniper woodland, and sagebrush steppe communities. It is also found on dolomite, sandstone, and siltstone outcrops and rims. In Bighorn Canyon, *Eriogonum brevicaulle* var. *canum* can be found on most upland shrub steppe and sparse grassland habitats at least as far north as Deadman Creek. Although they vary in size, most individual populations of Rabbit buckwheat are abundant or even locally dominant. *Eriogonum brevicaulle* var. *canum* is locally abundant in a number of vegetation types that cover large areas of the landscape, and has few threats. No special management is required to ensure the survival of this species. Bighorn Canyon NRA supports the largest known populations of Rabbit buckwheat in Wyoming, as well as extensive contiguous populations on the Montana side. Rabbit buckwheat is not considered a species of special concern in Montana and in light of discoveries at Bighorn Canyon it will probably be down-listed to WYNDD's "watch list" in the near future. Several sites of existing trails may come into close contact with this species and it may be impacted by off trail use. Impacts with current maintenance and off-trail use, is estimated to be adverse, site-specific, short and long-term and negligible.

Wildlife:

American peregrine falcon- Peregrines nest on ledges, potholes and in small caves on sheer cliff faces that are relatively inaccessible to mammalian predators. Activity in the Canyon Rim planning area has the most potential to impact nesting peregrines. Construction of an ADA accessible path at the Devil Canyon Overlook would have very limited, indirect impact on possible nesting individuals during a specific time of year. However, construction would be short-term and planning would avoid particularly sensitive areas during nesting season. Continued off-trail use near the overlook could potentially affect nesting areas, as visitors are not restricted to trails in these areas, making education and regulation difficult. Overall impacts would be adverse, site-specific, short-term and minor.

Yellow-billed cuckoo- The yellow-billed Cuckoo is extremely sensitive to habitat fragmentation, and population declines in parts of its range are a result of deterioration and fragmentation of riparian woodland habitat. The only areas in Wyoming that currently support the large cottonwood-riparian stands that are required by this species occur in isolated stands along the Bighorn, Powder, and North Platte rivers. The Yellowtail Wildlife Habitat has perhaps one of the largest cottonwood

riparian systems in Wyoming and could potentially support this species. To date, no surveys confirming or denying its use of the area have been performed. However, if present, leaving an excessive road system open and unregulated would lead to further habitat fragmentation and species disturbance. Impacts of the No Action Alternative, that is leaving roads as they currently are, could have adverse impacts locally that are short and long-term and minor.

Pallid bat- The pallid bat emerges about 1 hour after sunset to forage. It primarily gleans large insect prey from the ground and vegetation, but also forages in flight within about 10 ft of the ground. Due to its roost preferences, very few areas in Wyoming are suitable for the pallid bat. Bighorn Canyon is one of the best such sites due to its warm, arid climate and abundant cliff roosting habitat. Because of its nocturnal behavior, direct impact while foraging is not a major concern. Negative impacts would be felt mainly in roosting sites, which tend to be on or near cliffs and occasionally in buildings. Continued trail maintenance is not expected to impact pallid bats and should have no discernable effects on populations. The only exception would be the path upgrade at the Devil Canyon Overlook which could create noise, disrupting day roosts temporarily. Impacts would be adverse, site-specific, short-term and negligible.

Spotted bat- Roosting habitat is almost exclusively rocky cliffs on or near substantial cliff features. Suitable habitat in Wyoming is associated with rocky cliffs near permanent water, a situation especially prevalent in Bighorn Canyon. In fact, BICA is one of the few places in Wyoming where the spotted bat regularly occurs. This species emerge to forage long after sunset and specializes in high flying moths, which they catch in flight. Because of its nocturnal behavior, direct impact while foraging is not a major concern. Continued trail maintenance is not expected to impact roosting habitat, with the exception of the path upgrade at the Devil Canyon overlook which could temporarily create noise, disrupting day roosts. Impacts would be adverse, site-specific, short-term and negligible.

Fringe-tailed myotis- Seem to roost predominantly in crevices of cliff or in large, middle-aged snags in mature conifer forest. They are adapted to fly in vegetatively clustered environments, and probably forage in interior forest and/or along forest edges. Recent surveys found it to be a regular, if not commonly found species, in BICA, where abundant cliff habitat exists for roosting surrounded by a patchwork of arid forest and grassland. Surveys recorded them near the Ewing-Snell Ranch and in the Yellowtail wildlife habitat, however these were merely study sites and may not fully represent its range throughout the park. Because it will utilize tree snags as roosting habitat, it is possible that trail maintenance could disrupt nearby roosts, more so than other bats. Impacts would be adverse, site-specific, short-term and minor.

Townsend's big-eared bat- The most critical and restrictive feature of Townsend's big-eared bat ecology is the requirement for large cavern-like structures for roosting during all stages of its life-cycle. Maternity roosts are even more limiting, as they must be consistently warm throughout the breeding season. This results in a general preference for warm, low-mid elevation habitats. BICA and nearby BLM and Reservation land contain geological features ideal for the formation of roost caves. There are several known maternity colonies in the vicinity of Bighorn Canyon and it is likely that smaller ones exist that have not yet been identified. Nighttime foraging and daytime roosting sites are not expected to be impacted by continued trail maintenance. The only exception would be the path upgrade at the Devil Canyon Overlook which could create noise, disrupting day roosts temporarily. Impacts would be adverse, site-specific, short-term and negligible.

Northern leopard frog- Under the No Action Alternative habitat near the Upper Layout Creek trail would continue to be trampled and degraded which could adversely impact the northern leopard frog and its habitat. Impacts would be adverse, site-specific, short and long-term and minor.

Plains spadefoot toad- Habitat is poorly documented, however this species is usually found in areas with soft sandy/gravelly soils near permanent or temporary bodies of water, which they enter to breed. As desert amphibians they are active primarily during rainy periods and remain in estivation, deep in underground burrows for the remainder of the year. Continued trail maintenance is not expected to impact this species, however if habitat is discovered during regular maintenance, mitigation measures will be used to limit impact as much as possible. The No Action Alternative is expected to have no discernable effect on this species

Cumulative effects

Future projects with impacts to vegetation include prescribed fires, invasive plant treatments, and re-vegetation projects. All of these projects are intended to improve vegetation/habitat in the park, causing short-term, adverse impacts followed by beneficial, long-term results. The WAPA proposed transmission line rebuild will also impact sensitive vegetation in the park. Past grazing and ATV use as well as inundation of habitat by the Yellowtail Reservoir may have past impact on specific plant species, however documentation is not available.

Grazing, ATVs, and the dam may also have had long-term cumulative impacts on wildlife habitat through inundation, habitat fragmentation and changes in plant ecology. Prescribed fires, invasive plant treatments and re-vegetation projects would have temporary adverse impacts on habitat but they are outweighed by long-term habitat improvement once finished.

Conclusion

The No Action Alternative leaves trails in their current conditions with minimal continued maintenance. Impact from this action would not have substantial impact compared to current conditions. However, in some cases trail neglect, when added to cumulative effects could have direct negative impacts on plant habitat, such as at Upper Layout Creek. Continued visitor impact at the spring could impact plant and animal species of concern in the creek area. The lack of trails at the Devil Canyon Overlook would mean continued off-trail use, with the potential to negatively impact nesting and roosting habitat, undocumented toad habitat and plant habitat.

Overall impacts, although adverse in some cases are negligible to minor for state listed plant and animal species of interest for the most part. The exception being continued impact at Upper Layout Creek and Crooked Creek fishing access. Impacts to state special status species are expected to be anything from no-discernable effect to adverse, site-specific, short and long-term and minor to moderate. No effect is expected for the federally listed plant species in the park.

Because there would be no adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Bighorn Canyon National Recreation Area; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP or other relevant NPS planning documents, there would be no impairment of the park's resources or values. There would also be no unacceptable impacts as defined in the "Unacceptable Impacts" section of this chapter.

Alternative A

Alternative A would establish new trails in the park and improve existing trails. Mountain bike trails would be introduced and trails would be designated for user groups. Roads would be closed to public use in some areas.

New trails and trail sections which pass through potential habitat for these endangered species would be surveyed for their presence and trails modified or rerouted as appropriate. There are currently no known populations of threatened or endangered species in any of the proposed trail corridors. Small numbers of state listed species could potentially be impacted, though trail sections would be routed primarily along existing roads and any new sections would avoid any concentrations of these species.

Federally Rare and Endangered Species

Blowout Penstemon (*Penstemon haydenii*)- No populations have been documented in Bighorn Canyon NRA, therefore this action is expected to have no effect on this species.

Ute Ladies-Tresses (*Spiranthes divialis*)- No populations have been documented in Bighorn Canyon NRA, therefore this action is expected to have no effect on this species.

Federal and State Special Status Species

Plants:

Wyoming sullivan (*Sullivantia hapemani*)- Is a regional endemic of the Bighorn Mountains in north-central Wyoming and the contiguous Bighorn Canyon area of south-central Montana. It grows at calcareous springs and seeps on canyon walls and stream banks, plus boulder-lined stream courses and at waterfalls with waters rich in calcium bicarbonate. Habitat sites in Bighorn Canyon include seeps near the Upper Layout Creek trail, Hillsboro ranch, Trail Creek and the Om-Ne-Ah trail. Wyoming Sullivantia is often in remote settings that have few direct threats. The primary threat to this species is change in water quality and flow. It has narrow ecological amplitude and occupies a fragile habitat that is directly affected by any changes in the groundwater discharge and stream flow conditions, with unconsolidated substrate that is vulnerable to the slightest amount of trampling. Under Alternative A, some areas of sensitivity would receive trail improvement and educational signs to protect its habitat, particularly Upper Layout Creek. However, reopening the Om-ne-a trail could open that area up to off-trail travel, which would affect nearby seeps and springs. Impacts would therefore be beneficial, adverse, site-specific, short and long-term and minor to moderate.

Persistantsepal yellowcress (*Rorippa calycina*)- This species is found primarily along moist sandy to muddy banks of streams, stock ponds, and man-made reservoirs near the high-water line. The typical shoreline zone is a broad flat and includes sandy parent material. Most populations are in sparsely vegetated settings that are semi-disturbed or recently flooded openings in small inlets or bays At Bighorn Canyon, it occurs on moist, reddish sandy clay soils lining small inlets along the shore of the lake. The Crooked Creek fishing access is the most likely trails area where this species could be impacted. Under Alternative A, a graveled path would be developed using an existing social path. It is believed that once a clear path is established it would reduce the number of social trails, allowing plants to re-establish. However, the path would only extend to the high water mark, leaving areas below high water mark open to trampling. This species prefers recently inundated habitat so there may still be impact to the seed bed. Impacts would be adverse, site-specific, short and long-term and minor.

Bighorn fleabane (*Erigeron alloctus*)- Found primarily on limestone and calcareous sandstone tablelands, rims, cliffs, and talus slopes. It also grows in crevices of otherwise unvegetated outcrops. Bighorn fleabane is consistently found on the Madison, Amsden, and Tensleep geologic formations, although large colonies have also been found on outcrops of the Chugwater Formation within sagebrush grasslands plains. Bighorn Canyon NRA harbors 3 of the 11 protected populations for this species rangewide. Most populations are thought to be stable under present management, as they are widespread and locally common within suitable habitats of the Bighorn Canyon NRA and adjoining Pryor Mountains. Plants are protected by their remote and often difficult to access habitat. They are usually restricted to moisture-accumulating fissures in the bedrock covered by a thin layer of whitish, rocky, sandy soil or sandstone and limestone gravel chips. However, it also occurs in cushion plant communities and it is not impossible it could be found near the Stateline, Ranger's Delight, Rim, Balcony or Powerline trails. Although trail proposals are not expected to impact this species, if it is discovered in proposal areas, mitigation measures would be taken to ensure its protection. At present no discernable impact is anticipated.

Hairy prince's plume (*Stanleya tomentosa*) - In the Wyoming portion of Bighorn Canyon NRA, Hairy prince's-plume is found mostly on slopes of fissured, white, limey-sandstone boulders and bedrock outcrops of Tensleep Sandstone in openings within *Pinus flexilis*/*Juniperus* woodlands. The understory of these sites is usually dominated by cushion plants and bunchgrasses that provide a total cover of at least 50%. In the Montana portion of Bighorn Canyon NRA, Hairy prince's-plume is most often found on Juniper Woodland ridges on the Chugwater Formation. Bighorn Canyon is one of the few locations in Montana or Wyoming where Hairy Prince's-plume is afforded any protection, and maintenance of healthy populations in the NRA is important from a range-wide perspective. Although impact has not currently been noted on or near existing trails, further surveys of off trail impact in the Canyon Rim and Ranch/Landing planning areas may help in management. Surveys in these areas and the Proposed Wilderness planning area would be necessary prior to implementation of proposed trails to ensure population protection. At present no discernable impact is anticipated.

Wind River milkvetch (*Astragalus oreganus*)- In Bighorn Canyon NRA it is restricted to sparsely vegetated "red beds" of the Chugwater formation. In a 2001 rare plant survey it was located close to a gravel road on the western border of the NRA. No trails exist in the vicinity of the discovered population and restrictions on the use of ATV's in the park, allow for protection without action. The proposed Powerline trail is not expected to encounter or to have any impact on this species. However, surveys would be done and mitigation measures used to ensure its protection. Alternative A is expected to have no discernable effect on this species.

Rabbit buckwheat (*Eriogonum brevicaule* var. *canum*)- Rabbit buckwheat is a regional endemic of southern Montana and north-central Wyoming. Across its range, Rabbit buckwheat occurs commonly on barren to sparsely vegetated "redbed" clay or sandy soils in cushion plant, juniper woodland, and sagebrush steppe communities. It is also found on dolomite, sandstone, and siltstone outcrops and rims. In Bighorn Canyon, *Eriogonum brevicaule* var. *canum* can be found on most upland shrub steppe and sparse grassland habitats at least as far north as Deadman Creek. Although they vary in size, most individual populations of Rabbit buckwheat are abundant or even locally dominant. *Eriogonum brevicaule* var. *canum* is locally abundant in a number of vegetation types that cover large areas of the landscape, and has few threats. No special management is required to ensure the survival of this species. Bighorn Canyon NRA supports the largest known populations of Rabbit buckwheat in Wyoming, as well as extensive contiguous populations on the Montana side. Rabbit buckwheat is not considered a species of special concern in Montana and in light of discoveries at Bighorn Canyon it will probably be down-listed to WYNDD's "watch list" in the near future. Several sites of existing trails may come into close contact with this species and it

may be impacted by off trail use. Proposed trails may involve some vegetation removal, which could impact rabbit buckwheat but in light of its abundance in Bighorn Canyon, impacts are not expected to change population dynamics or limit recovery. Impacts are expected to be adverse, site-specific, short and long-term and negligible.

Wildlife:

American peregrine falcon- Peregrines nest on ledges, potholes and in small caves on sheer cliff faces that are relatively inaccessible to mammalian predators. Individuals have been observed nesting near Devil Canyon overlook and possibly foraging in the Dry Head Canyon area. Noise from trail construction and increased traffic may affect nesting individuals, though their placement in out-of-the way cliff areas insulates them from direct disturbance by humans. The trail building planned in the Canyon Rim planning area has the most potential to impact nesting peregrines. However, construction would be short-term and planning would avoid particularly sensitive areas during nesting season. Trail use would not be so intense as to substantially disrupt nesting sites. Foraging activities of the falcons could potentially be affected by hikers in other areas of the park, but any effects would be short-term and negligible. Overall impacts would be adverse, site-specific, short-term and negligible to minor.

Yellow-billed cuckoo- The yellow-billed Cuckoo is extremely sensitive to habitat fragmentation and population declines in parts of its range are a result of deterioration and fragmentation of riparian woodland habitat. The only areas in Wyoming that currently support the large cottonwood-riparian stands that are required by this species occur in isolated stands along the Bighorn, Powder, and North Platte rivers. The Yellowtail Wildlife Habitat has perhaps one of the largest cottonwood riparian systems in Wyoming and could potentially support this species. To date, no surveys confirming or denying its use of the area have been performed, and no records exist in the park. However, if present, actions taken in Alternatives A to close roads in the Yellowtail Habitat would benefit the yellow-billed cuckoo by reducing habitat fragmentation and site-specific disturbance. Impacts for Alternatives A would be beneficial, site-specific to local, short and long-term and minor to moderate.

Pallid bat- The pallid bat emerges about 1 hour after sunset to forage. It primarily gleans large insect prey from the ground and vegetation, but also forages in flight within about 10 ft of the ground. Due to its roost preferences, very few areas in Wyoming are suitable for the pallid bat. Bighorn Canyon is one of the best such sites due to its warm, arid climate and abundant cliff roosting habitat. Because of its nocturnal behavior, direct impact while foraging is not a major concern. Negative impacts would be felt mainly in roosting sites, which tend to be on or near cliffs and occasionally in buildings. The path upgrade at the Devil Canyon Overlook, construction of the Balcony and Rim trails and the improvements on the Upper Layout Creek trail have the most potential to temporarily impact the soundscape near day roosts. Impacts would be adverse, site-specific, short-term and negligible.

Spotted bat- Roosting habitat is almost exclusively rocky cliffs on or near substantial cliff features. Suitable habitat in Wyoming is associated with rocky cliffs near permanent water, a situation especially prevalent in Bighorn Canyon. In fact, BICA is one of the few places in Wyoming where the spotted bat regularly occurs. This species emerge to forage long after sunset and specializes in high flying moths, which they catch in flight. Because of its nocturnal behavior, direct impact while foraging is not a major concern. The path upgrade at the Devil Canyon Overlook, construction of the Balcony and Rim trails and the improvements on the Upper Layout Creek trail have the most potential to temporarily impact the soundscape near day roosts. Impacts would be adverse, site-specific, short-term and negligible.

Fringed myotis- Seem to roost predominantly in crevices of cliff or in large, middle-aged snags in mature conifer forest. They are adapted to fly in vegetatively clustered environments, and probably forage in interior forest and/or along forest edges. Recent surveys found it to be a regular, if not commonly found species, in BICA, where abundant cliff habitat exists for roosting surrounded by a patchwork of arid forest and grassland. Surveys recorded them near the Ewing-Snell Ranch and in the Yellowtail wildlife habitat. However these were merely study sites and may not fully represent its range throughout the park. Because it will utilize tree snags as roosting habitat, it is possible that trail maintenance and construction could disrupt nearby roosts, more so than other bats. Impacts would be adverse, site-specific, short-term and minor.

Townsend's big-eared bat- The most critical and restrictive feature of Townsend's big-eared bat ecology is the requirement for large cavern-like structures for roosting during all stages of its life-cycle. Maternity roosts are even more limiting, as they must be consistently warm throughout the breeding season. This results in a general preference for warm, low-mid elevation habitats. BICA and nearby BLM and Reservation land contain geological features ideal for the formation of roost caves. There are several known maternity colonies in the vicinity of Bighorn Canyon and it is likely that smaller ones exist that have not yet been identified. Nighttime foraging and daytime roosting sites are not expected to be impacted by trails construction and maintenance, as most proposed areas are far from potential roosting sites. This may not be true however in the Canyon Rim planning area and in the Ranch Planning area, where construction noise could temporarily disrupt the soundscape, impacting sleeping bats. Impacts would be adverse, site-specific, short-term and minor.

Northern leopard frog- Potential habitat for the northern leopard frog found within the park is along springs, bogs, ponds and other areas of slow moving or shallow water. Construction and maintenance is not expected to impact water quality or habitat for the northern leopard frog. Trail improvement and interpretive efforts on the Upper Layout Creek trail would help protect potential habitat in that area. Ponds and riparian areas near the historic ranches, near the Beaver Pond trail and near Crooked Creek would see no discernable effect from improved brushing. The current level of trail use is not expected to increase dramatically and impacts to the soundscape, which could affect frogs, would be negligible and short-term. Impacts under Alternative A would be beneficial, site-specific, short and long-term and minor.

Plains spadefoot toad- Habitat is poorly documented, however this species is usually found in areas with soft sandy/gravelly soils near permanent or temporary bodies of water, which they enter to breed. As desert amphibians they are active primarily during rainy periods and remain in estivation, deep in underground burrows for the remainder of the year. Trail work is not expected to impact this species, however if probable habitat is discovered during new trail construction, mitigation measures will be used. Construction would not occur during the rainy season. Alternative A is not expected to have any discernable impact on this species.

Cumulative effects

Future projects with impacts to vegetation include prescribed fires, invasive plant treatments, and re-vegetation projects. All of these projects are intended to improve vegetation/habitat in the park, causing short-term, adverse impacts followed by beneficial, long-term results. The WAPA proposed transmission line rebuild will also impact sensitive vegetation in the park. Past grazing and ATV use as well as inundation of habitat by the Yellowtail Reservoir may have past impact on specific plant species, however documentation is not available.

Grazing, ATVs, and the dam also have had long-term cumulative impacts on wildlife habitat through inundation, habitat fragmentation and changes in plant ecology. Prescribed fires, invasive plant treatments

and re-vegetation projects would have temporary adverse impacts on habitat but they are outweighed by long-term habitat improvement once finished.

Conclusion

Trail construction activities under Alternative A have the potential to impact special status species by disturbing habitat, compacting soil, creating noise, and introducing visitors to newly opened areas. In some cases, as in the improvements at Upper Layout Creek, habitat could be improved through trail re-routing and educational signs, which would benefit sensitive plants and amphibians. In many other cases, proposed and existing trails would have little to no effect on these species. In the cases where adverse impacts are expected, most impacts are site-specific and negligible to minor, meaning that the overall viability of the species would not be affected, and if left alone, the species would recover. This combined with surveys and mitigation measures would ensure that no state species of special status would be significantly affected. Overall impacts to special status species are expected to have no discernable effect to adverse impacts that are site-specific, short and long-term and negligible to minor. No effects are expected for federally listed species in the park.

Because there would be no adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Bighorn Canyon National Recreation Area; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP or other relevant NPS planning documents, there would be no impairment of the park's resources or values. There would also be no unacceptable impacts as defined in the "Unacceptable Impacts" section of this chapter.

Alternative B

Alternative B would improve existing trails without building any new trails. Redundant or unnecessary roads would be reclaimed and some trails would be re-routed to address resource damage. Mountain bikes would not be allowed on trails.

New trail sections which pass through potential habitat for these endangered species would be surveyed for their presence and trails modified or rerouted as appropriate. There are currently no known populations of threatened or endangered species in any of the existing trail corridors. Small numbers of state listed species could potentially be impacted, though trail sections would be routed primarily along existing roads and any new sections would avoid any concentrations of these species.

Federally Rare and Endangered Species

Blowout Penstemon (*Penstemon haydenii*)- No populations have been documented in Bighorn Canyon NRA, therefore this action would be expected to have no effect on this species.

Ute Ladies-Tresses (*Spiranthes divialis*)- No populations have been documented in Bighorn Canyon NRA, therefore this action would be expected to have no effect on this species.

Federal and State Special Status Species

Plants:

Wyoming sullivantia (*Sullivantia hapemani*)- Is a regional endemic of the Bighorn Mountains in north-central Wyoming and the contiguous Bighorn Canyon area of south-central Montana. It