

CHAPTER 3: AFFECTED ENVIRONMENT

Introduction

The “Affected Environment” describes existing conditions for those elements of the environment that would be affected by the implementation of alternatives considered in this Environmental Assessment (EA). The natural environment components addressed include vegetation, wildlife, species of special concern, and soils. The cultural environment includes archeological resources, cultural landscapes and ethnographic resources. Human environmental components include visitor use and experience, wilderness values, and park operations. Impacts for each of these topics are analyzed in “Chapter 4: Impacts.”

Natural Resources

Vegetation Types

The North District of Bighorn Canyon 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.

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

The Yellowtail Wildlife area has abundant wetlands, cottonwood forests, sage grassland and desert.

Protected Plant Species and Species of Concern

There are two federally listed plant species under the ESA that could potentially grow in the park;

- Blowout penstemon (*Penstemon haydenii*) a federally listed endangered species
- Ute ladies-tresses (*Spiranthes divialis*) a federally listed threatened species

Several State Plant Species of Concern are found within park boundaries (see table below). The Species of Concern lists are used for general conservation planning. The lists summarize information on species in Wyoming and Montana that are rare, endemic, disjunct, threatened, or otherwise biologically sensitive. Plants and animals are considered for inclusion on lists if they are vulnerable to extirpation at the global or state level due to:

- their rarity (e.g., restricted distribution, small population size, low population density)
- inherent vulnerability (e.g., specialized habitat requirements, restrictive life history)
- threats (e.g., significant loss of habitat, sensitivity to disturbances)

Table 3.1 Rare Vascular Plants of Bighorn Canyon National Recreation Area

Scientific name	Common name	G Rank	MT S-Rank	WY S-Rank
<i>Agrimonia gryposepala</i>	Common agrimony	G5	SU	S1
<i>Arabis demissa</i> var. <i>languida</i>	Daggett rock cress	G4	S1	S2
<i>Aster glaucodes</i>	Gray aster	G4 G5	S1	S3
<i>Astragalus aretioides</i>	Sweetwater milkvetch	G4	S2	S3
<i>Astragalus geyeri</i> var. <i>geyeri</i>	Geyer's milkvetch	G3 G4	S2	S3
<i>Astragalus oreganus</i>	Wind River milkvetch	G4?	S1	S3
<i>Carex gravida</i> var. <i>gravida</i>	Pregnant sedge	G5?	S1	S2
<i>Cleome lutea</i>	Yellow bee plant	G5	S1	S3
<i>Delphinium geyei</i>	Geyer's larkspur	G5	S1	S4
<i>Erigeron allocotus</i>	Bighorn fleabane	G3	S3	S2 S3
<i>Eriogonum brevicaulis</i> var. <i>canum</i>	Rabbit buckwheat	G3	S3	S2
<i>Eupatorium maculatum</i> var. <i>bruneri</i>	Joe-pye weed	G5	S2	S2
<i>Grayia spinosa</i>	Spiny hopsage	G5	S2	S3 S4 S3
<i>Leptodactylon caespitosum</i>	Leptodactylon	G3 G4	S1	S3
<i>Lesquerella lesicii</i>	Lesica's bladderpod	G1	S1	not in WY
<i>Mentzelia pumila</i> var. <i>pumila</i>	Dwarf mentzelia	G4	S2	S3
<i>Musineon vaginatum</i>	Sheathed musineon	G3?	S3	S2
<i>Oxytropis besseyi</i> var. <i>fallax</i>	Bighorn locoweed	G5	SU	S3
<i>Oxytropis besseyi</i> var. <i>ventosa</i>	Wind River locoweed	G5	SU	S3
<i>Rorippa calycina</i>	Persistent sepal yellowcress	G3	S1	S2 S3
<i>Senecio eremophilus</i> var. <i>eremophilus</i>	Cut-leaved groundsel	G5	S1	S3
<i>Sphenopholis intermedia</i>	Slender wedgegrass	G5	S1	S2
<i>Stanleya tomentosa</i> var. <i>tomentosa</i>	Hairy prince's-plume	G3	S3	S2
<i>Stipa lettermanii</i>	Letterman's needlegrass	G5	S1	S3 S4
<i>Sullivantia hapemanii</i> var. <i>hapemanii</i>	Wyoming Sullivantia	G3	S1	S3

***Rank Definition**

A rank prefaced by “G” refers to global rank, i.e. rangewide rank. A rank prefaced by “S” refers to state rank, determined separately from G-rank but by much the same standards within state boundaries.

- 1 Critically imperiled because of extreme rarity (usually 5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction.
- 2 Imperiled because of rarity (usually 6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range.

- 3 Vulnerable because of rarity (usually 21 to 100 occurrences) or found in a restricted range even though it may be abundant at some of its locations.
- 4 Apparently secure, though it may be quite rare in parts of its range, especially at the periphery.
- 5 Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.
- U Possibly in peril, but status uncertain, more information needed.
- H Historical, known only from records over 50 year ago, may be rediscovered.

Of special interest for the areas of proposed action in the park:

- Wyoming sullivan (*Sullivantia hapemanii*)- grows at calcareous springs and seeps on canyon walls and streambanks, plus boulderlined streamcourses and at waterfalls with waters rich in calcium bicarbonate. The springs and seeps represent contact zones between limestone or dolomite and underlying impervious layers, or else groundwater discharge along fault lines. Some of the most distinct settings are “amphitheaters,” grotto-like settings where *Sullivantia hapemanii* var. *hapemanii* covers cavernous interior walls. It occurs at foothills and montane zones from 3,650 ft to 7,400 ft in elevation. Planning areas where this plant may grow include the Ranch/Landing and Reservoir.
- Persistent sepal 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. The species ranges in elevation from 3660-6800 ft. Planning areas where this plant may grow include Horseshoe Bend.
- Bighorn fleabane (*Erigeron allocotus*)- found primarily on limestone and calcareous sandstone tablelands, rims, cliffs, and talus slopes. It is often part of cushion plant communities within sparse grasslands that lie within juniper woodlands, mountain mahogany scrub or sagebrush steppe. It also grows in crevices of otherwise un-vegetated outcrops. Bighorn fleabane is consistently found on the Madison, Amsden, and Tensleep formations, although large colonies have also been found on outcrops of the Chugwater Formation within sagebrush grasslands plains. Its exposed habitat is maintained in early stages of natural succession by the forces of wind and water. Populations range in elevation from 3680-7600 feet. Planning areas where this plant may grow include all areas in South District.
- Hairy prince's plume (*Stanleya tomentosa*)- Hairy prince's-plume occurs primarily in cushion plant communities, sagebrush-grasslands, limber pine woodlands, and Utah juniper woodlands on limey-sandstone ridges, dry dolomite cliffs and talus, sandy canyons, or rocky clay slopes in the foothills of desert mountains. 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 limber pine/juniper woodlands. Populations range in elevation from 3800-7300 feet. Planning areas where this plant may grow include the Canyon Rim, Ranch/Landing and SE Lake.
- Wind River milkvetch (*Astragalus oregonus*)- a regional endemic of south-central Montana and western Wyoming. In Montana, it is only known from the Pryor Mountain desert area, while it is widely scattered over western Wyoming. It occupies sandy or clay soil in desert shrublands and sagebrush grasslands, occurring on both Chugwater Formation and Madison Group Formations, most often sagebrush steppe and juniper scrubland. Planning areas where this plant may grow include Proposed Wilderness.

- Rabbit buckwheat (*Eriogonum brevicaulis* var. *canum*) - 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. In Bighorn Canyon, it can be found on most upland shrub steppe and sparse grassland habitats at least as far north as Deadman Creek. It is abundant on Chugwater Formation redbed clay barrens dominated by scattered rabbitbrush and sagebrush steppe. Bighorn Canyon NRA supports the largest known populations of Rabbit buckwheat in Wyoming, conservatively estimated at over 200,000 plants, 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 downlisted to WYNDD's "watch list" in the near future (Heidig and Fertig 2001). Planning areas where this plant may grow include all areas in the South District.

Wildlife

From the low elevation desert to the high elevation forests, Bighorn Canyon has a diverse array of wildlife. Bighorn Canyon is well known in guidebooks as an excellent place to see wild horses, and offers the only paved access to the Pryor Mountain Wild Horse Range. However, the horses account for only a small portion of Bighorn Canyon's diverse fauna.

In the North District several species of raptors can be easily seen throughout the area. Beaver, black bear, mountain lion, deer, porcupine, skunk, badgers, raccoon, bobcats, coyotes, bats and songbirds are found in the mountainous and riparian areas. Mule deer are common as well.

The South District contains desert reptiles, raptors, songbirds, a large variety of migrating birds, bats, bighorn sheep, wild horses, deer, pronghorns, mountain lion, black bear, bobcats, beaver, coyotes, rabbits, and other species common to desert, grassland, and juniper forests.

The Yellowtail habitat has various songbird and migrating species, a diversity of owls and raptors, deer, rabbits, bobcats, and other species common to wetlands, cottonwood forests and desert.

Wildlife Species of Special Concern

Several species of concern in Montana and/or Wyoming could potentially be affected by trail construction and use:

- American peregrine falcon- has recovered well in Bighorn Canyon and has been documented as nesting near Devil Canyon overlook and in other cliff locations in the park. It forages in a variety of habitats in the park.
- Yellow-billed cuckoo- Because it nests primarily in large stands of cottonwood-riparian habitat below 7000 ft. it is possible it could occur in the Yellowtail Wildlife Habitat, although it is not documented. 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- Due to its warm climate and abundant cliff nesting sites, BICA contains excellent habitat for the Pallid bat. Recent surveys recorded calls in the Ranch/Landing Planning area but they could utilize all parts of the park particularly the South District and Yellowtail Habitat.
- Spotted bat- Throughout its wide range, the spotted bat uses a variety of habitats from desert shrub to coniferous forest, but roosting habitat is almost exclusively rocky cliffs on or near substantial cliff features. Suitable habitat in Wyoming is associated with rocky cliffs and

karst formation near permanent water, a situation especially prevalent in the Bighorn Basin. Recent surveys found them throughout the park, one of the few places in Wyoming where they regularly occur.

- Fringed-tail myotis- Fringed-tailed myotis in Wyoming seem to roost predominantly in crevices of cliff or in large, middle-aged snags in mature conifer forest. They are a fairly common species in BICA, where abundant cliff habitat exists for roosting surrounded by a patchwork of arid forest and grassland.
- Townsend's big-eared bat- Require large, warmer, mid to low elevation caves for roosting, particularly maternal roosts. Many geologic features within Bighorn Canyon would meet the requirements to provide ideal habitat for this bat. Individuals have been captured in the Ranch/Landing Area and sighted at the south end of the Lake however, individuals could utilize edge foraging habitat throughout the park.
- Northern leopard frog- is common within the national recreation area. 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.
- 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.

Geology and Soils

Most of the soils in the bighorn Canyon area are formed in place and are derived from sandstone, siltstone, limestone, and shale bedrock. Soils deposited on alluvial terraces are generally derived from sandstone and shale. Sandy soils develop on sandstone, clays are derived from shale soils, and silt soils develop from limestone. Variations in the texture of soils throughout the area are usually associated with the parent bedrock. These variations are very noticeable and often abrupt. All soils are relatively rocky and gravelly, with depth to bedrock often less than two feet.

The organic content and amount of loam in the soil is fairly low, especially in the southern end of the recreation area. The surface organic layer is usually shallow and often not distinguished by any evident color change.

Alkalinity and salinity of the soil in the area are fairly high. The reaction pH ranges from 7.7-8.5. Salt and sodium are acquired from parent material, and soil development from limestone is high in calcium carbonate. This soil condition limits the number and species of plants in the area.

Permeability of the soil by water runoff is moderate (1.5-5 cm/hr or 0-6.2 in/hr). Percolation through the soil is limited by the clay content of the soil, and layers of clay are interspersed throughout most of the parent bedrock formations. The shrink/swell potential for most soils is moderate to low, except where there is bentonite. Frost action is moderate in general and high in some areas. The high seasonal groundwater table is less than 1.5 meters except near streams.

Suitability for development is rated as severe for most areas due to the shallow depth of bedrock. Paved trails would require special construction methods. Erosion potential in most areas is very high. Runoff is rapid and the soil particles are readily carried away on slopes greater than 15%.

The direct weight load of hikers, backpackers, horses, and bicycles impose considerable stress on soils. Trampling results in a loss of organic matter, making soils more prone to the additional impacts that follow, including compaction and reduced water infiltration. Some sections of trail

experience greater degrees of impacts depending on soil composition, slope, trail design, climate, and existing trail conditions.

Compaction increases surface runoff, which in turn greatly increases the potential for erosion. Although some surface erosion will result from nearly all types of trails, excessive surface erosion is frequently encountered when trails are improperly designed and constructed.

Cryptobiotic soil

Of special concern are cryptobiotic soils, particularly visible in the Horseshoe Bend Planning Area. This crusty looking, soft soil is a living groundcover that forms the foundation of high desert plant life. The soil crust is dominated by cyanobacteria, but can also include lichens, mosses, green algae, microfungi and bacteria depending on the level of development.

When wet, Cyanobacteria move through the soil and bind rock or soil particles, forming an intricate web of fibers. In this way, loose soil particles are joined together, and an otherwise unstable surface becomes very resistant to both wind and water erosion. The soil-binding action is not dependent on the presence of living filaments. Layers of abandoned sheaths, built up over long periods of time, can still be found clinging tenaciously to soil particles, providing cohesion and stability in sandy soils at depths up to 10cm.

Nitrogen fixation is another significant capability of cyanobacteria. Vascular plants are unable to utilize nitrogen as it occurs in the atmosphere. Cyanobacteria are able to convert atmospheric nitrogen to a form plants can use. This is especially important in desert ecosystems, where nitrogen levels are low and often limiting to plant productivity. Soil crusts have other functions as well, including an ability to intercept and store water, nutrients and organic matter that might otherwise be unavailable to plants.

Unfortunately, many human activities negatively affect the presence and health of soil crusts. Compressional stresses placed on them by footprints or machinery is extremely harmful, especially when the crusts are dry and brittle. Tracks such as those produced by hikers can create areas that are highly vulnerable to wind and water erosion. Rainfall carries away loose material, often creating channels along these tracks, especially on slopes.

Impacted areas may never fully recover. Under the best circumstances, a thin veneer of cryptobiotic soil may return in five to seven years. Damage done to the sheath material, and the accompanying loss of soil nutrients, is repaired slowly during up to 50 years of cyanobacterial growth. Lichens and mosses may take even longer to recover.

Cultural Resources

Archeological Resources

Cultural resources in Bighorn Canyon span 10,000 years of human use and occupation. 450 archeological sites have been documented, with many sites remaining. Prehistoric resources are, for the most part, low visibility artifact scatters that represent campsites, tool making, and hunting. Archeological sites from the Historic era are scattered throughout the park and include the Bad Pass trail, the Pretty Creek site, bison jumps, medicine wheels, burial and vision quest sites, occupation sites, and Euro-American settlements. Historic structures are found at several historic ranches, and also include the Kane Cemetery and the Headgate of an early irrigation system in the North District.

An archeological site(s) or historic structure can be eligible to be listed in the National Register of Historic Places (NRHP) if the site(s) has yielded, or may be likely to yield, information important in prehistory or history. In order for a cultural resource to be eligible for the National Register of Historic Places it must meet one or more of the following criteria of significance:

- A) associated with events that have made a significant contribution to the broad patterns of our history;
- B) associated with the lives of persons significant in our past;
- C) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction;
- D) have yielded, or may be likely to yield, information important in prehistory or history.

In addition, the cultural resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association (National Register Bulletin, Guidelines for Evaluating and Registering Archeological Properties).

Several sites at Bighorn Canyon have been placed on the National Register of Historic Places (NRHP), these include; The Bad Pass Trail, Pretty Creek Site, the Ewing-Snell Ranch, Hillsboro (Cedarvale), the Lockhart Ranch, and the M-L Ranch.

The Bad Pass Trail: Is an important access route connecting the grassland plains to the north and east to the Wyoming Basin and Great Basin country to the south and west. Its deep travois ruts and hundreds of large rock cairns attest to its long use and high visibility. Along this path are a number of campsites and other sites of interest.

The Pretty Creek Site: Is a complex of different activity areas which were occupied for different lengths of time, by various groups of people throughout its estimated 8,000 year history. Activity areas include hearths, tipi rings, sweat lodges, vision quest sites, and occupational lithic debris. Archeologically this site has revealed great antiquity, interregional exchange and contact, and inter-site associations with the Bad Pass Trail.

The Ewing-Snell Ranch: Also known as the Sorenson Ranch, it consists of one of the longest occupied sets of historic building in the park. The main house has been restored and updated and currently serves as a research station for visiting research and education groups. Four log buildings and a corral are visible from the main house and the ranch is easily accessible from the park's road.

The Hillsboro site: Bighorn Canyon's first recreational business, the Hillsboro site was vacation "dude ranch" in the early 1900's. Several buildings and remaining foundations still stand at this site and corresponding interpretive signs have been placed to tell the story of the Cedarvale Ranch. The remaining buildings include the post office, chicken coop, Dude cabin/black smith shop, root cellar, milk house, Hulbert cabin, chicken coop, foundation of the St. John home, and a lone chicken coop farther up trail creek from the ranch.

The Lockhart Ranch: The Caroline Lockhart Ranch is an agricultural complex located between the eastern flank of the Pryor Mountain Range and Bighorn River within BICA. Accessed from Highway 37, 27 miles north of Lovell, WY, the ranch headquarters sits at the terminus of Wasson Canyon, approximately 2.5 miles west of the Bighorn River, and 4 miles northwest of Barry's Landing. The ranch once extended over +6000 acres; however, cultural landscape is primarily focused on a 125 acre area that includes the developed ranch complex, neighboring pastures and historic circulation systems.

The period of significance – 1901 to 1950 – encompasses the early years of the site as the Wasson homestead, and cattle ranching enterprise / work retreat for Caroline Lockhart. The layout of the site reflects the organizations of a small homestead from Wasson's era, while later additions contribute to the functioning of the Lockhart's L Slash Heart ranch headquarters. Most of the historic-era landscape features remain intact, and built structures continue to maintain historic character, physical form and setting are largely unchanged from Lockhart's tenure, and provide a representative example of regional architecture and a ranch complex established in the Dry head frontier during the first half of the 20th century.

The M-L Ranch: Located in the southernmost section of the park, it consists of a log bunkhouse, outbuildings, corrals and ranch lane. Stabilization is ongoing and a cell phone tour is available to visitors. The remaining structures include the North Cabin, Bunkhouse, Blacksmith Shop, and South Cabin.

Cultural Landscapes

Cultural landscapes are the result of the long interaction between people and the land, the influence of human beliefs and actions over time upon the natural landscape. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, a visual chronicle of its history. The dynamic nature of modern human life, however, contributes to the continual reshaping of cultural landscapes; making them a good source of information about specific times and places, but at the same time rendering their long-term preservation a challenge.

The landscape must also have integrity of those patterns and features - spatial organization and land forms; topography; vegetation; circulation networks; water features; and structures/buildings, site furnishings or objects necessary to convey its significance (Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes).

Most notable to the cultural landscape of Bighorn Canyon are the historic ranches (listed above in historic structures section) and the Bad Pass Trail, a significant transportation route used by prehistoric and historic groups. The Bad Pass Trail was an important access route connecting the grassland plains to the north and east to the Wyoming Basin and Great Basin country to the south and west. Its deep travois ruts and hundreds of large rock cairns attest to its long use and high visibility. Along this path are a number of campsites and other sites of interest.

Near the Ewing-Snell Ranch is another area of interest known as the Pretty Creek site. It is a series of different activity areas which were occupied for different lengths of time, by various groups of people throughout its estimated 8,000 year history. Activity areas include hearths, tipi rings, sweat lodges, vision quest sites, and occupational lithic debris. Archeologically this site has revealed great antiquity, interregional exchange and contact, and inter-site associations with the Bad Pass Trail.

Ethnographic Resources

Certain important questions about human culture and history can only be answered by gathering information about the cultural content and context of cultural resources. Questions about contemporary peoples or groups, their identity, and heritage have the potential to be addressed through ethnographic resources. As defined by the National Park Service, an ethnographic resource is a site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. Some places of traditional cultural use may be eligible for inclusion in the National Register

of Historic Places as traditional cultural properties (TCPs) because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community (National Register Bulletin, Guidelines for Evaluating and Documenting Traditional Cultural Properties).

The historical connection of the Bad Pass Trail and Pretty Creek archeological site to the Crow Tribe, make them significant ethnographic resources. Other archeological sites such as vision quest sites, medicine wheels, and burial sites in the park are valuable ethnographic resources as well.

Human Environmental Components

Wilderness Values

The purpose of wilderness designation, which may be accomplished only through congressional action, is to preserve and protect wilderness characteristics and values over the long term while providing opportunities for solitude and unconfined recreation. With passage of the *Wilderness Act* of 1964 (16U.S.C. 1131 et seq.), Congress declared that it is national policy to secure for present and future generations the benefits of enduring wilderness resources.

In 1981 a proposal was written recommending wilderness designation of Roadless Area A, a long, narrow area of land, approximately 8,500 acres, extending westward from the Bad Pass trail to the western border of the park. This land borders a BLM study area, which is managed similarly. The proposal prohibits the use of motorized vehicles and requires trail development to be "unpaved and narrow". This proposal was left open to public scoping and comment, while the majority of the land in question was classified as part of "the natural zone" of the General Management Plan (1981). The National Park Service carefully considered the suggestions made in the scoping period, but at present there has been no change in the preliminary wilderness proposal.

In accordance with the building of Yellowtail Dam, and prior to wilderness recommendation, electrical transmission lines were established and roads, to service these lines, were built. Short sections of service road enter the easternmost edges of the proposed wilderness for short intervals.

The Wilderness Act of 1964 states that to be defined as wilderness, an area must fit this criteria:

- (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable
- (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition
- (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value

The Resource Management Division of Bighorn Canyon has identified the following issues with the proposed wilderness area:

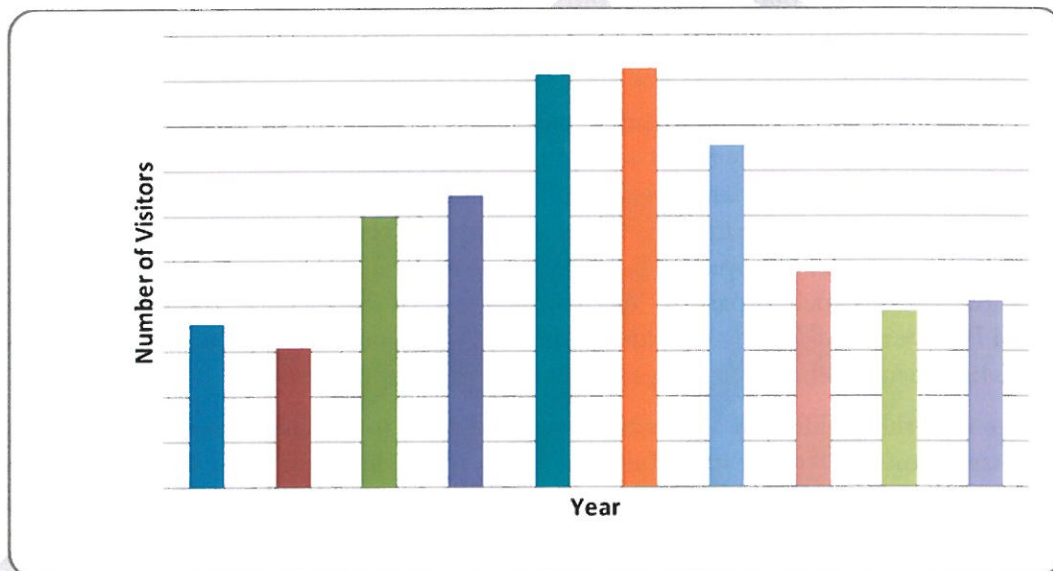
- The long and narrow corridor of the proposed area does not provide opportunities for solitude or primitive and unconfined recreation. Power lines and the main park road are visible from a major portion of the proposed area.
- The original plan designated the borders of the roadless area to include sections of WAPA service roads that are currently proposed to be used for upgrading the power lines. The imprint of man's work is therefore substantially noticeable in portions of the proposed area

and does not appear “to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable”.

Visitor Use and Experience

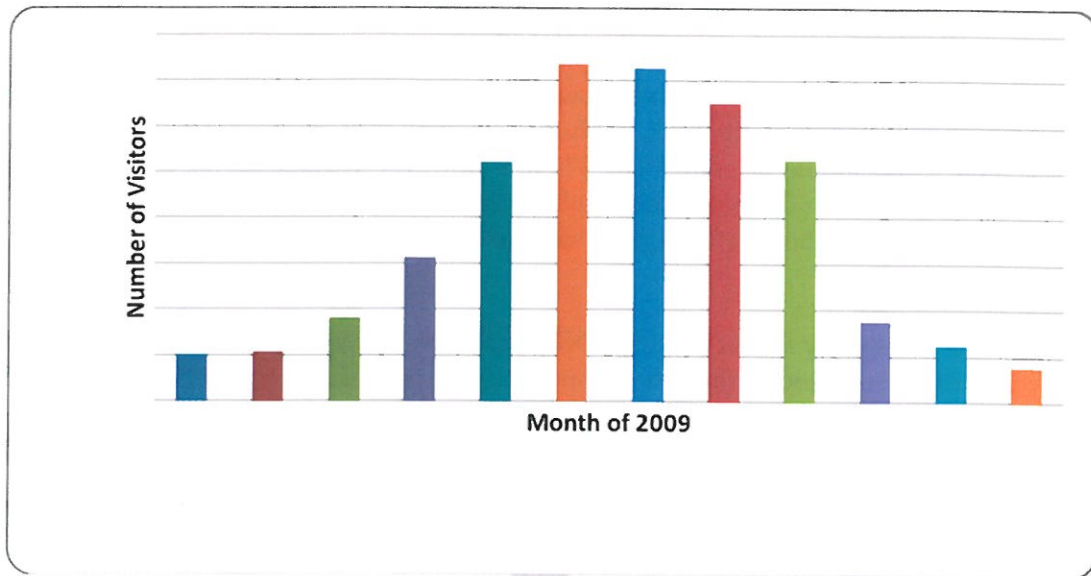
Park visitation peaked in the early 1990's but has seen a decline and stabilization since. Current visitation is similar to numbers reported at the time of the park's creation (see Graph 3.1 below). Visitation tends to fluctuate around lake levels, as a majority of visitors use the park for water-based recreation. Other visitor activities include, auto-touring, hiking, wildlife viewing, horseback riding, camping and bird watching.

Graph 3.1 BICA Yearly Visitation



Typical peak visitation occurs from May to September when fishing and boating season is optimal. Most land-based activities occur in spring and autumn months when temperatures are cooler, as many trails provide little shade.

Graph 3.2 2009 Visitation by Month



A majority of the trails in the park are confined within the South District of the park. Of the 10 designated trails in the South District, 6 of them are classified as easy to moderate, 2 are moderate and 2 are difficult. Most are primitive trails and are restricted to hiking only. Horses are allowed on all trails however some trails are not horse friendly and provide hazards for use. Horses are also allowed off trail throughout the park. Trip planning can be done by purchasing the Hiking Guide, which is sold at-cost at the Visitor Centers in Lovell and Ft. Smith. Without the guide, some trails can be a bit difficult to find and follow.

The North District has 3 described trails, ranging from easy to moderate in difficulty. Two of the trails, the Bighorn Head Gate and Beaver Pond trails are very brief, .10 and .5 miles round trip respectively. The two trails can be connected by following a rough trail and a gravel access road. The 3-mile Access Trail is a short (1.3 mile round trip) trail that is used primarily by fishermen to access the section of the river below the Yellowtail Dam. The hiking guide can be purchased at Park Headquarters, Ft. Smith, but is not as necessary as it is on the south end. All trails are hiker only.

Because of its remote location and limited land-based use, trail use has been difficult to quantify. Most trail use estimates are based on visual inspection done at the time of trail maintenance. Trail crew leaders estimate yearly use qualitatively by analyzing brush growth, soil compaction and maintenance needs. To date trail use has been limited to the point that quantifying methods have not been necessary.

Opportunities for Education and Orientation

Interpretive signs have been established at the historic ranch sites to help visitors understand their significance and have been positively received. Interpretive tours of ranches are popular, but infrequent. Special request tours can be arranged through the visitor centers, but regularly scheduled interpretive hikes are not currently offered. The Bighorn Canyon Hiking Guide provides a small amount of interpretive information but contains mostly directional information. The guide provides the best orientation information about trails and helps visitors stay on trail in areas where the trails are less defined. Rock cairns and carsonite posts are also used to navigate trails.

Visitor access, including disabled access

Most trails have signs posted at their trailheads with approximate distance, but do not imply appropriate use. Several access points have informal parking on the roadside, which has been adequate at current usage, but could become crowded if use increases. At this point, there are no ADA accessible trails anywhere in the park. Although disabled visitors can access the viewpoints, that access is limited and should be addressed. There is however disabled access to fishing areas and arrangements can be made for disabled access to historic ranches. Three virtual tours are available on the official park website, allowing visitors to view and learn about a few trails in the park.

Conflicts and Safety

According to *NPS Management Policies 2006*, the NPS will strive to identify recognizable threats to the safety and health of persons and to the protection of property. In addition, the Title 36 CFR 4.30 regulations, which provide for the use of bicycles on designated routes, require a written determination that the safety of such use on a designated route has been considered (NPS 2002a).

At present, Bighorn Canyon trails are little known and used, and are primarily used by hikers. User conflicts have not been an issue of concern, however, increased trail use and the addition of mountain bike users could bring some issues into consideration.

Poorly defined trails present safety concerns in some areas where wandering away from the path can lead visitors to areas of loose rock and soil or cause visitors to become disoriented. The lack of shade and high temperatures can quickly dehydrate visitors on summer days, creating a hazard for lost hikers who may become overexerted or dehydrated. Undefined trails can also make it difficult to see hazards like rattlesnakes or animal burrows. Off-trail hiking near the canyon edge presents a safety concern as visitors cannot be directed away from unstable cliff edges and wildlife breeding areas where animals may become defensive.

Park Operations

Park Organization

Bighorn Canyon is managed in two coordinating districts. The North District is managed out of Ft. Smith, Montana and serves as the park headquarters which is overseen by the superintendent. The South District visitor center and offices are in Lovell, Wyoming. The offices for both districts are located outside of park boundaries. Management is organized into the following divisions: Administrative, Maintenance, Resource Management, Interpretation and Protection.

The Administrative division is responsible for the park's budget and financial accounting, property management, payroll, personnel management, procurement, contracting, mail services, administrative filing, and management of the park-wide computer system. This division is also responsible for employee housing management.

The Maintenance division is responsible for the operation and maintenance of all park facilities and equipment, including buildings and maintained grounds; utility systems, such as power, water, sewer, and solid waste management; employee housing; roads; parking areas; picnic areas; and telephones.

The Resource Management division includes the management of all natural resources within the park to ensure the preservation of fundamental physical and biological processes as well as individual species, features, and plant communities. This protection includes weed monitoring and removal, fire management, research and resource planning. This division also manages cultural resources including the maintenance and restoration of the historic ranches, and the associated

research and stewardship of those resources. This division administers the park's Geographic Information System (GIS) database and all cooperative research and research permits within the park.

The Interpretive division is responsible for visitor orientation, education, events, and sales for the Western National Parks Association. The interpretive staff members work primarily in the offices, contact stations and visitor centers and schools. Contact with visitors inside the park includes guided ranch tours. Evening programs are given twice weekly, during summer months, at the amphitheater at the Horseshoe Bend Campground, and occasionally at the Afterbay amphitheater. Interpretation within the park is done mainly with wayside signs, and the park literature developed by the interpretation staff. This branch has also been responsible for trail orientation and has worked with the maintenance department and YCC to establish and maintain trails.

The Law Enforcement division enforces laws and regulations intended to safeguard visitors and park resources. In addition to law enforcement, this division is responsible for search-and-rescue operations, emergency medical services and assisting with fire management. Rangers make routine park visitor contacts to provide orientation and educational information, to check for safety and resource violations, and to respond to or direct visitor inquiries to appropriate park staff. At Bighorn Canyon duties also include boater assistance and safety inspection, game and fish regulation, fire and safety equipment, and fee collection.

Park Facilities

Park facilities are primarily designed to provide safe, enjoyable, and educational access and support to park visitors. They also provide administrative space for park staff and living space for visiting educational and research groups. Park facilities are typically located in areas that can sustain visitation while protecting park resources and natural systems.

Trails and Trailheads

There are 13 officially designated and maintained trails within the park totaling more than 27 miles of trail. Maintenance is done as a collateral duty of the interpretive staff with the seasonal help of intern groups such as the YCC. Trails are used primarily by hikers and occasional horseback riders.

Roads

In the South District one main road leads into the park, with several turn-offs, leading to campgrounds, boat launches, viewpoints and parking areas. Pavement from the south entrance to The Barry's Landing turn-off is approximately 13 miles. The pavement ends just past Barry's Landing and continues, unpaved to the Lockhart Ranch. Park property ends approximately 2 miles past the Lockhart Ranch, however, the unpaved road continues further to private property and the Crow Reservation.

The Yellowtail Habitat is crisscrossed with unpaved roads and can be difficult to navigate. Some roads have been forged by 4WD vehicles trying to avoid muddy areas. The road system here can be disorienting and is not very well signed.

The North district has one main road leading from Ft. Smith to the Yellowtail Dam, which is closed to the public, and one 10 mile road that leads to the Ok-A-Beh marina and swimming area. There is also a paved road leading across the Afterbay Dam and follows the river for 1.5 mile.

Visitor Centers

The South District hosts the park's main visitor center, the Cal S. Taggart Bighorn Visitor Center in Lovell, Wyoming, on US Highway 14A, approximately 12 miles from the south park entrance. The main visitor center includes a theater, with short films about the park and surrounding area, interpretive displays, a small bookstore, bathrooms and an information desk. It is staffed by interpretive staff and volunteers year round, and also serves as staff offices. In addition, the Crooked Creek Contact Station is located at the south entrance, which collects fees and provides interpretive material and maps. The contact station is staffed, when volunteers are available, during the summer season. An automated fee collection station is located just across the main road from the contact station.

In the North District, the Yellowtail Dam Visitor Center serves visitors at the Yellowtail Dam which is open daily through the summer season and staffed by interpretive rangers and volunteers. The Afterbay Contact Station, located below the dam near the Bighorn River, is open intermittently during the winter/spring and open daily in the summertime.

Parking

Trailhead parking in Bighorn Canyon consists of a few paved areas, some grated, graveled areas, and a few informal roadside areas. Trail use has not been so high in the park as to create parking conflicts however increased use may eventually lead to conflicts that would need to be addressed.

Signs

Trails are signed at the trailheads and list approximate mileage, however additional signs to help visitors find trailheads would be beneficial. Trailhead signs do not currently list appropriate user groups or restrictions such as "No Motorized Use".

Camping

Bighorn canyon has five camping areas with more than 100 available sites, most of which are free. There are two campgrounds in the North District, three in the South and none in the Yellowtail Habitat, though dispersed camping is allowed.

The South District has three options to choose from. Horseshoe Bend, the only campground that provides pay, utility sites, is open year round. The primitive campground at Trail Creek is free and in close proximity to Barry's Landing. Backcountry camping is available, at Medicine Creek, a backcountry area, that can be reached either by hiking in on the Barry's Island Trail or by boat. Backcountry camping is also permitted at least ¼ mile from any road.

In the North District there is a campground near the Afterbay Dam, and a campground on the north side of the lake which are open year round. The other campground at Black Canyon is also open year round and is boat-in only.