National Park Service
U.S. Department of the Interior

State of the Park Report

Big Hole National Battlefield

Montana

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Disclaimer. This State of the Park report summarizes the current condition of park resources, visitor experience, and park infrastructure as assessed by a combination of available factual information and the expert opinion and professional judgment of park staff and subject matter experts. The internet version of this report provides the associated workshop summary report and additional details and sources of information about the findings summarized in the report, including references, accounts on the origin and quality of the data, and the methods and analytic approaches used in data collection and assessments of condition. This report provides evaluations of status and trends based on interpretation by NPS scientists and managers of both quantitative and non-quantitative assessments and observations. Future condition ratings may differ from findings in this report as new data and knowledge become available. The park superintendent approved the publication of this report.

Executive Summary

The mission of the National Park Service is to preserve unimpaired the natural and cultural resources and values of national parks for the enjoyment, education, and inspiration of this and future generations. NPS Management Policies (2006) state that “The Service will also strive to ensure that park resources and values are passed on to future generations in a condition that is as good as, or better than, the conditions that exist today.” As part of the stewardship of national parks for the American people, the NPS has begun to develop State of the Park reports to assess the overall status and trends of each park’s resources. The NPS will use this information to improve park priority setting and to synthesize and communicate complex park condition information to the public in a clear and simple way.

The purpose of this State of the Park report is to:

- Provide to visitors and the American public a snapshot of the status and trend in the condition of a park’s priority resources and values;
- Summarize and communicate complex scientific, scholarly, and park operations factual information and expert opinion using non-technical language and a visual format;
- Highlight park stewardship activities and accomplishments to maintain or improve the State of the Park;
- Identify key issues and challenges facing the park to help inform park management planning.

Big Hole National Battlefield (BIHO) was the site of a battle on August 9–10, 1877 between the U.S. Army with Montana citizen volunteers and the Nez Perce people and their allies. The battle was a key event within a five-month conflict in which the army, intent on moving the Nez Perce to the Lapwai Reservation in Idaho, pursued roughly 800 men, women, and children across 1,170 miles from the Wallowa Valley in Oregon to the Bear Paw Mountains, just 40 miles from the Canadian border in northern Montana. Along the way, the two sides fought a series of confrontations during which scores of people were killed, including soldiers, citizen volunteers, and Nez Perce men, women, and children. Exhausted, cold, and hungry, the remaining Nez Perce surrendered at the Battle of Bear Paw on October 5, 1877.

The Big Hole National Battlefield site was set aside from development as a five-acre national monument through a June 23, 1910 executive order signed by President Taft. The site was originally administered by the War Department and later the U.S. Forest Service, and jurisdiction was transferred to the NPS in July of 1933 by President Franklin D. Roosevelt. Passage of Public Law 88-24 on May 17, 1963 allowed for expansion of the now 200-acre site to include roughly 455 additional acres, and conversion of the site from a national monument to a national battlefield. Acquisition of these additional lands was not fully completed by the NPS until 1972, at which time the Big Hole National Battlefield totaled 655 acres.

In 1992, Big Hole National Battlefield became an administrative unit of Nez Perce National Historical Park (NEPE), which was established in 1965 to facilitate protection and provide interpretation of sites in the “Nez Perce Country” that have exceptional value in commemorating the history of the nation. NEPE is non-traditional because it is not a contiguous tract of land but rather a conglomerate of small sites. These sites depict the historic role of the Nez Perce people in the westward expansion of the United States and include, but are not limited to, historic buildings, missions, battlefields, cemeteries, archeological sites, geological formations and trails. The purposes of all 38 units of NEPE, including Big Hole National Battlefield, are to:

- Facilitate protection and offer interpretation of Nez Perce sites in Idaho, Oregon, Washington, Montana, and Wyoming that have exceptional value in commemorating the history of the United States.
- Protect and preserve tangible resources that document the history of the Nez Perce people and the significant role of the Nez Perce in North American history.
- Interpret the culture and history of the Nez Perce people and promote documentation to enhance that interpretation.

Since the battle, Big Hole National Battlefield has been recognized and honored both as a historic site and as a memorial for those who lost their lives in the battle. The site was entered on the National Register of Historic Places when the register was first created in 1966. The National Register nomination establishes national significance of the site for its association with events beginning in 1877 that have bearing on our national history.

The people and culture of this park are inextricably tied to the natural resources in the area; it is impossible to separate them. The location and condition of natural resources such as the meandering river and dense willow riparian vegetation, the floodplain meadow where the Nez Perce encampment was located, and the open hillslopes overlooking the river, were fundamental to the way that the 1877 battle itself played out. The National Battlefield today is surrounded by ranching operations and the Beaverhead National Forest, but retains much of the character of 1877 when Colonel John Gibbon's forces attacked the Nez Perce at their camp next to the North Fork of the Big Hole River. Today, the natural sights, sounds, and scents of the Battlefield landscape frame the tragic history of the site, providing visitors a profound “sense of place.” Visitor experience is therefore fundamentally dependent on the condition of Battlefield natural resources as well as the cultural resources and park infrastructure, all of which are summarized in this report.

The summary table, below, and the supporting information that follows, provide an overall assessment of the condition of priority resources and values at Big Hole National Battlefield based on scientific and scholarly studies and expert opinion. The internet version of this report, available at http://www.nps.gov/stateoftheparks/biho/**,** provides additional detail and sources of information about the resources summarized in this report, including references, accounts on the origin and quality of the data, and the methods and analytical approaches used in the assessments.

The Status and Trend symbols used in the summary table below and throughout this report are summarized in the following key. The background color represents the current condition status, the direction of the arrow summarizes the trend in condition, and the thickness of the outside line represents the degree of confidence in the assessment.

Condition Status		Trend in Condition		Confidence in Assessment	
	Warrants Significant Concern		**Condition is Improving**		**High**
	Warrants Moderate Concern		**Condition is Unchanging**		**Medium**
	Resource is in Good Condition		**Condition is Deteriorating**		**Low**

State of the Park Summary Table

Priority Resource or Value	Condition Status/Trend	Rationale
Natural Resources		web
Climate		Precipitation and temperature are key drivers of natural resources conditions at BIHO, which is characterized by long, cold winters and cool summers. Above-average spring rainfall and moderate temperatures, particularly in 2010, have provided favorable growing conditions for focal species such as Lemhi penstemon and camas lily. No trends away from long-term averages are discernible.
Air Quality		For 2005–2009, estimated values for ozone and visibility in Big Hole NB warrant moderate concern based on NPS Air Resource Division benchmarks. Air quality is in good condition for estimated sulfur and nitrogen wet deposition levels for 2005–2009.
Water Quality		The Upper Columbia Basin I&M Network (UCBN) recently began to monitor water quality at BIHO. Water temperature and pH were within State standards, but dissolved oxygen levels fell below the regulatory threshold (8.0 mg/L) on 97 of the 106 monitoring days (92% exceedance). A Hilsenhoff Biotic Index of 4.23 for aquatic macroinvertebrates indicates that water quality is good.
River Channel		The UCBN monitoring program began monitoring of river channel characteristics and the riparian plant community in the North Fork Big Hole River in 2012. A natural resource condition assessment conducted in 2009 provided evidence that the channel and riparian vegetation is in good condition.
Vegetation Communities		The willow-dominated riparian zone and adjacent floodplain meadow, and the open steppe hillslopes and pine forest overlooking the Battlefield, are key cultural landscape plant communities. Overall condition of these three communities is good, but worrisome trends in invasive weeds have been reported. Lodgepole pine encroachment into the open hillslopes is an ongoing cultural landscape issue requiring management intervention.

Priority Resource or Value	Condition Status/Trend	Rationale
Invasive and Nuisance Species		Spotted knapweed abundance and distribution is increasing in the open hillslopes, as is the number of infested acres of Canada thistle in the floodplain meadow. These infestations present a serious threat to the largely intact native plant communities that contribute much to the Battlefield's sense of place. The mountain pine beetle outbreak in the lodgepole pine forest has resulted in tree mortality that is a serious concern to park managers. Scientists predict that 75% to 90% of the pine trees in the park may be killed by this outbreak in coming years, and the park has begun removing beetle-killed pine trees in the Siege Area of the Battlefield.
Species of Management Concern		BIHO is globally significant for having the largest reported population of Lemhi penstemon, a rare endemic flowering plant dependent on the open steppe hillslopes. The size of the penstemon population appears to be stable or perhaps slightly increasing, but the reproductive vigor of the population may be in decline. Camas lily, a key food source for the Nez Perce that was harvested in the floodplain meadow prior to the 1877 battle, is increasing in abundance at an annual rate of ≈ 6%. The number of flowering camas plants, a measure of reproductive vigor and a contributing resource to visitor experience, is stable.
Cultural Resources		web
Tribal Relations		The park is working hard to maintain and strengthen relationships with the Nez Perce People. The park routinely consults with the Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, and the Colville Confederated Tribes on matters involving park operations, management, and planning. These consultations occur on multiple levels and the results of these efforts greatly enhance and shape park management direction.
Cultural Anthropology		The park is finishing a two-year oral history project with representatives of the Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, and Colville Confederated Tribes. The purpose of this project is to work in partnership with Nez Perce descendants who live on three different reservations in Idaho, Oregon, and Washington to record family histories, songs, dance, and other cultural manifestations that are derived from Nez Perce participation in the battle of the Big Hole during the Nez Perce conflict of 1877.
Archeological Resources		Surface archeological surveys have been conducted for the entire park, and five recorded archeological sites occur within the NPS boundaries of Big Hole National Battlefield. All five sites are currently in good condition. Site condition assessments are scheduled on a rotating basis with a five-year return interval. All sites are currently stable with the potential for disturbance and threats to site integrity very small.
Cultural Landscapes		A detailed cultural landscape inventory for Big Hole National Battlefield was completed in 2008. The landscape is currently in good condition.
History		The park has accumulated a robust historical research collection pertaining to the Big Hole battle. The NPS has also completed many of the baseline historic documents needed to properly manage and understand the battlefield site.
Museum Collections		Except for those items currently on exhibit, all BIHO museum objects and archive collections are stored at the Nez Perce NHP museum storage facility near Lewiston, Idaho that is maintained by a professional museum staff. The NEPE facility meets all federal standards as established through the NPS Museum Handbook.

Priority Resource or Value	Condition Status/Trend	Rationale
Visitor Experience		web
Number of Visitors		Average number of visitors entering the visitor center was 25,749 per year for 1999–2011. For the past five years (2007–2011), average annual visitation was down 14%, to 22,122. Fiscal years 2010 and 2011 saw dramatically decreased visitation, likely due to visitor center renovations.
Visitor Satisfaction		Based on the standard visitor satisfaction survey conducted each year, the percent of visitors satisfied was 99%, and 100% for 2008 and 2009, then decreased to 80% in 2010, and increased to 94% in 2011 and back to 100% in 2012. The visitor center renovation that began in 2010 contributed to visitor dissatisfaction in that year, and the index has since increased now that renovations are complete.
Sense of Place		Big Hole National Battlefield is located in a beautiful expanse of green, fertile land surrounded by often snow covered mountains. Through it flows the North Fork of the Big Hole River. Wildlife abounds and the fishing can be excellent. But the beauty and peacefulness of the land conflicts with the events that occurred here in 1877. Standing in the encampment area or looking out from the howitzer site, one can feel the sorrow that still inhabits the land. It is the combination of the beauty and the sadness that defines this place. Battlefield natural resources are generally in excellent condition, a major contributing factor to the sense of place and visitor experience.
Educational and Outreach Programs		The number of school groups coming to the park has increased, partially due to the creation of a new educational opportunity entitled “Coyote Camp.” The park has increased the number of demonstrations and tours offered to the public, but attendance at programs was down by 50% in 2011, possibly because of the visitor center renovations.
Park Infrastructure		web
Facility Condition Index (Overall FCI)		The overall Facility Condition Index for 45 assets for FY12 is 0.039, which is Good based on industry and NPS standards.
Energy Consumption		Energy usage (BTUs per gross square footage of buildings) at the park in 2012 was 7.3% lower than the average for the previous 4 years.
Water Consumption		Water consumption at the park in 2012 was 16.3% lower than the 4-year average for 2008-2011.
Park Carbon Footprint		The park has undertaken several climate change mitigation measures to reduce its carbon footprint. Emissions from park operations during the baseline year were roughly equivalent to that for 11 households.

Summary of Stewardship Activities and Key Accomplishments to Maintain or Improve Resource Condition:

The list below provides examples of stewardship activities and accomplishments by park staff and partners to maintain or improve the condition of priority park resources and values for this and future generations:

Natural Resources

- Partnership with U.S. Forest Service and Beaverhead County to manage weeds and invasive plants
- Working with Upper Columbia Basin Network Inventory & Monitoring team to incorporate monitoring results into vegetation management strategies
- Pine beetle tree removal from siege area and howitzer trail and pheromone placement on Douglas fir to combat beetle kill

Cultural Resources

- Oral history project
- Archeological site condition assessments
- Museum management plan
- Historic Resource Study converted into book

Visitor Experience

- New exhibits
- Coyote camp
- Daily ranger-led tours out onto the battlefield

Park Infrastructure

- Visitor center rehabilitation – New cold roof system and atrium
- Installed wheelchair-accessible ramps and vault toilets in lower parking area

Key Issues and Challenges for Consideration in Management Planning

Big Hole National Battlefield has accomplished much during the past few years, but underpinning all is the continuing effort to build and improve relationships with tribal partners. This is nowhere more apparent than in the recently-concluded planning process that led to the creation of the new exhibits at the park. The Nez Perce People were heavily involved in all aspects from initial discussions on the need to replace and update exhibits, through design, fabrication and installation. In addition, the park has also strengthened partnerships with Nez Perce National Historical Park and the local community. This has allowed the park to accomplish a number of important resource, visitor service, and park infrastructure projects essential to the long term preservation and interpretation of the battlefield.

The park has moved to the forefront in creating a unique visitor experience. The story of Big Hole is one of great tragedy, a clash of cultures and the resiliency of the human sprint. The park staff, working with tribal partners, is able to tell the story of a people and what happened to them here, and how these people are still a thriving community. With new ideas and new products, the park's interpretive staff is reaching out to both new audiences and those that have been here many times before. The strong partnership with the Upper Columbia Basin Network inventory and monitoring team has enabled the park to better integrate cultural and natural resource management. Park interpretive staff is also better equipped to incorporate natural resource information into Battlefield interpretation.

As the park moved into the new century, almost all of the park facilities were old and simply worn out. Over the last few years, with financial assistance from the American Recovery and Reinvestment Act of 2009 and the NPS Repair and Rehabilitation program, the park has greatly enhanced its infrastructure. These improvements not only affect the visitor's experience in the park but have saved park resources and have contributed towards reducing the carbon footprint of the park. This goal of updating the park's infrastructure continues into the future with new projects as funding becomes available.

Looking into the future, the park will continue to build its relationships with the tribes, the community and Nez Perce NHP. It will use those relationships to maintain and expand upon the solid foundation that has been built, all of which make Big Hole National Battlefield exemplary within the National Park System.

Chapter 1 - Introduction

This State of the Park report for Big Hole National Battlefield is the first to be produced by the National Park Service. Its purpose is to assess the overall condition of the park's priority resources and values, communicate complex park condition information to visitors and the American public in a clear and simple way, and to inform visitors and other stakeholders about stewardship actions being taken by park staff to maintain or improve the condition of priority park resources for future generations. The State of the Park report uses a standardized approach to focus attention on the priority resources and values of the park based on the park's purpose and significance, as described in the park's Foundation Document or General Management Plan. The report:

- Provides to visitors and the American public a snapshot of the status and trend in the condition of a park's priority resources and values.
- Summarizes and communicates complex scientific, scholarly, and park operations factual information and expert opinion using non-technical language and a visual format.
- Highlights park stewardship activities and accomplishments to maintain or improve the state of the park.
- Identifies key issues and challenges facing the park to inform park management planning.

The process of identifying priority park resources by park staff and partners, tracking their condition, organizing and synthesizing data and information, and communicating the results will be closely coordinated with the park planning process, including natural and cultural resource condition assessments and Resource Stewardship Strategy development. The term "priority resources" is used to identify the fundamental and other important resources and values for the park, based on a park's purpose and significance within the National Park System, as documented in the park's foundation document and other planning documents. This report summarizes and communicates the overall condition of priority park resources and values based on the available scientific and scholarly information and expert opinion, irrespective of the ability of the park superintendent or the National Park Service to influence it.

Big Hole National Battlefield was the site of a battle on August 9–10, 1877 between the U.S. military and the Nez Perce people and their allies. The battle was a key event within a five-month conflict in which the army, intent on moving the Nez Perce to the Lapwai Reservation in Idaho, pursued roughly 800 men, women, and children across 1,170 miles from the Wallowa Valley in Oregon to the Bear Paw Mountains, just 40 miles from the Canadian border in northern Montana. Along the way, the two sides fought a series of confrontations during which scores of people were killed, including soldiers, citizen volunteers, and Nez Perce men, women, and children. Exhausted, cold, and hungry, the remaining Nez Perce surrendered at the Battle of Bear Paw on October 5, 1877.

The Big Hole National Battlefield site was set aside from development as a five-acre national monument through a June 23, 1910 executive order signed by President Taft. The site was originally administered by the War Department and later the U.S. Forest Service. Jurisdiction was transferred to the NPS in July of 1933 by President Franklin D. Roosevelt. Passage of **Public Law 88-24** on May 17, 1963 allowed for expansion of the now 200-acre site to include roughly 455 additional acres, and conversion of the site from a national monument to a national battlefield (Catton and Huber 1999). Acquisition of these additional lands was not fully completed by the NPS until 1972, at which time the Big Hole National Battlefield totaled 655 acres.

In 1992, Big Hole National Battlefield became an administrative unit of Nez Perce National Historical Park (NEPE), which was established in 1965 to facilitate protection and provide interpretation of sites in the "Nez Perce Country" that have exceptional value in commemorating the history of the nation (NPS 1997). NEPE is non-traditional because it is not a contiguous tract of land but rather a conglomerate of small sites. These sites depict the historic role of the Nez Perce people in the westward expansion of the United States and include, but are not limited to, historic buildings, missions, battlefields, cemeteries, archeological sites, geological formations and trails. The purposes of all 38 units of NEPE, including Big Hole National Battlefield, are to:

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1877 battle itself played out. The National Battlefield today is surrounded by ranching operations and the Beaverhead National Forest, but retains much of the character of 1877 when Colonel John Gibbon's forces attacked the Nez Perce at their camp next to the North Fork of the Big Hole River. Today, the natural sights, sounds, and scents of the Battlefield landscape frame the tragic history of the site, providing visitors a profound “sense of place.” Visitor experience is therefore fundamentally dependent on the condition of Battlefield natural resources as well as the cultural resources and park infrastructure, all of which are summarized in this report.

Figure 1. Map of Big Hole National Battlefield.

Figure 2. Location of Big Hole National Battlefield in southwestern Montana.

Chapter 2 - State of the Park

The State of the Park is summarized below for four categories--Natural Resources, Cultural Resources, Visitor Experience, and Park Infrastructure–based on a synthesis of the park's monitoring, evaluation, management, and information programs, and expert opinion. Brief resource summaries are provided below for a selection of the priority resources and values of the park. Clicking on the web ▸ symbol found in the tables and resource briefs below will take you to the internet site that contains content associated with specific topics in the report.

The scientific and scholarly reports, publications, datasets, methodologies, and other information that were used as the basis for the assessments of resource condition are referenced and linked throughout the report and through the internet version of this report that is linked to the NPS IRMA data system (Integrated Resource Management Applications). The internet version of each report, and the associated workshop summary report available from the internet site, provide additional detail and sources of information about the findings summarized in the report, including references, accounts on the origin and quality of the data, and the methods and analytical approaches used in data collection and the assessments of condition. Resource condition assessments reported in this State of the Park report involve expert opinion and the professional judgment of park staff and subject matter experts involved in developing the report. This expert opinion and professional judgment derive from the in-depth knowledge and expertise of park and regional staff gained from their being involved in the day-to-day practice of all aspects of park stewardship and from the professional experience of the participating subject matter experts. This expert opinion and professional judgment utilized available factual information for the analyses and conclusions presented in this report. This State of the Park report was developed in a park-convened workshop.

2.1. Natural Resources

Climate

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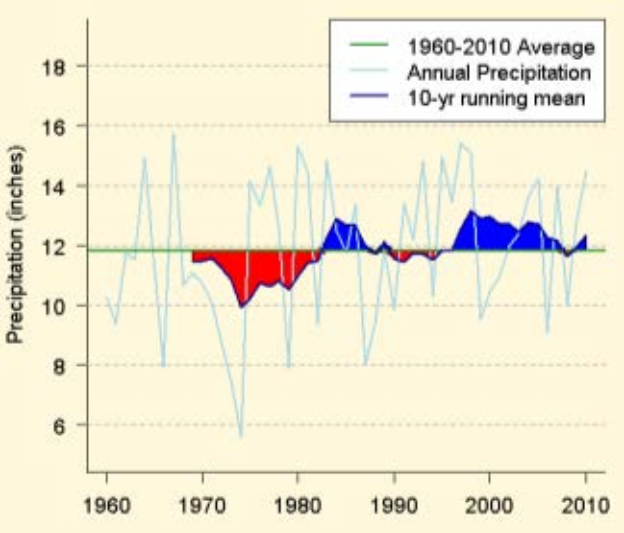
Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Precipitation	Average annual precipitation (inches) for last 10 years	↑	Recent above-average spring rainfall has provided favorable growing conditions for focal species such as camas and Lemhi penstemon, and unfortunately also for invasive weeds. June rainfall in 2010 was 194% of the 30-year average (Jean et al. 2011). No trends away from long-term averages are discernible (Western Regional Climate Center, 2011).
Temperature	Mean annual temperature	⇔	Moderate average temperatures have contributed to favorable growing conditions. Both the onset of spring and fall, based on temperature, were delayed by several weeks in 2010 (Jean et al. 2011). No trends away from long-term averages are discernible (Western Regional Climate Center, 2011).
Drought Index	Normalized Palmer Drought Severity Index	⇔	The drought index has been below average in recent years, although the index for 2010 was 0.6, slightly above the long-term average of 0.36 (NOAA U.S. Climate Division Data).

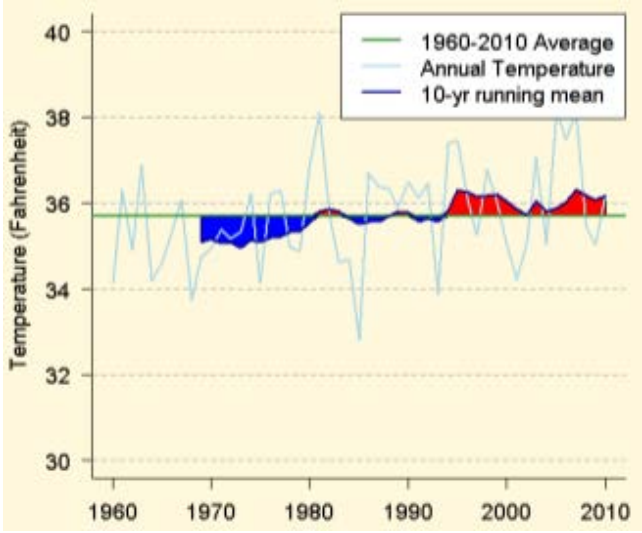
Based on recordings from the Wisdom weather station located 10 miles east and 250 feet below the park, precipitation in the upper Big Hole Valley has been above the 50-year average in recent years. Winter precipitation and snowpack in 2010 was slightly below average, but this was quickly eclipsed by a very wet spring and summer. Rainfall in June was twice the amount of the recent 10-year average, and the wettest on record since 1993 (Jean et al. 2011). Above-average rainfall continued throughout the rest of 2010 (Western Regional Climate Center 2011).

Monthly average temperatures for 2010 were at or slightly below the 50-year average. 10-year monthly temperature averages ending in 2010 were approximately the same as long-term monthly averages. However, slight decreases in regional winter precipitation, and increases in summer precipitation and in average temperatures for western Montana have been noted over the last several decades. A

slight increasing trend in mean annual temperature and in the 10-year running mean in annual temperature appeared in 1994 and has continued through 2010. The Palmer Drought Severity Index provides additional evidence of the recent favorable growing conditions that have occurred in the upper Big Hole Valley.



Upper Big Hole Valley (Wisdom, Montana) precipitation, 1960–2010 (Western Regional Climate Center).



Upper Big Hole Valley (Wisdom, Montana) mean annual temperature, 1960–2010. (Western Regional Climate Center).

Air Quality

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Ozone	Annual 4th-Highest 8-Hour Concentration		The estimated ozone level for 2005–2009 at Big Hole NB was 65.9 parts per billion (ppb), which warrants moderate concern based on NPS Air Resource Division benchmarks. For 2000–2009, ozone levels at the monitoring site representing the Big Hole NB remained unchanged (no statistically significant trend) (NPS ARD 2013). List of ozone-sensitive plant species.
Deposition	Sulfur Wet Deposition		For 2005–2009, estimated sulfur wet deposition was 0.5 kilograms per hectare per year (kg/ha/yr), therefore, the resource in in good condition based on NPS ARD benchmarks. The park may be moderately sensitive to acidification effects (Sullivan et al. 2011a), including changes in water chemistry that impact aquatic vegetation, invertebrate communities, amphibians, and fish. No trend information is available because there are not sufficient on-site or nearby wet deposition monitor data (NPS ARD 2013).
	Nitrogen Wet Deposition		For 2005–2009, estimated nitrogen wet deposition was 0.9 kilograms per hectare per year (kg/ha/yr), therefore, the resource in in good condition based on NPS ARD benchmarks. The park may be highly sensitive to nitrogen-enrichment effects (Sullivan et al. 2011b), which can affect biodiversity of certain vegetation communities, including wetland plant communities. However, levels of nitrogen wet deposition at Big Hole NB are relatively low. No trend information is available because there are not sufficient on-site or nearby wet deposition monitor data (NPS ARD 2013).
Visibility	Haze Index		For 2005–2009, estimated average visibility in Big Hole NB was 3.0 deciviews (dv) above natural conditions, which warrants moderate concern based on NPS ARD benchmarks. No trend information is available because there are not sufficient on-site or nearby visibility monitor data (NPS ARD 2013).

Water Quality
(North Fork of the Big Hole River)

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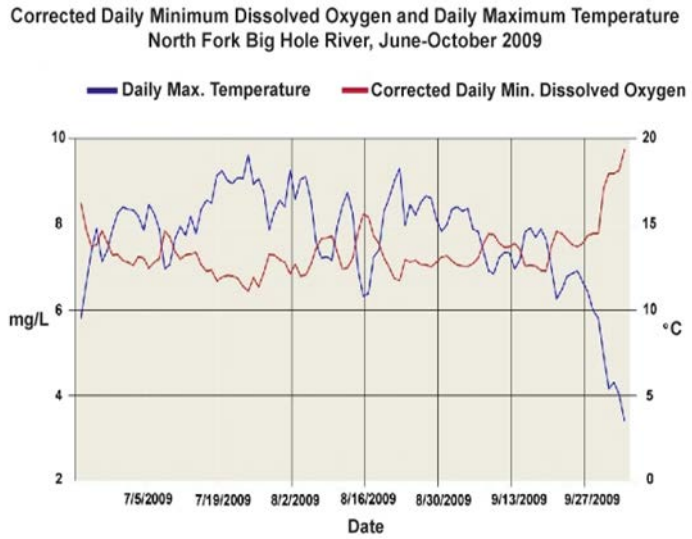
Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Water Chemistry	Maximum daily maximum temperature (MDMT)		Maximum daily maximum temperature is calculated as 18.84 °C. In 0.37% of the hourly observations the MDMT exceeded the lethal temperature threshold (18 °C) for fluvial Arctic Grayling (*Thymallus arcticus*; Starkey 2010).
	Dissolved oxygen (mean daily minimum)		Dissolved oxygen mean daily minimum is calculated as 7.37 mg/L. In 93% of the hourly observations dissolved oxygen was below the regulatory threshold (8.0 mg/L) (Starkey 2010).
	pH (mean daily min and max)		The mean daily minimum pH (7.1) and mean daily maximum pH (7.4) were within the regulatory threshold of 6.5 – 8.5 pH (Starkey 2010).
	Turbidity (mean daily maximum)		Confidence in the mean daily maximum turbidity (18.8 NTU) calculation is low due to sediment (primarily ash) settling out of the water column onto the sensors during the second and third deployment periods in 2009. Although conclusions are limited based on the quality of data, it is likely that the river experiences occasional pulses of turbidity/sediment due to fire activity in the watershed (Starkey 2010).
Aquatic Macroinvertebrates	Hilsenhoff Biotic Index [HBI] (mean)		The mean HBI is 4.23 indicating that water quality is good to very good (Starkey 2010).

In 2009, all but one of the core parameters (Temperature, pH, Specific Conductance, Dissolved Oxygen, and Turbidity) monitored by the UCBN fell within state standards (Starkey 2010). Dissolved oxygen levels fell below the regulatory threshold (8.0 mg/L) on 97 of the 106 monitoring days (92% exceedance). The North Fork of the Big Hole River is not on the 303(d) list for dissolved oxygen impairment (Montana Department of Environmental Quality – Clean Water Act Information Center), but monitoring suggests that the river was below the total maximum daily load (TMDL) established by Montana Department of Environmental Quality (DEQ) for most of the sample period. Dissolved oxygen indicates the amount of oxygen available for fish and aquatic macroinvertebrates is low. Low dissolved oxygen levels can have a negative influence on the aquatic macroinvertebrate and vertebrate assemblages and community composition. The amount of dissolved oxygen decreases in response to increasing water temperature and stream eutrophication, possibly an impact from water withdrawal and upstream livestock operations.



Water temperatures did not technically exceed the state threshold; although, maximum temperatures in late July were close to the upper lethal temperatures for cutthroat trout (≈ 18.0 °C), and exceeded optimum growth temperatures 15 °C on a regular basis (Bear et al. 2007). Projected climate change could exacerbate the problem by decreasing summer stream flow and increasing peak temperatures.

River Channel

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
River Channel Characteristics	Percent pool tail fines <2 mm (mean) ; Residual pool depth (m) (mean); Sinuosity (ratio) (mean); Percent stable banks (%) (mean)		The river channel of the North Fork of the Big Hole River is a priority natural resource and integral to the cultural landscape and visitor experience. A recent Natural Resource Condition Assessment (Corrao and Erixson 2011) concluded that river channel characteristics were in good to excellent condition. In summer 2012, the UCBN monitoring program will implement river channel characteristics monitoring in the North Fork of the Big Hole River.

Vegetation Communities

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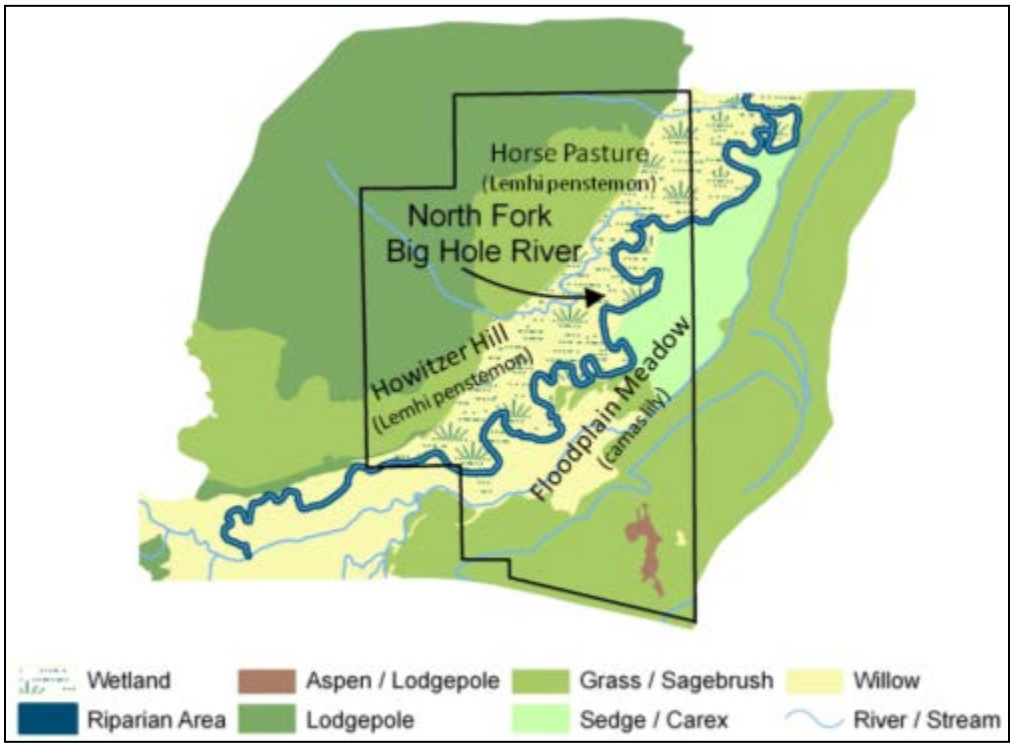
Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Wetland and Riparian Communities	Distribution and abundance of invasive weeds		The floodplain meadow south of the river is showing increasing vulnerability to weed invasion. Recent mapping efforts have identified numerous patches of Canada thistle and common dandelion. The trail to the encampment is a vector for visitors to inadvertently introduce weedy plant species into the park.
	Camas lily abundance		The camas population in the floodplain meadow south of the river is in good condition. Monitoring results show increasing trend in camas density and stable trend in flowering camas plants.
	Willow community condition		A recent Natural Resource Condition Assessment (Corrao and Erixson 2011) concluded that this community was in excellent condition, with high diversity in species composition and in willow age classes.
Forest Community	Percent beetle-induced lodgepole pine mortality		The mountain pine beetle outbreak in the lodgepole pine forest overlooking the Battlefield and in the Siege Area is increasing rapidly and has become a serious threat to the integrity of the Battlefield scene. Recent management actions have included removal of infested trees out of the siege area.
Open Hillslope Steppe Communities	Distribution and abundance of invasive weeds		Although the overall condition of the hillslope steppe communities appears to be in excellent condition and has been noted as a remarkable example of this kind of habitat (Dr. Steve Shelly, US Forest Service, personal communication), the spotted knapweed infestation is increasing rapidly and poses a serious threat on the open hillslopes of the Battlefield (Stucki et al. 2013).
	Distribution and abundance of Lemhi penstemon		A recent inventory demonstrated that the Battlefield is home to the largest reported population of Lemhi penstemon anywhere within its narrow range (Stucki et al. 2013).

	Lodgepole pine encroachment		Although lodgepole pine forest is crucial to the look and feel of the Battlefield landscape, and is in fact threatened by mountain pine beetle infestations, there is also an ongoing management concern with the encroachment of lodgepole pine into the open steppe hillslopes. Past park management efforts have included burning and logging of lodgepole pine off those slopes. Young pine trees are increasing on these slopes again. During the Lemhi penstemon survey in 2011, pine trees were encountered in 1% of plots (Stucki et al. 2013).



Vegetation communities and landscape features of Big Hole National Battlefield.

Invasive and Nuisance Species

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Spotted Knapweed	Abundance of knapweed		Spotted knapweed abundance in portions of the open Battlefield hillslopes has increased at an average rate of 3.35 times per year since monitoring began in 2009, and in 2011 was estimated at ≈ 2700 plants (Stucki et al. 2013).
	Frequency of occurrence		The frequency of occurrence, a measure of knapweed distribution, has increased in the hillslope habitat by 1.7 times per year since 2009 (Stucki et al. 2013).
	Infested acres		Spotted knapweed distribution was mapped by park staff in 2011 at approximately 18 acres.
Canada Thistle	Infested acres		Canada thistle distribution was mapped in 2011 at approximately six acres.

Aquatic Nuisance Species	Presence/Absence in North Fork Big Hole River		In sampling events during 2009, no evidence of Didymo algae (*Didymosphenia geminate*) or New Zealand mud snail (*Potamopyrgus antipodarum*) was detected (Garrett et al. 2011). Whirling disease (*Myxobolus cerebralis*), although known to be present in the watershed, has not been documented in the North Fork.
Mountain Pine Beetle	Percent beetle-induced lodgepole pine mortality		There is an active outbreak of pine beetle in the Battlefield's lodgepole pine forest (Garrett et al. 2011). A USFS forester predicted 75–90% mortality during this outbreak over the next few years.

Mountain Pine Beetle

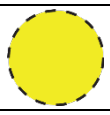
The long-term health of the forest at Big Hole is a serious management concern, in part, because historic fire patterns have been altered (Garrett et al. 2011). A century of fire suppression has led to densities of lodgepole pine (*Pinus contorta*) that create heightened-risk of high-severity wildfire. In addition, there is an active outbreak of mountain pine beetle (*Dendroctonus ponderosae*) in the Battlefield and adjacent USFS lands above the Battlefield. Evidence suggests that warming temperatures may intensify outbreaks of mountain pine beetle throughout much of the northern Rocky Mountains by enabling the beetles to survive the winter even at higher elevations. Earlier snowmelt and warmer temperatures also stress many tree species making them more vulnerable to attack by beetles and more vulnerable to wildfire. High beetle-induced mortality of pine trees in the Battlefield's Siege Area has required active management, including removal of hazard trees which not only create a risk to visitors but threaten to uproot the rifle pits dug by soldiers during the 1877 battle, which are still visible today.

Lodgepole pine tree mortality due to infestation of mountain pine beetle at Big Hole National Battlefield.

Species of Management Concern

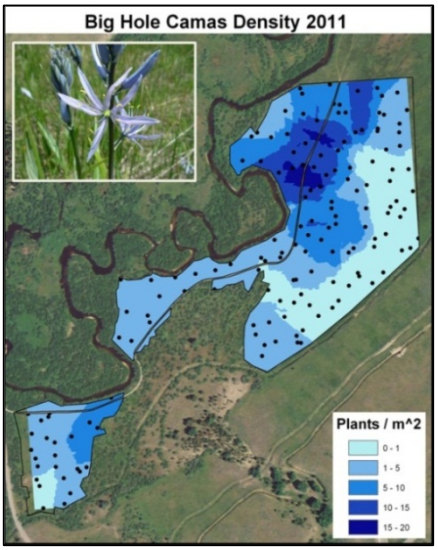
web

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Camas Lily	Established plant density (plants/m^2, excluding seedlings)		In 2006, the NPS I&M network initiated a camas monitoring program in the floodplain meadow adjacent to the North Fork of the Big Hole River. Trend in camas density is increasing across the site at an average annual rate of approximately 6% (Rodhouse and Jocius 2011).
	Flowering plant density		There is a stable trend in flowering camas plant density over the 2006–2011 period.
	Flowering ratio		There is a stable trend in the ratio of flowering to total established camas plants.
Lemhi Penstemon	Abundance		The Lemhi penstemon inventory during 2009–2011 determined that Big Hole National Battlefield contains the largest known population of Lemhi penstemon (Stucki et al. 2013). The 2011 survey estimated ≈ 3000 plants, considerably larger than 2009–2010 estimates, suggesting an increasing population perhaps associated with recent wet, cool springs.

	Rosettes per plant		The average number of basal rosettes per plant (a proxy for plant age) was 3.5. This is higher than has been reported elsewhere, suggesting a possible decline in reproduction and seedling establishment (Stucki et al. 2013). Lemhi penstemon has generally been described as a poor competitor in dense sagebrush steppe vegetation.
	Seedling density		Very few seedlings were found during targeted searching in 2011, providing additional evidence of a possible decline in reproductive vigor.
Arctic Grayling	Presence/Absence in the North Fork Big Hole River		The last remaining population of fluvial Arctic grayling *(Thymallus arcticus)* in the lower 48 states exists in the Big Hole River (east of Big Hole National Battlefield approximately 15 km). Historically Arctic grayling likely inhabited the North Fork of the Big Hole River within the park. Recently, Arctic grayling have only been documented downstream of the park near the confluence of the North Fork with the Big Hole River (Garrett et al. 2011).

Camas Lily

Annual camas surveys since 2006 have found an increasing trend of ≈ 6% per year in the median number of established plants per m² (Rodhouse and Jocius 2011, Rodhouse et al. 2011). The estimated annual average number of established plants per m² increased from 4.2 in 2006 to 6.8 in 2011. Recent cool, wet weather patterns may account for this trend. The camas population in the Battlefield is characterized by high spatial variation, with discrete patches of very high density (e.g., >20 plants per m²) concentrated in the northern portion of the study area near the Nez Perce encampment. Below-average density along the eastern border of the study area adjacent to the irrigation canal is suggestive of a possible connection to altered down-slope surface and subsurface runoff. High spring runoff and flooding of the meadow that occurred in the winter and spring of 2010 may invigorate camas populations, and we anticipate a continued increasing trend in camas density in 2012.



The map to the right shows camas lily density (established plants/m^2) interpolated across the monitoring study area in the floodplain meadow adjacent to the river. Inset photo courtesy of NPS.

Lemhi Penstemon

The 2009–2011 inventory confirmed that Big Hole National Battlefield is home to the largest reported population of Lemhi penstemon (*Penstemon lemhiensis*), making the park a globally significant conservation area for this rare endemic species. In 2011 the population was estimated to contain ≈ 3000 established plants (Stucki and Rodhouse 2009, Stucki et al. 2013). This was a substantial increase over the 2009 and 2010 population estimates, 1362 and 1618, respectively. This increase may be the result of recent favorable growing conditions, although it is also possible that this represents typical natural variability. All but three reported populations from elsewhere in the species' range contain fewer than 30 plants. In the Battlefield, the population is concentrated on the two east-facing open hillslopes overlooking the river–Howitzer Hill and the Horse Pasture. There is some concern that the population is aging and that reproduction and recruitment of young plants into the population has declined. The species is known to require bare soil microsites for germination, including roadcuts, and the old roadcut at the base of the Howitzer Hill appears to support a particularly large concentration of plants. In 2011, a small subpopulation thought to have been extirpated was rediscovered below the visitor center along the eroded canal bank. Thirty-three (33) plants were counted in this area. Lemhi penstemon is reported to be a poor competitor, requiring bare soil microsites for germination and responding favorably to fire (Elzinga 1997). This and the need for active park management of lodgepole pine encroachment into the open hillslopes have motivated consideration of a new prescribed burning program for the park. This represents an important step forward for the park and for the NPS more broadly to better integrate cultural and natural resource management (Stucki et al. 2013).

Lemhi penstemon (*Penstemon lemhiensis*) in the Horse Pasture at Big Hole National Battlefield.

2.2. Cultural Resources

Tribal Relations

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Relationships with Nez Perce People	Level and frequency of engagement; status of the relationship		The park is working hard to maintain and strengthen relationships with the Nez Perce People. The park routinely consults with the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Colville Confederated Tribes on matters involving park operations, management, and planning. These consultations occur on multiple levels and the results of these efforts greatly enhance and shape park management direction.

Cultural Anthropology

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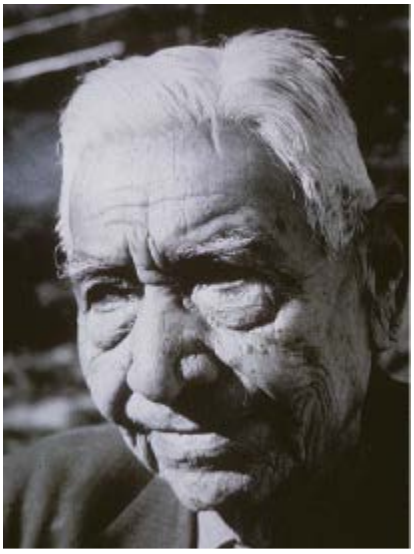
Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Completeness of Documentation	Baseline documentation completed		The park is finishing a two-year oral history project with representatives of the Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, and Colville Confederated Tribes. The purpose is to work in partnership with Nez Perce descendants who live on three different reservations in Idaho, Oregon, and Washington to record family histories, songs, dance, and other cultural manifestations derived from Nez Perce participation in the battle of the Big Hole during the Nez Perce conflict of 1877.

Big Hole Oral History Project

The battle of the Big Hole was a critical turning point in the Nez Perce conflict of 1877 and had a deep and lasting effect on the Nez Perce People. Tribal casualties from the Big Hole encounter totaled more than those from the other six battles and skirmishes combined. The impacts of these losses were deeply felt by the surviving Nez Perce. The ramifications of this battle have since manifested themselves in unique aspects of Nez Perce culture on three different reservations to this day. Examples of this can be seen in several tribal-specific songs and dances that have origins in actual events that occurred at the Big Hole. While many Nez Perce descendants know the songs, dances, and cultural traditions, few know the actual historical details that resulted in the creation of those specific cultural manifestations. The group of remaining Nez Perce who have direct knowledge of these historical events and how they transpired on the landscape at the Big Hole is rapidly shrinking. The number of surviving individuals holding this knowledge is believed to be fewer than 10, and most are over the age of 80. These individuals all learned of these events through the oral tradition from actual battle survivors; the last of whom passed away in 1971.



Josiah Red Wolf, last surviving Nez Perce from the War of 1877

The staff of Big Hole National Battlefield recently held a meeting with representatives of the Nez Perce, Colville, and Umatilla tribes and all expressed an interest in working with the NPS to record much of this battle-related historical information. From this meeting, the NPS worked with the tribes to develop a two-year oral history project. What makes this project different from most traditional oral history projects is the main focus of the work will not be on recording the battle events, but rather on the cultural impacts of the battle as felt and retold through the oral tradition. That is, work will focus on recording how the events of the battle (and its resulting impact on the culture of the Nez Perce) were handed down to subsequent generations and how those events have manifested themselves in the modern day culture of the Nez Perce, Colville, and Umatilla tribes.

One of the interesting aspects of this project is that while many of the resulting cultural traditions or manifestations are now tribally based, most of the specifics of the events that led to them are family-specific and not widely known. The aim and challenge for this

project is to work with the elder representatives of these families and record their family traditions and recollections. The preservation of these events, stories, and traditions will be vital to the Nez Perce, Colville, and Umatilla tribes and also contribute greatly to effective NPS management and interpretation of the Big Hole site. Only through the completion of projects such as this can we truly preserve all aspects of the Big Hole battle and the ramifications of those events on the Nez Perce culture. This allows us, as the caretakers of the Big Hole site, to capture and preserve important aspects of a human experience that would otherwise go undocumented. It will provide another vital conduit for transmittal of knowledge from one generation to the next and opens up new avenues for collaborative research between three federally recognized tribes and the NPS. Through recording the stories, songs, and dance, and their historical contexts associated with the Big Hole battle, the overall knowledge of the events and how they transpired on the landscape will be improved. This will lead to better interpretation of the site for all visitors and afford the NPS an opportunity to better manage this nationally-significant cultural resource.

Archeological Resources

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Completeness of Inventories	Percent of park that has been surveyed		Currently, 100% of the park land base (655 acres) has been subjected to surface archeological survey of one form or another. A majority of the park was subjected to intensive archeological inventory via a metal detector survey conducted in 1991 and 1992 (Scott et al. 1994).
Site Condition/Stability	Percent of sites in good condition (ASMIS database)		There are five recorded archeological sites within the NPS boundaries of Big Hole National Battlefield. All five sites are currently in good condition. Site condition assessments are scheduled on a rotating basis with a five-year return interval. All sites are currently stable with very low potential for disturbance and threats to site integrity.
Documentation	Percent of known sites that have been adequately researched		Four of the five archeological sites located within the park could use some additional historical documentation. While all five sites are adequately documented to assess historic integrity and determine site significance, additional documentation into the details of several of the properties is recommended and planned for future research.

Archeological Surveys and Condition Assessments

Big Hole National Battlefield has been subjected to varying levels of archeological inventory and relic collection over the years. Like many battlefields, relic collection occurred within days of the end of the battle. Sporadic artifact collections continued into the 1950s by area residents, interested individuals, and visitors prior to the site being in NPS ownership. It really wasn't until the late 1950s and early 1960s that more formal, archeological inventories conducted by archeologists, historians, or other interested parties with at least some modest amount of training were conducted. However, much like the early relic collection efforts, these studies primarily focused on artifact-rich areas or areas known to have seen the majority of the battle during the 1877 conflict. It really wasn't until the early 1990s that a detailed, intensive-level archeological inventory of the entire battlefield was conducted.

Conducting archeological site assessment at Big Hole

The 1991 archeological project conducted by Doug Scott and funded through generous donations by country music entertainer, Hank Williams Jr. was primarily focused on getting a complete look at the archeological resources across the entire NPS holdings. To accomplish this, Scott focused on gaining a better understanding of the battle events through realizing the intrinsic relationship between the historic events and the physical remains of those events. In this way, he hoped to uncover those relationships in their existing historic context allowing us to better understand the individual human behavior that led to their creation. The results of this effort were reported by Scott in the 1994 manuscript ***A Sharp Little Affair***, which has become one of the primary research documents used by the park to better understand the events of the 1877 battle.

During the past five years, the NPS has continued to build upon these previous research efforts to insure long-term preservation of the nationally significant archeological resources of the Big Hole Battlefield. The park has developed and implemented a five-year

rotating assessment schedule in which all sites within the NPS holdings are periodically visited by a professional archeologist. These visits are on a fixed return interval allowing for a complete assessment of the current condition of each archeological site within the park. This information, along with bi-annual archeological inventories of selected locations, affords park management an opportunity to identify and address any specific site stability or condition issues prior to them adversely impacting the historic integrity of the properties.

Cultural Landscapes

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Documentation	Condition of cultural landscape		A detailed cultural landscape inventory for Big Hole National Battlefield was completed in 2008. The landscape is currently in good condition.

History

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Documentation	Completeness of historical documentation		The accumulation of historical research pertaining to the Big Hole battle is quite robust. This ranges from several accounts of the battle, and larger Nez Perce war context, from direct battle participants to latter works by historians. The NPS has also completed many of the baseline historic documents needed to properly manage and understand the battlefield site [references].

Museum Collections

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Museum Facility Integrity	Meets facility standards		Except for those items currently on exhibit, all BIHO museum objects and archives collections are stored at the NEPE museum storage facility near Lewiston, Idaho. This facility maintains a professional museum staff insuring all collections are properly housed for long-term preservation. Having the collections housed in the same facility as the much larger NEPE museum collection allows them to be fully accessible to a wide array of potential researchers through the NEPE research center. The NEPE facility meets all federal and NPS standards.
Completeness of Curation	Percent of objects catalogued; Data quality audits		The BIHO museum collection consists of 38,260 items. 95.3% (36,463 of 38,260 items) of the BIHO museum collection is catalogued to current NPS standards. A random sample of BIHO items are examined every year as part of the NPS annual inventory of museum objects.
Adherence to Museum Checklist	Percent of applicable standards met		93.68% (178 of 190) of applicable NPS museum checklist standards have been met by all facilities housing BIHO collections.

2.3. Visitor Experience

Visitor Numbers and Visitor Satisfaction

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Fiscal years 2010 and 2011 saw dramatically decreased visitation, likely due to Visitor Center renovations. The number of visitors is expected to increase now that the renovations are complete. The new facilities, and especially the new exhibits, are also expected to return visitor satisfaction to its previously high level.

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Number of Visitors	Number of visitors per year entering Visitor Center	⬇	Average number of visitors entering the Visitor Center was 25,749 per year for 1999–2011. For the past five years (2007–2011), average annual visitation was down 14%, to 22,122. Fiscal years 2010 and 2011 saw dramatically decreased visitation, likely due to Visitor Center renovations.
Visitor Satisfaction	Percent of visitors who were satisfied with their visit	⬆	Based on the standard visitor satisfaction survey conducted each year, the percent of visitors satisfied was 99%, and 100% for 2008 and 2009, then decreased to 80% in 2010, and increased to 94% in 2011 and back to 100% in 2012. The visitor center renovation that began in 2010 contributed to visitor dissatisfaction in that year, and the index has since increased now that renovations are complete.

New Exhibits

The process of developing new exhibits for the visitor center at Big Hole National Battlefield began in 2008. Often in projects like this, the park staff and the contractor come up with a design and then take it to the Tribes for approval. The Big Hole staff felt that this would be unacceptable and they included the Tribes from the very beginning. Representatives were appointed by the Nez Perce, Umatilla and Colville Tribes to attend the planning meetings and present the Nez Perce perspective. In this first meeting it was decided that the new exhibits would reflect a Nez Perce voice and would focus on events leading to the 1877 conflict and the impacts on the people instead of a straight chronology of the events of the battle. The group also wanted to hear the voices of individuals from both the Nez Perce and the military.

Another unique aspect of this process was the selection of a group of writers from the main planning group. These members wrote the text that is used throughout the exhibit. The members of the writers group also made certain that Nez Perce names and phrasing was used throughout the exhibit, making language a key component of the experience. The main group came together at each stage of the process for additional input and approval, from design with Formations, Inc. to fabrication with Turner Exhibits. The meetings were held in different locations allowing each tribe to host at least one.

The result is an exhibit that is fresh, modern and inclusive of multiple viewpoints, not just the view of the “victors.” The exhibit is challenging since it concerns a very tragic event and tells it from a new perspective. Not all visitors will be comfortable with the story since it includes actions that were horrific, but they also include moments of bravery and compassion on both sides. The exhibit also allows the visitor to connect with individuals who were there through quotes and stories. And finally, visitors can connect with descendants of people who were there and see how it still impacts people today. The inclusion of Tribal input from the very beginning made all the difference. The final stage in the project will be a gathering at the Visitor Center where Tribal Elders will offer a blessing of the new exhibits followed by the grand opening.

Sense of Place

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Solitude, Quietness, Remoteness			The Big Hole Battlefield is located in a beautiful expanse of green, fertile land surrounded by often snow-covered mountains. Through it flows the North Fork of the Big Hole river. Wildlife abounds and the fishing can be excellent. The beauty and peacefulness of the land conflicts with the events that occurred here in 1877. Standing in the encampment area or looking out from the howitzer site one can feel the sorrow that still inhabits the land. It is the combination of the beauty and the sadness that defines this place, and the generally good-to-excellent condition of Battlefield natural resources is a major contributing factor.

Education and Outreach Programs

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Education Programs	Number of programs		The number of school groups coming to the park has increased, partially due to the creation of a new educational opportunity entitled "Coyote Camp." The method for measuring these numbers changed in 2010, thus comparing numbers was difficult.
Ranger Programs	Number of programs		The park has increased the number of demonstrations and tours offered to the public, but due to renovations was unable to offer deck talks. This resulted in a 10% decrease in overall programs offered in fiscal year 2011.
	Attendance		The number of visitors attending programs in fiscal year 2011 was down by 50%. This is believed to be directly related to the visitor center renovations.

Coyote Camp

During the spring of 2010, Big Hole National Battlefield had a challenge to overcome. The Visitor Center was predicted to be closed for renovations starting in the month of May, which happens to be the park's busiest month for school groups. The temporary Visitor Center could not accommodate groups of this size, so all programs would have to be presented outside. To mitigate this situation, the staff created Coyote Camp.

This educational opportunity brought students, rangers, and Nez Perce demonstrators together for a unique curriculum-based experience on the Battlefield. Nez Perce tribal members presented two different programs, while park rangers led the students on walks to different parts of the Battlefield to discuss aspects of the battle. The programs were varied and offered activities that reached different learning styles. The five-day program was such a success that the park staff chose to offer it again the following year.

For Coyote Camp 2011 we brought in twice as many cultural demonstrators, while maintaining six park personnel giving presentations. We were able to increase both the number of schools from 13 to 18, and the number of students from 683 to 885. The program was once again considered a success from the perspectives of the park, tribes, and schools. To sum it up, here are some direct quotes from the teachers attending:

"The camp was very informative. The kids actually being at the site helped them learn… in a hands-on way!"

"It was great to have the Nez Perce there."

"The experience was terrific, despite the terrible weather on the day we came."

2.4. Park Infrastructure

Overall Facility Condition Index

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The National Park Service uses a facility condition index (FCI) to indicate the condition of its facilities and infrastructure. FCI is the cost of repairing an asset, such as a building, road, trail, or water system, divided by the cost of replacing it. The lower the FCI number, the better the condition of the asset. The overall FCI for 45 assets at Big Hole National Battlefield for FY12 was 0.039, which is considered Good based on industry and NPS standards. The table below summarizes the number of assets at BIHO within each industry-standard asset category and the mean FCI on October 1, 2012, compared to October 1, 2008, to determine trends in condition. For additional information about how park managers use information about the condition of facilities and infrastructure to make decisions about the efficient use of funding for maintenance and restoration activities at the park, Click Here.

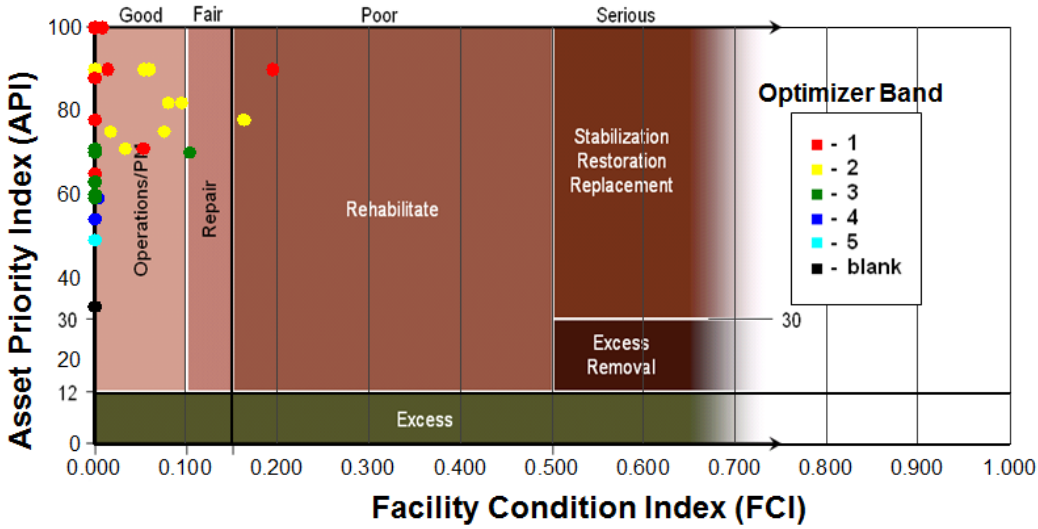
Asset Category	Number of Assets 2008 / 2012	FCI 2008 / 2012	Condition Status/Trend	Rationale
Buildings	17 / 18	0.126 / 0.036		The park has installed an energy-efficient cold roof on the Visitor Center. The renovated Visitor Center has a new viewing deck for visitors, and a new fire suppression system. A new equipment shed has been built. Interiors of park housing are in the process of being renovated. New porches have been built for houses using Trex recycled decking.
Trails	8 / 9	0.114 /0.016		Beetle-killed hazard trees along trails have been removed for visitor safety.
Waste Water Systems	2 / 2	0.031 /0.146		
Water Systems	1 / 1	0.076 /0.000		New chlorine injection equipment has been purchased.
Unpaved Roads	1 / 1	0.000 /0.163		New signage has been added to the service road.
Paved Roads, Parking Areas, Bridges, Tunnels	7 / 7	0.124 /0.021		Slurry seal was applied to roads in 2009. Improved hand rails have been installed on the bridge along the trail to the siege area.
All Others	8 / 7	0.123 /0.000		New radio system installed in 2009. Data cables in visitor center have been replaced.

The condition of the buildings and other infrastructure assets at each park is determined by regular facility inspections, or “condition assessments,” including daily informal inspections and formal yearly inspections. Deficiencies identified from these assessments are documented in the NPS Facility Management Software System and the cost for each repair determined. Repairs that cannot be completed within the year count against the condition of a structure. The total cost of these deferred repairs divided by the total cost to replace the structure results in the FCI, with values between 0 and 1 (the lower the decimal number, the better the condition). The FCI is assigned a condition category of Good, Fair, Poor, or Serious based on industry and NPS standards. Deferred maintenance projects that require additional funding are identified based on FCI. Planned preventive maintenance on critical components occurs during the year, using a park’s base budget.

Another important facilities management planning tool used at a park is the Asset Priority Index (API). It identifies the importance of the various infrastructure components at a park. The API is determined using five criteria, and is calculated out of 100 possible points. The criteria are weighted based on their importance to NPS core priorities. They are distinct to ensure that each aspect of the asset is measured independently. As a result, most assets will not rate high in every category.

The scatterplot (below) for 2012 shows the FCI for each of the infrastructure asset types at Big Hole NB. It plots buildings, trails, roads, parking areas, and other infrastructure assets against its Asset Priority Index (API). Park managers and maintenance staff use

the FCI and API data for each park asset to focus on preventive maintenance and repairs to facilities that are most critical to their parks. Optimizer bands—the color of the dots in the scatterplot—are assigned to each facility or asset as a tool to prioritize use of limited funding to maintain park infrastructure. Optimizer Band 1 includes those assets with the highest maintenance priorities. These assets are most important to the park—often linked to the park's enabling legislation or have high visitor use—and usually are in the best condition. Band 1 assets receive the highest percentage of base funding for routine operations, preventive maintenance, and recurring maintenance to keep them in good condition with proactive, planned maintenance. These assets are important to park operations, but because fewer park base dollars are available after maintaining Band 1 assets, Band 2 assets receive a lesser percentage of remaining funds. Assets in the lower priority bands may only receive preventive maintenance for the most critical components or may require special projects or partner funding to maintain them. For additional information about optimizer bands and how park managers use them to make decisions about the efficient use of funding for maintenance and restoration activities at the park, click here.



Energy Consumption

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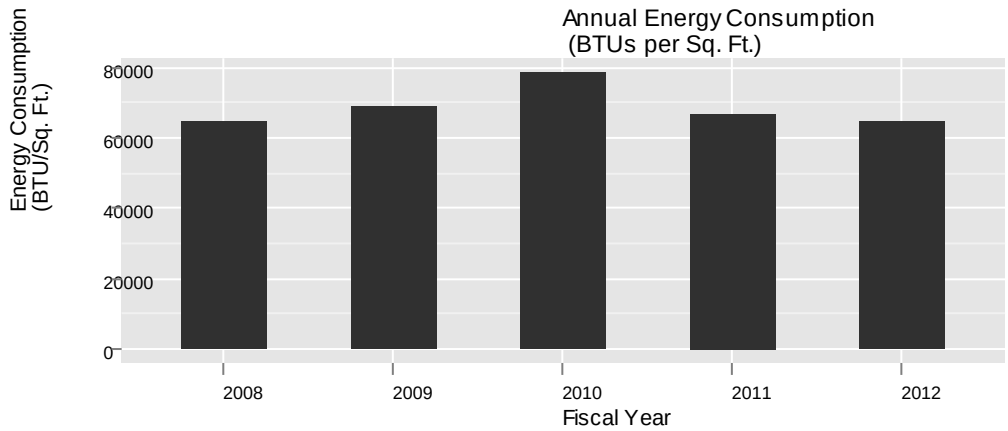
The production of energy to heat, cool, and illuminate buildings and to operate water utility systems is one of the largest contributors to greenhouse gas emissions in the United States. The National Park Service is committed to improving facility energy performance and increasing its reliance on renewable energy sources. The National Park Service has a goal to reduce Servicewide building energy consumption per square foot of building space by 35% by 2016 from the baseline set in 2003 (NPS Green Parks Plan 2012).

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Energy Consumption	BTUs per gross square footage of buildings		Energy usage (BTUs per gross square footage of buildings) at the park in 2012 was 7.3% lower than the average for the previous 4 years (Source: NPS Annual Energy Report).



Water Consumption

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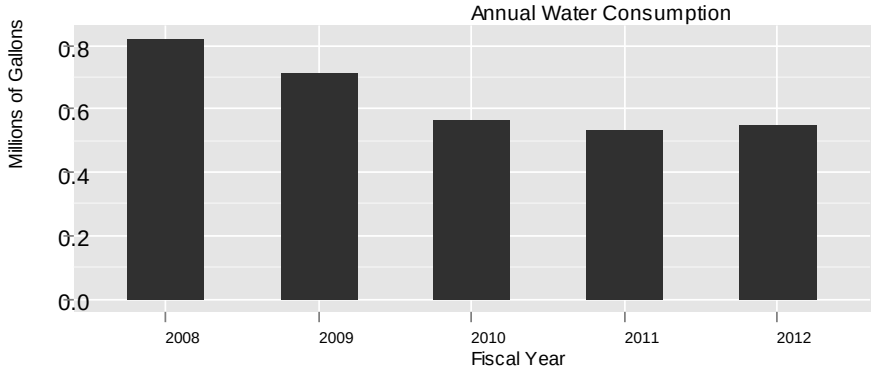
The national and global supply of fresh water has diminished in recent decades, and this trend is likely to continue due to drought and other climatic changes. To contribute to the responsible use of freshwater supplies, encourage groundwater recharge, and protect water quality, the National Park Service is improving its efforts to conserve water, reuse gray water, and capture rainwater, and has set a goal to reduce non-irrigation potable water use intensity by 30% by 2020 from the baseline set in 2007 (NPS Green Parks Plan 2012).

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Water Consumption	Millions of gallons		Water consumption at the park in 2012 was 16.3% lower than the 4-year average for 2008-2011 (Source: NPS Annual Energy Report).



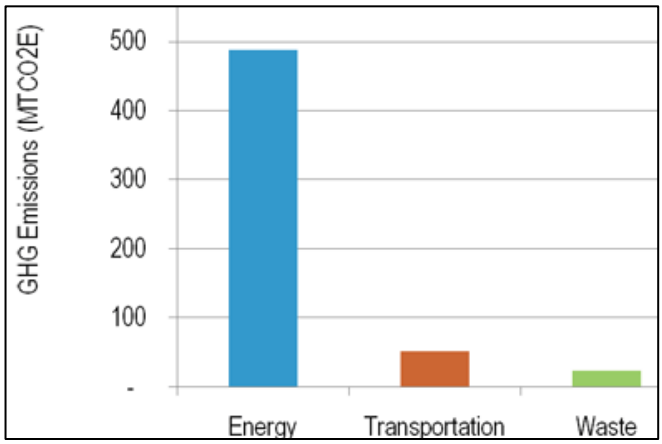
Park Carbon Footprint

web

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Greenhouse Gas Emissions	Metric tons of CO_2 equivalent ($MTCO_2E$)		The park has undertaken several climate change mitigation measures to reduce its carbon footprint. Emissions from park operations during the baseline year were roughly equivalent to that for 11 households.

Profile – Park Carbon Footprint.

A park's carbon footprint is measured by greenhouse gas (GHG) emissions from the combustion of fossil fuels for transportation and energy, the decomposition of waste and other organic matter, and the release of gases from various other sources, such as fertilizers or refrigerants. A decreasing carbon footprint indicates that the park is striving to reduce its impact on climate change through mitigation efforts. In 2008, the baseline GHG emissions were set within BIHO and totaled 126 metric tons of carbon dioxide equivalent (MTCO2E). To put this in perspective, a typical U.S. single family home produces approximately 12 MTCO2E per year (U.S. EPA 2011). Thus, the emissions from park operations are roughly equivalent to the emissions from the energy use of 11 households each year. The largest emission sector for BIHO is energy, which totals 81 MTCO2E.



Big Hole National Battlefield heats with propane exclusively. The park has installed a new cold roof system to increase energy efficiency. At this time, the park purchases green energy (not all of the park's needs, but as much as its co-op will allow). Big Hole National Battlefield has plans to put up solar panels to generate power and tie into the grid and is in the process of cutting down on waste in the Visitor Center and employee housing by recycling more products. A recycle trailer has been purchased to transport materials to the recycling center in Butte, Montana. Learn More.

Big Hole National Battlefield intends to:

- Reduce GHG emissions from the park to 30% below 2008 levels by the year 2016 by implementing emission mitigations actions identified by the park.
- Reduce park operations' energy use emissions to 40 percent below 2008 levels by 2016.
- Reduce park operations' transportation emissions to 15 percent below 2008 levels by 2016.
- Reduce park operations' waste emissions to 15 percent below 2008 levels by 2016 through waste diversion and reduction.

To read more about what we are doing at Big Hole National Battlefield about climate change, check out our Action Plan!

Chapter 3. Summary of Key Stewardship Activities and Accomplishments

The park has accomplished much over the past few years, but underpinning all is the continuing effort to build and improve relationships with tribal partners. This is nowhere more apparent than in the recently concluded planning process that led to the creation of the new exhibits at the park. The Nez Perce People were heavily involved in all aspects from initial discussions on the need to replace and update exhibits, through design, fabrication and installation.

The isolated nature and small staff of Big Hole requires frequent consultation for all aspects of park operations. Along those lines, Big Hole and Nez Perce NHP are working more closely together now than in any time in the history of the parks. Divisions from both parks frequently plan, develop and implement projects together to achieve park management goals. This collaboration with NEPE has also led to an increased awareness of the park's role in the local community.

Recently the park requested and received local hiring authority and this has gone a long way to creating greater cooperation between the residents of the valley and the park. This has afforded the park the ability to provide employment opportunities and strengthen community ties.

These strengthened partnerships with the tribes, NEPE and the community have allowed the park to accomplish many priority resource, visitor service, and park infrastructure projects essential to the long term preservation and interpretation of the Battlefield. The information below provides examples of stewardship activities and accomplishments by park staff and partners to maintain or improve the condition of priority park resources and values for this and future generations.

Activities and Accomplishments

BIHO has responsibility for managing resources (both natural and cultural) of national significance to the American people. These resources are relatively "pristine" and are some of the few remaining fragments representative of once much larger communities and cultures. Ongoing management of these resources is vital to the preservation of native plant and animal populations as well as significant components of the Nez Perce culture. Resource management in this context has required the park to actively seek out and engage in partnerships and management opportunities with NEPE and other federal, state, local, and tribal partners. This cooperation and interaction has led to the development and completion of numerous projects aimed at preservation and protection of these nationally significant resources.

Natural Resources

- Partnership with U.S.D.A. Forest Service and Beaverhead County to manage weeds and invasive plants
- Weed mapping and treatment accomplished through the efforts of park staff and the Northern Rockies Exotic Plant Management Team
- Ponderosa pine genetics study
- Working with Upper Columbia Basin Network Inventory & Monitoring Program for monitoring and natural resource management
- Monitoring of camas in meadow area with Upper Columbia Basin Network
- Pine beetle tree removal from Siege Area and Howitzer Trail
- Inventory and monitoring of Lemhi penstemon on the Horse Pasture and Howitzer Hills
- Pheromone placement on Douglas fir to combat bug kill

- Natural Resource Condition Assessment report
- Willow reduction in irrigation ditches in the park to help restore the historic scene

Cultural Resources

- Big Hole tribal oral history project
- Archeological site condition assessments
- Biennial shoreline archeological survey along North Fork of the Big Hole River
- Museum management plan
- Museum housekeeping plan
- Conservation treatment project for metallic objects from BIHO collection
- Museum storage facility upgrades at Nez Perce National Historical Park where Big Hole museum collections are housed
- Historic Resource Study on the Nez Perce War of 1877 converted into the book, *Summer of 1877*
- Replaced tipi poles in Nez Perce encampment

Visitor Experience

Big Hole has moved to the forefront in creating a unique visitor experience. The story of Big Hole is one of great tragedy, a clash of cultures and the resiliency of the human sprint. The park staff, working with tribal partners, is able to tell the story of a people and what happened to them here and how these people are still a thriving community. With new ideas and new products, the park's interpretive staff is reaching out to both new audiences and those that have been here many times before with the following items to enhance the visitor experience.

- New exhibits in the visitor center
- Coyote camp education program
- New trail guide for the Big Hole trails
- Campfire programs for the community conducted in the summer
- Updated bird and mammal checklists for park visitors
- Daily ranger-led tours out onto the battlefield
- Tipi demonstrations and visitor participation at the battlefield
- Resource briefs completed for various natural resource projects and made available to the public
- Cultural demonstrators – presentations in summertime
- New waysides at several locations on the battlefield
- New metal howitzer carriage on the battlefield
- Annual commemoration of the 1877 events held by the Lapwai, Idaho VFW post.
- Chief Joseph trail ride
- New vista deck on the west side of the visitor center

Park Infrastructure

As the park moved into the new century, almost all of the park facilities were old and simply worn out. Over the last few years, with a financial assistance from American Recovery and Reinvestment Act of 2009 and the NPS Repair and Rehabilitation program, the park has greatly enhanced its infrastructure. These improvements not only affect the visitor's experience in the park but have saved park resources and have contributed towards reducing the carbon footprint of the park. This goal of updating the park's infrastructure continues into the future with new projects as funding becomes available.

- Visitor center updates
- Installed vault toilets in the lower parking area
- Fencing projects on east and south boundaries to help keep neighboring cattle out
- New facility for equipment storage
- ADA accessible ramps in lower parking area
- New cold roof system and atrium at the visitor center
- Participated in the Climate Friendly Park Program
- Purchases of green energy
- Recycle trailer
- Fire suppression system installed in the visitor center

Chapter 4. Key Issues and Challenges for Consideration in Management Planning

Tribal Relationships

The park has made great strides in developing and strengthening tribal relationships, but much remains to be done. Only through these relationships can the park understand the tie between the native culture and the resources and stories preserved at the battlefield. The living culture is a very important resource, not just for tribal members and descendants, but for all Americans; it is a vehicle for learning and understanding, and the battlefield is the forum where it must take place. This connection to "place" is difficult to foster and maintain due to the remote nature of the park and its great distance from the Nez Perce People.

Understanding of the park's stewardship role in preservation of resources under NPS control and maintenance of this cultural connection is still growing. It is hoped through continued cooperative efforts between the park and tribal partners these relationships can help realize additional opportunities to strengthen ties to the park and its resources.

Community

Even though the park is over 100 years old, there are features within the park that management has little or no control over. Currently there are three irrigation canals that run through the park with active water rights. The park does not own or have any authority over these canals. At any time the owners of these canals can come into the park and maintain them any way they see fit. The canal closest to the visitor center was recently repaired by the water rights holders with heavy equipment used to patch a breach in the canal. The resulting repair work created significant amounts of ground disturbance and increased the potential for weed invasion in the largest canal that runs just below the visitor center.

The Big Hole Valley is very remote and one of the coldest places in the continental United States. Cattle easily outnumber humans 1,000 to 1 with ranching as the primary occupation and economic driver. The park is bordered on three sides by ranch land which can lead to yearly livestock intrusions into the park. These are often settled quickly, but they can lead to increased tension over fence maintenance. For a number of years the park has been in negotiations with the adjacent ranch to the east over acquiring additional lands. This property was utilized in 1877 by the Nez Perce as the escape route from the battleground and the area has become known locally as "bloody gulch."

For nearly 90 years of federal management, the park has almost always been staffed by personnel brought in from elsewhere. This has contributed to resentment and mistrust of the frequently changing park staff in the local community. That mistrust, coupled with aggressive lands acquisition strategies of the past, has often made life difficult for park employees. During the last 5 to 10 years, the park has received and used local hiring authority, opening a window of opportunity for residents of the Big Hole Valley to be hired into stable, well-paying jobs. Many members of the park staff have made great strides at continuing and increasing their involvement in community programs such as the Volunteer Fire Department and school programs and events. This has gone a long way towards creating local ownership among the long-time valley residents of the park. While this good will is viable and working, it can be very quickly shattered and the park must be vigilant of how it is perceived in the community.

Resource Management

With the coming of settlers into the Big Hole Valley in the late 19th Century came invasive species. Though much of the battlefield area is considered to be in relatively good condition, the park currently has two major invasive threats, spotted knapweed and Canada thistle. These weeds have been a concern for years and their spread is being closely monitored by the park. While the park can inventory, treat, and attempt to control these species on park lands, it has little to no control over how park neighbors manage their land. Private and other federal lands around the park continue to be seed beds for invasive species that infest the park. In the last few years the park has taken an active role to work closely with the county, private land owners, and other federal partners to identify and treat infestations closest to the park.

The park is confronted by a serious infestation of mountain pine beetle, which is having a major effect on the interpretation of the battle and the landscape itself. Combined with the anticipated effects of accelerated climate change, which may include drought and warmer winters, this problem could become much worse. This is the second outbreak of mountain pine beetle in the park's history and is more severe than the outbreak in the late 1930s. It was estimated in the summer of 2011 by a USDA Forest Service forester that

75% to 90% of the lodgepole pine stand may be killed by pine beetles during this current outbreak. During the past three summers, park staff has removed nearly 500 beetle-kill hazard trees from the park area. The effort is ongoing as the dead trees become safety issues for park staff and visitors and threaten the nationally significant rifle pit features that were dug by Colonel Gibbon's forces during the siege.

Another compounding factor leading to the mountain pine beetle epidemic has been the removal of fire from the park's ecosystem for nearly 100 years. The open hillsides and meadow systems evolved under a natural reoccurring fire regime that limited lodgepole pine encroachment and willow growth across the site. These frequent fires and the disturbance they create encouraged the native bunch grass communities and benefited forbs such as the Lemhi penstemon. There have only been a few NPS initiated burns in the park's history. However, with the help of the Glacier National Park Fire Management program and the Upper Columbia Basin Network Inventory and Monitoring program, a new prescribed fire strategy is being developed and will be tested in a series of controlled burns in the near future. The hope is to use fire to control tree encroachment, encourage native grasses and the Lemhi penstemon population, and maintain the hillslope steppe vegetation in a natural appearance that closely resembles the scene as it was during August 1877.

Operations

Big Hole National Battlefield presents a wide variety of operational challenges that are not faced by many parks in the system. The very rural nature of the park and the small staff leads to a reliance upon others from the NPS, other agencies of the federal government, the tribes, and the community to accomplish the task at hand and this will continue to be a concern. Each staff member must be a jack-of-all-trades and cannot be the master of any. The Big Hole Valley is one of the coldest spots in the coterminous United States and receives a large amount of snow; consequently snow removal is a major job for the park staff and is done almost every day from October until May. The park housing was built for a milder climate and leaks occur with freeze-thaw events. Changes in climate and the more frequent freezing and thawing, has led to more leaking roofs that need to be replaced.

The current visitor center was built in 1968 on a bench overlooking the battlefield. This location was chosen specifically because it provided an excellent overview of the entire battlefield from one location. Unfortunately, these same attributes also created one of largest physical intrusions on the viewshed and setting of the battlefield. The facility can be seen from nearly every part of the battlefield and is considered by many to be an eyesore and a constant reminder of human impact on the battlefield.

The reduced funding for the park and restrictions on travel have reduced the ability of park to perform certain functions and to remain relevant to the public. Travel to the Bear Paw unit of Nez Perce NHP, which is managed by BIHO, and travel for training, have been curtailed. The park is very concerned with not continuing to move forward in all fields of operations and not taking full advantage of the great strides in resource management and interpretation over the past few years. Visitation is dropping not only in the park but statewide and the economy is a major factor in this drop.

References

See the State of the Park Report for Big Hole National Battlefield website for a more complete list of references to documents and data sets upon which the assessments in this State of the Park report are based. References for several of the key documents cited in this report are as follows:

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Website: http://www.epa.gov/cleanenergy/energy-resources/calculator.html

See Also:

Collection of General References

Collection of Natural Resource-Related References

Collection of Cultural Resource-Related References

Collection of Visitor Experience-Related References

Other Park Infrastructure-Related References

Glossary

See the State of the Parks home page for links to a complete glossary of terms used in State of the Park reports. Definitions of key terms used in this report are as follows:

Americans with Disabilities Act (ADA)	Law enacted by the federal government that includes provisions to remove barriers that limit a disabled person's ability to engage in normal daily activity in the physical, public environment.
Archeological Sites Management Information System (ASMIS)	The National Park Service's standardized database for the basic registration and management of park prehistoric and historical archeological resources. ASMIS site records contain data on condition, threats and disturbances, site location, date of site discovery and documentation, description, proposed treatments, and management actions for known park archeological sites. It serves as a tool to support improved archeological resources preservation, protection, planning, and decision-making by parks, centers, regional offices, and the national program offices.
Baseline Documentation	Baseline documentation records the physical condition of a structure, object, or landscape at a specific point in time. A baseline provides a starting point against which future changes can be measured.

Carbon Footprint	Carbon footprint is generally defined as the total set of greenhouse gas emissions caused by an organization, event, product or person.
Climate Friendly Park	The NPS Climate Friendly Park designation requires meeting three milestones: completing an application; completing a comprehensive greenhouse gas (GHG) inventory; and completing a Climate Action Plan, which is the actions, policies, programs, and measures a park will put into place to reduce its GHG emissions.
Cultural Landscape Inventory (CLI)	A Cultural Landscapes Inventory describes historically significant landscapes within a park. The inventory identifies and documents each landscape's location, size, physical development, condition, characteristics, and features, as well as other information useful to park management.
Curation	National parks are the stewards of numerous types of objects, field notes, publications, maps, artifacts, photographs, and more. The assemblage of these materials comprises a museum collection. Curation is the process of managing, preserving, and safeguarding a collection according to professional museum and archival practices.
Exotic Plant Management Team (EPMT)	One of the ways the NPS is combating invasive plants is through the Exotic Plant Management Team Program. The program supports 16 Exotic Plant Management Teams working in over 225 park units. EPMTs are led by individuals with specialized knowledge and experience in invasive plant management and control. Each field-based team operates over a wide geographic area and serves multiple parks.
Foundation Document	A park Foundation Document summarizes a park's purpose, significance, resources and values, primary interpretive themes, and special mandates. The statement identifies a park's unique characteristics and what is most important about a park. The foundation statement is fundamental to guiding park management and is an important component of a park's General Management Plan.
Fundamental and Other Important Resources and Values	Fundamental resources and values are the particular systems, processes, experiences, scenery, sounds, and other features that are key to achieving the park's purposes and maintaining its significance. Other important resources and values are those attributes that are determined to be particularly important to park management and planning, although they are not central to the park's purpose and significance. These priority resources are identified in the park Foundation Document and/or General Management Plan. The short-cut name that will be used for this will be Priority Resources.
Historic Integrity	Historic Integrity is the assemblage of physical values of a site, building, structure or object and is a key element in assessing historical value and significance. The assessment of integrity is required to determine the eligibility of a property for listing in the National Register.
Indicator of Condition	A selected subset of components or elements of a Priority Resource that are particularly "information rich" and that represent or "indicate" the overall condition of the Priority Resource. There may be one or several Indicators of Condition for a particular Priority Resource.
Interpretation	Interpretation is the explanation of the major features and significance of a park to visitors. Interpretation can include field trips, presentations, exhibits, and publications, as well as informal conversations with park visitors. A key feature of successful interpretation is allowing a person to form his or her own personal connection with the meaning and significance inherent in a resource.
Invasive Species	Invasive species are non-indigenous (or non-native) plants or animals that can spread widely and cause harm to an area, habitat or bioregion. Invasive species can dominate a region or habitat, out-compete native or beneficial species, and threaten biological diversity.
Museum Collection	NPS is the steward of the largest network of museums in the United States. NPS museum collections document American, tribal, and ethnic histories; park cultural and natural resources; park histories; and other aspects of human experience. Collections are managed by professionally-trained NPS staff, who ensure long-term maintenance of collections in specialized facilities.

Natural Resource Condition Assessment (NRCA)	A synthesis of existing scientific data and knowledge, from multiple sources, that helps answer the question: what are current conditions of important park natural resources? NRCAs provide a mix of new insights and useful scientific data about current park resource conditions and factors influencing those conditions. NRCAs have practical value to park managers and help them conduct formal planning and develop strategies on how to best protect or restore park resources.
Priority Resource or Value	This term refers to the Fundamental and Other Important Resources and Values of a park. These can include natural, cultural, and historic resources as well as opportunities for learning, discovery and enjoyment. Priority Resources or Values include features that have been identified in park Foundation Documents, as well as other park assets or values that have been developed or recognized over the course of park operations. Priority Resources or Values warrant primary consideration during park planning and management because they are critical to a park's purpose and significance.
Resource Management	The term "resources" in NPS encompasses the many natural, cultural, or historical features and assets associated with parks. Resource management includes the knowledge, understanding, and long-term stewardship and preservation of these resources.
Specific Measure of Condition	One or more specific measurements used to quantify or qualitatively evaluate the condition of an Indicator at a particular place and time. There may be one or more Specific Measures of Condition for each Indicator of Condition.
Upper Columbia Basin Network (UCBN)	One of 32 I&M networks established as part of the NPS Inventory and Monitoring Program. The Upper Columbia Basin Network comprises nine parks in Idaho, western Montana, Oregon, and Washington.