



# State of the Park Report

## Sand Creek Massacre National Historic Site Colorado



2017

**On the cover:** Sunset at Sand Creek. NPS Photo.

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

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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.

The purpose of Sand Creek Massacre National Historic Site (SAND) is to protect and preserve the landscape of the massacre site and interpret the associated cultural values to enhance public understanding of the massacre and assist in minimizing the chances of similar incidents in the future.

Statements of significance describe why an area is important within a global, national, regional, and system wide context. These statements are linked to the purpose of the park and are supported by data, research, and consensus. Significance statements describe the distinctive nature of the park and inform management decisions, focusing efforts on preserving and protecting the most important resources and values of the park unit. The park is significant because:

- The site of the Sand Creek Massacre has a sacred significance to the Cheyenne and Arapaho tribes, particularly those tribal members who are descended from victims and survivors of the massacre.
- The site is a reminder of the tragic extremes of the 500 years of conflict between American Indians and European Americans over land that now comprises the United States.
- The intense distrust resulting from the Sand Creek Massacre influences virtually all subsequent conflicts between American Indians and the U.S. Army.
- The Sand Creek massacre is an essential symbol of the struggles of American Indian tribes to maintain the ancestral ways of life.
- The massacre profoundly disrupted the social, political, and economic structures of the Cheyenne and Arapaho tribes.
- By eliminating most Cheyenne advocates for peace, the massacre hardened resistance to white expansion and escalated warfare between the army and the Cheyenne, Arapaho and the Sioux tribes.
- The circumstances of the massacre elicited widespread outrage, even against the backdrop of the Civil War, which forced substantial changes to U.S. Indian policy.

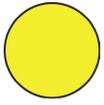
The summary table, below, and the supporting information that follows, provide an overall assessment of the condition of priority resources and values at the park based on scientific and scholarly studies and expert opinion. The internet version of this report, available at <https://www.nps.gov/stateoftheparks/sand/>, 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. Reference conditions that represent “healthy” ecosystem parameters, and regulatory standards (such as those related to air or water quality) provide the rationale to describe current resource status. In coming years, rapidly evolving information regarding climate change and associated effects will inform our goals for managing park resources, and may alter how we measure the trend in condition of park resources. Thus, reference conditions, regulatory standards, and/or our judgment about resource status or trend may evolve as the rate of climate change accelerates and we respond to novel conditions. In this context, the status and trends documented here provide a useful point-in-time baseline to inform our understanding of emerging change, as well as a synthesis to share as we build broader climate change response strategies with partners.

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. In some cases, the arrow is omitted because data are not sufficient for calculating a trend (e.g., data from a one-time inventory or insufficient sample size).

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
<b>Natural Resources</b> <a href="#">web</a> ▶		
<b>Air Quality</b>		Estimated ozone, average visibility, and nitrogen wet deposition levels in the park for 2009–2013 warrant moderate concern based on <a href="#">NPS Air Resource Division benchmarks</a> . Air quality is in good condition for estimated sulfur wet deposition for 2009–2013. Monitoring will be repeated on a 5-year cyclic basis to determine trend.
<b>Water Resources</b>		Running water and pools of the Big Sandy Creek provide water in an otherwise arid landscape, making water a unique resource at the park. Characteristics of the creek’s floodplain and channel such as sinuosity, width/depth ratio, and gradient, as well as other measures and observations, result in an overall evaluation of good condition for Big Sandy Creek.
<b>Riparian Habitat</b>		A proper functioning riparian area requires integration between water flow and floodplain characteristics, vegetation types and amounts, and sediment erosion and deposition processes. All of these aspects are properly functioning throughout the park’s riparian habitat areas.
<b>Grasslands</b>		Shortgrass prairie along Big Sandy Creek is dominated by native, perennial grasses expected on healthy prairies. Although exotic plants are present in the park, they do not dominate the landscape as they do in many other grasslands.
<b>Exotic Plants</b>		Several factors contribute to evaluation of the threat of exotic plants, including the type of plant, control difficulty of the observed species, and the location where the plants are growing. Even though the park has a few ecologically threatening plants (such as the non-native bromes) the majority of the non-natives are growing along the high disturbance corridors and have not invaded the interior areas. In addition, in over 57% of park-wide plots surveyed, no exotic plants were found.
<b>Birds</b>		72 bird species have been documented at the park, with 50 of them being detected in recent (2009–2012) surveys. The exception is the Burrowing Owl, which has not been observed since the disappearance of black-tailed prairie dogs at the park (in 2010).

Priority Resource or Value	Condition Status/Trend	Rationale
Prairie Dogs		Acreages occupied and prairie dog densities were estimated for prairie dog colonies from 2001–2009. However, in early 2010 the sylvatic plague decimated the colonies in and adjacent to the park. From an ecological standpoint, the condition of the black-tailed prairie dog is of significant concern. The trend is unchanging at this time; the condition had deteriorated in 2010, when the population was wiped out. The population cannot deteriorate further from that point, and there is no evidence of an increase at this time.
Dark Night Sky		A photic environment is described as the physical amount and character of light at a particular location, irrespective of human perception. The NPS Night Sky Program characterizes a park’s photic environment by measuring both anthropogenic and natural light. All-sky Light Pollution Ratio (ALR) is a measure of light pollution calculated as the ratio of median Anthropogenic Sky Glow to average Natural Sky Luminance. ALR for the park is 0.22, which is considered a good condition. While the populations of Denver and Colorado Springs have grown over the past four years (10.6% and 7.1%), trend is neutral due to the large distance of these cities to the park, 250 km and 200 km respectively.
Acoustic Environment		All sound resources, whether audible or not, are referred to as the <i>acoustic environment</i> of a park. The quality of the acoustic environment affects park resources including wildlife, cultural resources, the visitor experience, and landscapes. The condition of the acoustic environment is assessed by determining how much man-made noise sources contribute to the acoustic environment through the use of a national noise pollution model. This measure is referred to as the <i>mean acoustic impact level</i> . Impact is measured in A-weighted decibels (dBA). The mean acoustic impact level at the park is 0.8 dBA, meaning that the acoustic environment is in good condition. Overall, long-term projected increases in ground-based and aircraft traffic indicate a deteriorating trend in the quality of acoustic resources at this location.
<b>Cultural Resources</b> <span style="float: right;"><a href="#">web</a> ►</span>		
Archeological Resources		Archeological sites are being investigated to determine the geographical location of key events, and in coordination with park compliance activities toward an eventual 100% survey coverage of the park. All archeology is completed with tribal participation and consultation.
Cultural Anthropology		The park has four tribes associated with the Sand Creek Massacre. By legislation and by cooperative agreements with each tribe, the park consults with the tribes at least twice a year routinely and more often as needs require. Resources, uses, associated people, etc. are well documented, and will continue to be in perpetuity. An Ethnographic Overview and Assessment has been completed.
Cultural Landscapes		No Cultural Landscapes have been identified or documented at the park.
Historic Structures		The park has no historic structures. All structures on the site are modern NPS administration facilities and none are historic or NR eligible.
History		There is extensive research about the history of the Sand Creek Massacre. A Special Resource Study was completed in 2000 documenting the national significance of the site leading to its establishment as a National Historic Site. The park is on the National Register of Historic Places for its national significance. A General Management Plan has been complete, plus fifteen years of additional historical research since the park was established and research continues on a daily basis. An administrative history has been compiled and is being completed. A popular, prize-winning non-fiction book was written about the establishment of the park.

Priority Resource or Value	Condition Status/Trend	Rationale
Museum Collections		Museum collections are curated in a controlled, stable environment in museum storage facilities located at Bent's Old Fort National Historic Site and the NPS Western Archaeological Conservation Center.
<b>Visitor Experience</b> <a href="#">web</a> ▶		
Number of Visitors		Park visitation has continuously increased since opening to the public in 2007 with the most significant increase in 2014 during 150th anniversary events.
Visitor Satisfaction		Visitor Satisfaction has increased since the collection of surveys began. The current visitor survey indicates that 91% of visitors are satisfied with their experience.
Interpretive and Education Programs – Talks, Tours, and Special Events		The park completed its General Management Plan in FY 2015 and began its comprehensive interpretive planning in FY 2016. The park's current interpretive programming is based on an Interim Management Plan. The park continues to increase the number of interpretive programs both on and off site on an annual basis, and now that its comprehensive interpretive planning process has begun, we anticipate future increases in both interpretive and educational programs.
Interpretive Media – Brochures, Exhibits, Signs, and Website		The park continues to develop its interpretive media, adding new site bulletins and improvements to its website. The park is working with other NPS park sites to develop a series of joint site bulletins on shared history and interpretive themes. This project is succeeding in broadening the park's overall interpretive story to other NPS locations and regions.
Scenic Resources		Scenic views are in good condition. The park has undertaken viewshed analyses, buried overhead powerlines, mitigated potential oil and gas development impacts, maintained and restored native vegetation, and planed its interpretive trail with minimal impacts visible to the public.
Sense of Place		The park is located in a rural agricultural setting, which maintains much of the integrity of the landscape as it existed at the time of the Sand Creek Massacre. There is little development within the park boundaries and the General Management Plan has identified a preferred alternative that will maintain the park's "sense of place" into the future. Few additions to the park's current infrastructure footprint will take place under the preferred alternative.
Safety		The safety of visitors is a park priority. The park provides a safety briefing with each visitor orientation. Site bulletins covering a variety of safety topics are available to visitors as handouts. Safety briefings are held monthly during staff meetings and the park is part of a multi-park safety "zone" administered by a professional safety officer. The park has had no lost time accidents and no visitor safety issues since it opened to the public in 2007.
Partnerships		The park works in close collaboration with its legislated partners including the Northern and Southern Cheyenne and Arapaho Tribes, the State of Colorado and Kiowa County. It also maintains close working relationships with park neighbors and numerous other informal partners.
<b>Park Infrastructure</b> <a href="#">web</a> ▶		
Overall Facility Condition Index		The assets at Sand Creek Massacre Site have an overall FCI of 0.102, which warrants Concern based on industry and NPS standards. FCI is the cost of repairing an asset, such as a building, road, trail, or water system, divided by the cost of replacing it. Many proposed maintenance items and upgrades to infrastructure remain unfunded at the park.

# Summary of Stewardship Activities and Key Accomplishments to Maintain or Improve Priority 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

Completed baseline environmental monitoring includes: groundwater monitoring, pollen analysis, vegetation inventory, exotic plant monitoring, revegetation planning, paleontological inventory, vertebrate inventory, rare species documentation, insect identification, native fish identification, bird monitoring, prairie dog status documentation, prairie and wetland survey, natural resource condition assessment, acoustic soundscape monitoring, air quality assessment, viewshed status assessment, riparian condition assessment, soils identification and fire management planning. A reptile survey is planned for 2017.

## Cultural Resources

The park has completed numerous research and compliance archeological surveys and testing projects in collaboration with the Cheyenne and Arapaho Tribes; approximately 50% of parklands have been rigorously surveyed. The park continues acquisition and digitization of numerous significant archival collections. The park's museum collection is managed and maintained in accordance with NPS standards. The park works in close collaboration with the Cheyenne and Arapaho Tribes and has assisted them with repatriation of remains of several victims of the Sand Creek Massacre, all of whom are interred on-site. The park has also completed an Ethnographic Overview and Assessment and manages the ethnographic landscape in collaboration with the Tribes. Park staff worked for about five years on extensive archeological, historical, hydrological, and geomorphological research to determine the historic configuration of the Big Sandy Creek channel and location of the Cheyenne and Arapaho village site, which is critical to the stewardship of park resources and the interpretation. NPS staff continues extensive genealogical and primary documentation and historical research in collaboration with a team of subject matter experts and tribal representatives.

## Visitor Experience

The park completed its first General Management Plan in 2016 and in the process of completing a Foundation Document and the park's first Long Range Interpretive Plan. All interpretive themes have been developed and approved in consultation with the Cheyenne and Arapaho Tribes. The park has been working in partnership with Kiowa County for more than 10 years on the rehabilitation of a historic building on the main street of the park's gateway community to serve as a Visitor and Research Center. The facility will contextualize the visitor experience at the massacre site itself. The park anticipates completion of the facility by 2018. After twelve years of joint efforts, the park acquired 640 acres of former state land for inclusion in the park boundaries. The new addition will enable development of a vehicle pull-out with wayside exhibits to orient visitors to the massacre site upon arrival.

## Park Infrastructure

The park office is a remodeled ranch headquarters. The former ranch maintenance shop has been entirely repurposed and upgraded into a state-of-the-art park maintenance shop. The former ranch office has been refashioned into a conference room in which to host tribal consultations and other NPS meetings. The park has reduced energy and water consumption by installing an on-demand hot water heater, replacing lighting with LED fixtures, and installing low-flow toilets. The security camera system is also solar powered.

# Key Issues and Challenges for Consideration in Management Planning

Primary considerations in current management planning include:

- Staff Succession planning
- Maintaining tribal relationships
- Cultural landscape maintenance and External Development Threats (mineral leasing, oil and gas drilling, and wind turbine installation)

## Staff Succession

The permanent staff of the Sand Creek Massacre National Historic Site has grown from one project director in 2001, to four by the time the park was officially established and opened to the public 2007, to 9.5 today, in addition to 2–3 non-permanent staff members seasonally. The majority of these employees have been with the park for a decade or more, and a few have been with it since the initial site location study in 1999, before the park was authorized for establishment. These employees, especially in concert with a well-established and long-term group of tribal representatives and other subject matter experts, constitute an irreplaceable body of knowledge about the Sand Creek Massacre, the massacre site itself, and the history and creation of the national historic site.

Half of the permanent staff is eligible for retirement by 2018. One exceedingly knowledgeable ranger who has been with the park since before it was even established retired this year, and too many of the tribal representatives who have been integral to the park's founding and foundational management planning have already passed away. The knowledge that is lost with each and every departing individual could easily leave huge gaps in the background information necessary for new managers and administrators to make informed decisions, especially for such a sensitive site built upon long-term tribal relationships. In anticipation of these significant retirements and turnover of long-term permanent staff, the park *must* implement a comprehensive method for gathering institutional knowledge. The visitor experience could be threatened and a major loss of institutional knowledge could occur if an ongoing comprehensive method of data collection and information transfer is not completed prior to staff departures.

## Maintaining Tribal and Partner Relationships

Encouraging and maintaining partnerships between the National Park Service and the representative of the Cheyenne and Arapaho tribes and descendants is essential to the success of the park. The park staff continues to develop and maintain strong relationships with History Colorado, Kiowa County, park neighbors, the State of Colorado, and especially the Cheyenne and Arapaho tribes. These relationships must be maintained by future park administrations for the park to remain successful.

# Chapter 1. Introduction

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The purpose of this State of the Park report for Sand Creek Massacre National Historic Site (SAND) is to assess the overall condition of the park's priority resources and values, to 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.

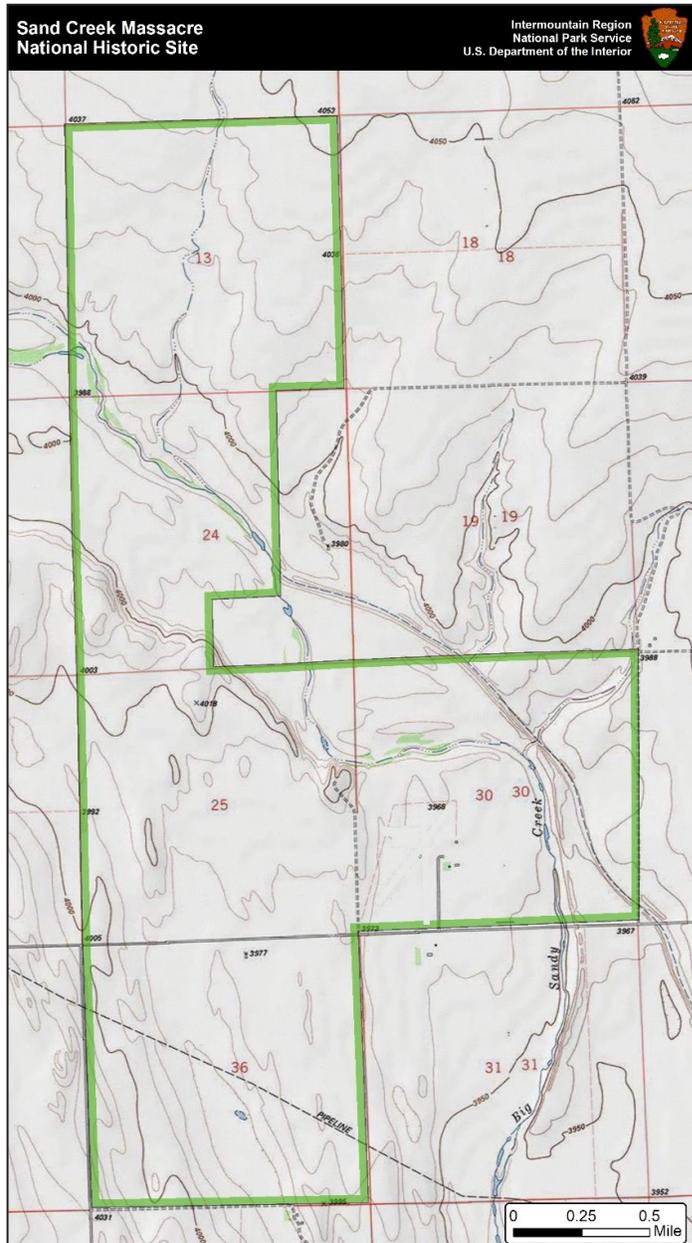
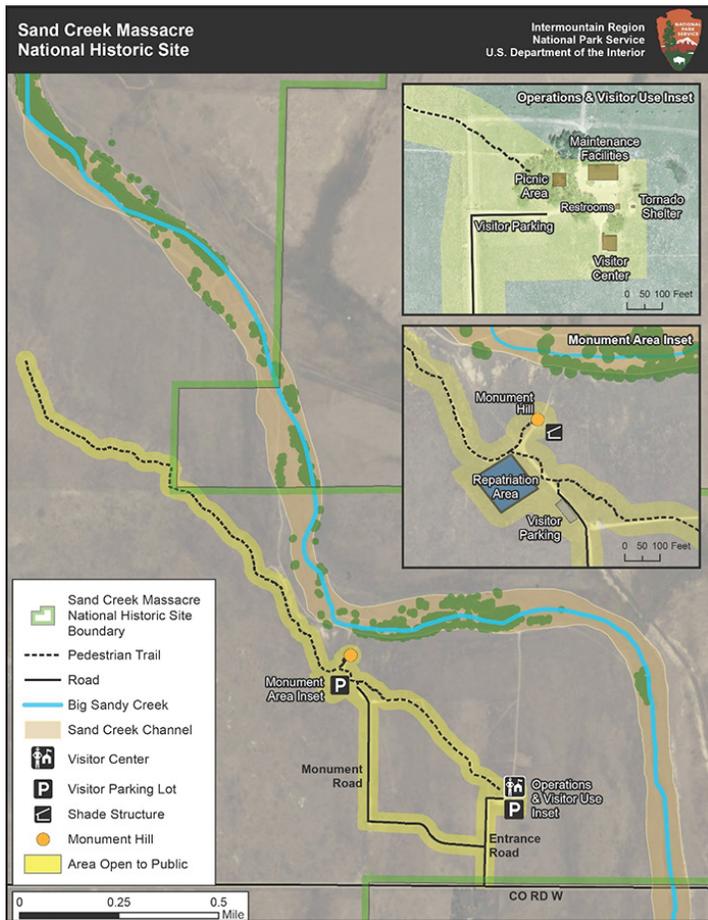
The Sand Creek Massacre occurred on November 29, 1864, when a 675-man force of Colorado U.S. Volunteer Cavalry attacked and destroyed a village of Cheyenne and Arapaho in southeastern Colorado Territory, killing and mutilating an estimated 230 Cheyenne and Arapahoe, about two-thirds of whom were women and children.

The purpose of Sand Creek Massacre National Historic Site is to protect and preserve the landscape of the massacre site and interpret the associated cultural values to enhance public understanding of the massacre and assist in minimizing the chances of similar incidents in the future. The park was authorized by Public Law 106-465 on November 7, 2000, in order to "recognize the national significance of the massacre in American history, and its ongoing significance to the Cheyenne and Arapaho people and the descendants of the massacre victims." The Act authorized the NPS to acquire up to 12,500 (+/-) acres for inclusion in the National Historic Site and directed the NPS to acquire enough of the massacre site lands to adequately protect, memorialize, and interpret them. By 2007, the core area of the massacre site, encompassing 2,385 acres, had been acquired by the NPS and the Sand Creek Massacre National Historic Site was officially established on April 28, 2007.

Statements of significance describe why an area is important within a global, national, regional, and system-wide context. These statements are linked to the purpose of the park and are supported by data, research, and consensus. Significance statements describe the distinctive nature of the park and inform management decisions, focusing efforts on preserving and protecting the most important resources and values of the park unit. SAND is significant because:

- The site of the Sand Creek Massacre has a sacred significance to the Cheyenne and Arapaho tribes, particularly those tribal members who are descended from victims and survivors of the massacre.
- The site is a reminder of the tragic extremes of the 500 years of conflict between American Indians and European Americans over land that now comprises the United States.
- The intense distrust resulting from the Sand Creek Massacre influences virtually all subsequent conflicts between American Indians and the U.S. Army.
- The Sand Creek Massacre is an essential symbol of the struggles of American Indian tribes to maintain the ancestral ways of life.
- The massacre profoundly disrupted the social, political, and economic structures of the Cheyenne and Arapaho tribes.
- By eliminating most Cheyenne advocates for peace, the massacre hardened resistance to white expansion and escalated warfare between the army and the Cheyenne, Arapaho and the Sioux tribes.
- The circumstances of the massacre elicited widespread outrage, even against the backdrop of the Civil War, which forced substantial changes to U.S. Indian policy.

# Maps of the Park



# 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 provides 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.

The status and trends documented in Chapter 2 provide a useful point-in-time baseline measured against reference conditions that represent “healthy” ecosystem parameters, or regulatory standards (such as those related to air or water quality). We also note that climate change adaptation requires us to continue to learn from the past, but attempting to manage for conditions based on our understanding of the historical “natural” range of variation will be increasingly futile in many locations. Thus, these reference conditions, and/or our judgment about resource condition or trend may evolve as the rate of climate change accelerates and we respond to novel conditions. Our management must be even more “forward looking,” to anticipate plausible but unprecedented conditions, also recognizing there will be surprises. In this context, we will incorporate climate considerations in our decision processes and management planning as we consider adaptation options that may deviate from traditional practices.

## 2.1. Natural Resources

Air Quality  <a href="#">web</a> ►			
Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Ozone	Human Health: Annual 4th-Highest 8-Hour Concentration		<p>Human health risk from ground-level ozone warrants moderate concern at the park. This condition is based on NPS Air Resources Division benchmarks and the 2009–2013 estimated ozone of 73.2 parts per billion (ppb).</p> <p>No trend information is available because there are not sufficient onsite or nearby ozone monitoring data. The degree of confidence is medium because estimates are based on interpolated data from more distant ozone monitors.</p> <p>The park contains two ozone-sensitive plant species, Indianhemp and Groundnut, with the latter serving as an ozone bioindicator. Bioindicator species are more likely to exhibit ozone damage before other species are impacted by higher ozone levels.</p>

## Air Quality (continued)

[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Ozone</b>	Vegetation Health: 3-month maximum 12hr W126		<p>Vegetation health risk from ground-level ozone warrants significant concern at the park. This condition is based on NPS Air Resources Division benchmarks and the 2009–2013 estimated W126 metric of 17.6 parts per million hours (ppmhrs). The W126 metric relates plant response to ozone exposure.</p> <p>No trend information is available because there are not sufficient onsite or nearby ozone monitoring data. The degree of confidence is medium because estimates are based on interpolated data from more distant ozone monitors.</p>
<b>Deposition</b>	Sulfur Wet Deposition		<p>Wet sulfur deposition is in good condition at the park. This condition is based on NPS Air Resources Division benchmarks and the 2009–2013 estimated wet sulfur deposition of 0.8 kilograms per hectare per year (kg/ha/yr). Acidification effects can include changes in water and soil chemistry that impact ecosystem health.</p> <p>No trend information is available because there are not sufficient onsite or nearby deposition monitoring data. The degree of confidence is medium because estimates are based on interpolated data from more distant deposition monitors.</p>
	Nitrogen Wet Deposition		<p>Wet nitrogen deposition warrants moderate concern at the park. This condition is based on NPS Air Resources Division benchmarks and the 2009–2013 estimated wet nitrogen deposition of 2.8 kilograms per hectare per year (kg/ha/yr). Nitrogen deposition may disrupt soil nutrient cycling and affect biodiversity of some plant communities.</p> <p>No trend information is available because there are not sufficient onsite or nearby deposition monitoring data. The degree of confidence is medium because estimates are based on interpolated data from more distant deposition monitors.</p>
<b>Visibility</b>	Haze Index		<p>Visibility warrants moderate concern as scenic views are sometimes obscured by pollution-caused haze at the park. This condition is based on NPS Air Resources Division benchmarks and the 2009–2013 estimated visibility on midrange days of 5.2 deciviews (dv) above estimated natural conditions.</p> <p>No trend information is available because there are not sufficient onsite or nearby visibility monitoring data. The degree of confidence is medium because estimates are based on interpolated data from more distant visibility monitors.</p>

## Water Resources


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Surface Water Quantity Big Sandy Creek</b>	Flow Rate and Frequency of Flooding		<p>The intermittent Big Sandy Creek bisects the park and flows infrequently following heavy and prolonged rain events. Occasional flow events, perennial springs, and perennial pools of the Big Sandy Creek provide water in an otherwise arid landscape, making water a unique and precious resource in the park.</p> <p>Data from dataloggers installed in shallow riparian monitoring wells along Big Sandy Creek in 2011 indicate two surface water flow events in the five-year period from May 2011 to June 2016.</p> <p>Water quality is not currently monitored.</p>
<b>Shallow Groundwater</b>	Depth to Groundwater		<p>The park is underlain by a thin layer of Quaternary deposits, which overlay relatively impermeable Cretaceous bedrock. Precipitation, spring flow, and occasional surface flows infiltrate the permeable valley-fill deposits and create a shallow perched aquifer above the impermeable bedrock.</p> <p>Shallow riparian groundwater levels have been monitored at Sand Creek since 2007 when 12 monitoring wells were installed along Big Sandy Creek. Data indicate a seasonal trend in shallow groundwater levels and quick response to large rain events. Water levels are highest in wells adjacent to the active channel.</p>
<b>Hydrology</b>	Floodplain and channel characteristics		The sinuosity, width/depth ration, and gradient all appear to be in balance with landscape setting. In certain reaches the channel is more incised but in general was considered “on-grade.” No evidence of excessive sediment inputs or adverse changes to channel form has been observed.
	Riparian wetland area		Riparian zone is near or at potential extent. Plains cottonwoods occupy most of the lower terraces in most of the reaches. Sinuosity is reestablishing in a slightly incised channel along reach #2, resulting in a widening riparian-wetland zone at this lower elevation. (See Riparian Habitat Table Below)
	Upland watershed		No evidence of excessive sediment inputs or adverse changes to channel form was observed, suggesting no potential issues in the upland watershed.

## Resource Brief: Water on the Prairie

Long-term water-level declines caused by sustained groundwater pumping are a key issue associated with groundwater use, and many areas of the United States are experiencing groundwater depletion. Groundwater resources supply approximately 18% of Colorado's water supply needs. With streams being sparse throughout Colorado's eastern plains, groundwater use is higher compared to surface water withdrawals. Groundwater withdrawal accounts for nearly 100% of use in Kiowa County (Topper et al. 2003).

Running water and pools of the Big Sandy Creek provide water in an otherwise arid landscape, making water a unique resource at the park. Perennial streams are among the most critical and impacted natural resources of the Southern Plains. The presence and extent of surface water has traditionally provided a focus for human habitation in the region, resulting in cultural significance coincident with reliable and abundant rivers, streams, wetlands, and springs. The intermittent Big Sandy Creek bisects the park and flows infrequently following heavy and prolonged rain events. The watershed (HUC8 -11020011) drains approximately 1,850 square miles of southeastern Colorado to the Arkansas River. Occasional flow events, perennial springs, and perennial pools of the Big Sandy Creek provide water in an otherwise arid landscape, making water a unique resource at the park.

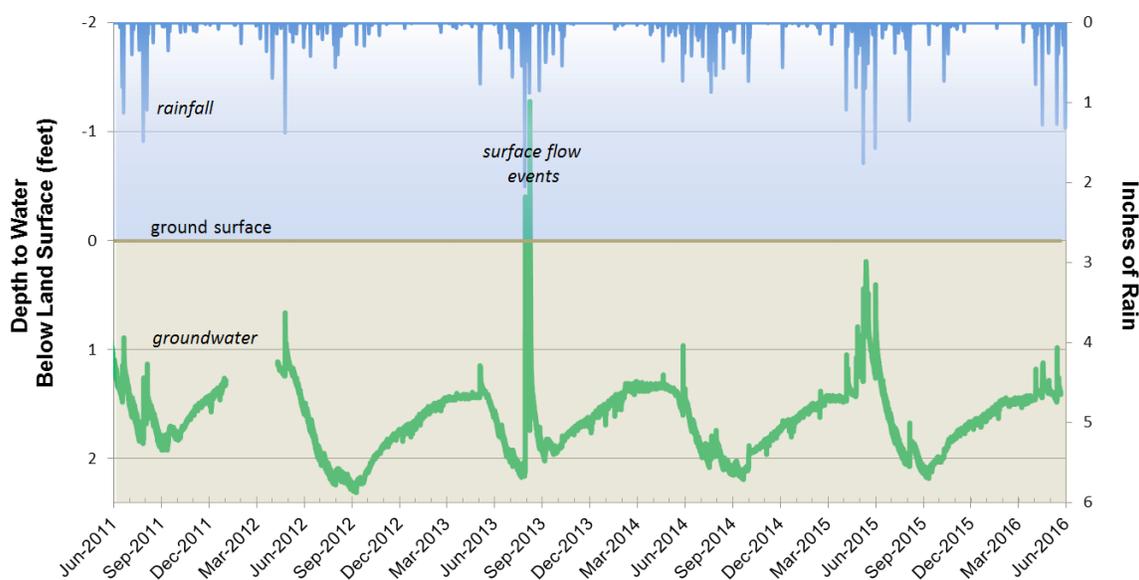
The park is underlain by a thin layer of Quaternary sediments, which overlay relatively impermeable Cretaceous bedrock. Precipitation, spring flow, and occasional surface flows infiltrate the permeable valley-fill deposits and create a shallow perched aquifer above the impermeable bedrock (Martin 2006). The sandy porous soils reduce the amount of precipitation and overland flow reaching the stream course. This combination of watershed conditions limits the magnitude of floods that may be produced by even extreme rain events. Nevertheless, historic floods are evident by cottonwood recruitment events separated by 40–50 years.



Big Sandy Creek runoff in 2007. NPS Photo.

Shallow riparian groundwater levels have been monitored at the park since 2007 when 12 monitoring wells were installed along Big Sandy Creek. Dataloggers logging hourly were installed in three of the monitoring wells in 2011. Data indicate a seasonal trend in shallow groundwater levels and quick response to large rain events (figure below). During the period from May 2011 to June 2016 water levels in one of the monitoring wells indicated surface flow twice in August 2013 following large rain events. These monitoring wells will be used to determine long-term trends in shallow groundwater levels and frequency of surface water flow events.

Preliminary Shallow Groundwater Data at SAND (2011 - 2016)



## Riparian Habitat

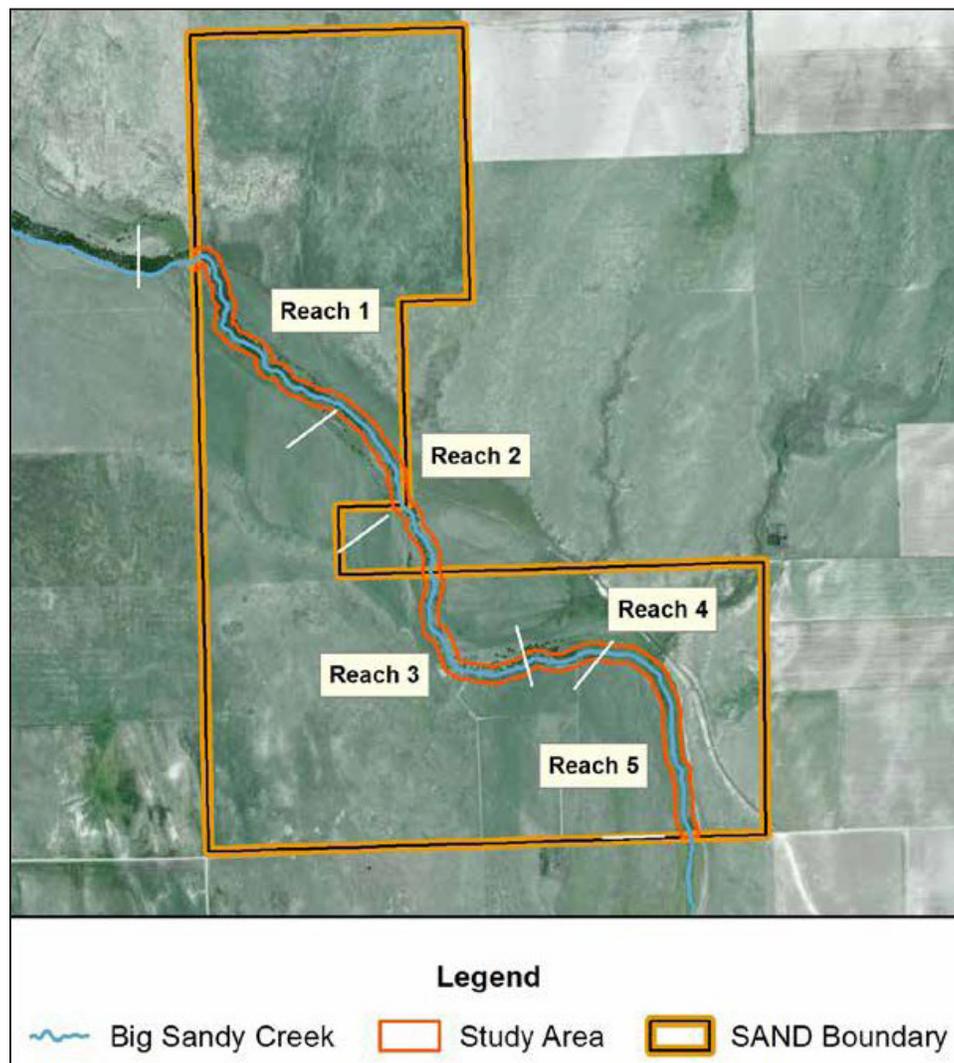

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Riparian Vegetation	Age class distribution of riparian wetland vegetation		Presently three age classes of Plains cottonwood dating back to 1865 are present, but no recruitment for the cottonwoods has occurred since the 1950s.
	Diversity of vegetation composition		Plains cottonwood is essentially the only woody species present but is absent throughout some of the stream reaches. However, a diverse, vigorous, soil-binding herbaceous plant community is likely to maintain channel stability in frequent to moderately frequent floods.
	Soil moisture characteristics		Plant species present were indicative of moist conditions, and a rising water table may be possibly due to Tamarisk removal. All species present are rhizomatous with root masses capable of withstanding frequent to moderately frequent flood flows, though probably not the very large, infrequent floods believed to be associated with cottonwood establishment.
	Plants have root masses capable of withstanding high streamflow events		All species present are rhizomatous with root masses capable of withstanding frequent to moderately frequent flood flows, though probably not the very large, infrequent floods believed to be associated with cottonwood establishment.
	Vigorous plants		Cottonwoods appear healthy along some reaches and are showing signs of age along others. The herbaceous communities exhibit strong vigor, and upland species are not invading the riparian zone.
	Vegetation cover		Greater than 90% native plant cover is present on >90% of banks along all reaches.
	Plant communities are coarse and/or large		No coarse and/or large woody debris was found (nor expected to be found) along the portion of Big Sandy Creek that runs throughout the park.
Channel Erosion	Floodplain and channel characteristics		In certain reaches, the channel is more incised but in general is considered “on-grade.” No evidence of adverse changes to channel form has been observed along any of reaches.
	Lateral stream movement		Lateral movement is related normal stream sinuosity and has occurred within the active floodplain as is evidenced by the distribution of cottonwood trees and older fluvial terraces.
	Balance of water and sediment		No evidence of excessive sediment inputs or adverse changes to channel form was observed in any reaches ( <a href="#">Struthers et al. 2013</a> ).

## Resource Brief: Riparian Habitat

Riparian wetlands are a type of non-tidal wetland formed along river and stream floodplains. These wetlands serve many functions, including water purification, flood control, buffering riverbank erosion, habitat for numerous wildlife, fish, shellfish, and plant species, and also provide many recreational opportunities. In the arid west, riparian habitat is often in marked contrast with the surrounding terrestrial vegetation and is strongly influenced by the presence or absence of water ([Martin 2011](#)).

An interdisciplinary team of experts from NPS' Water Resources Division and Southern Plains Inventory and Monitoring Network conducted a qualitative riparian habitat assessment at the park along Big Sandy Creek (Martin et al. 2012), using "A User Guide to Assessing the Proper Functioning Condition and the Supporting Science for Lotic Areas" developed by Prichard et al. (1998). This assessment included three main categories including hydrology, vegetation, and erosion/deposition. A total of 17 common attributes and processes within each of these three categories were assessed. Big Sandy Creek was divided into 5 separate reaches and, all indicators, throughout all reaches, were considered to be in good condition.



## Grasslands


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Soil Stability	Active erosion of soils by wind and water		<p>Soil stability is a measure of the capacity of an area to limit redistribution and loss of soil resources by wind and water. Soils at the park were significantly impacted by accelerated wind erosion on arid croplands as part of the Dust Bowl in the 1930s and from subsequent agricultural practices such as mechanical cultivation, irrigation, and livestock grazing.</p> <p>No major disturbance to grassland soil is currently present. Soil stability continues to improve as the site remains undisturbed from agricultural operations.</p> <p>Areas with previous, and possibly future, prairie dog activity represent a departure from historic ecosystem communities, but are also within the realm of what would be expected on these sites based on Natural Resources Conservation Service models for this area.</p>
	Presence of bare ground		<p>Amount and size of bare areas match that expected for the site. Bare areas are small and rarely connected.</p> <p>Other stressors to the soil resources include a former prairie dog town in the southeast corner of the park which resulted in a severe denudation of herbaceous cover, and a dramatic increase in bare ground, highly susceptible to wind and water erosion. A recent plague epidemic has eliminated the prairie dogs, and the herbaceous cover has increased to a degree in which the soil resources are much better protected from erosion.</p>
	Quality and intactness of protective layer of vegetation and resistant soils		Surface soil is stabilized by organic matter decomposition products and/or a biological crust.
Biotic Integrity	Species composition, landscape-scale diversity		The patterns of plant community distribution generally match what is expected based on soil types, moisture availability, and landscape disturbance, and are improving as areas previously converted to crop agriculture are being restored.
	Species composition locally		Local species composition is primarily native species that would be expected for the site, given the soil types present and disturbance history.
	Response of annual species to disturbance		<p>It is generally expected that the number of annual species at a given site would be higher immediately following a disturbance, and would shift toward an increasing number of perennials as time passes since a disturbance. The persistence of annuals after a disturbance could indicate some basis for concern. For example, roadside areas that are frequently and unnaturally disturbed might be expected to have a greater persistence of annual species compared to interior sites.</p> <p>Grasses present onsite are nearly all perennial, indicating plant ecosystem stability. Herbaceous flowering plants are considerably more variable among sites and years, but also tend to have a high proportion of perennial species.</p>

## Grasslands (continued)

[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Biotic Integrity</b> (continued)	Relative proportion of cool and warm season grass species		Shortgrass prairies are typically dominated by perennial warm season grasses, and such grasses have evolved to cope with the stresses associated with short grass prairies (e.g., grazing and drought). Park sites were dominated by warm season grasses, which is what would be expected in a healthy shortgrass prairie.
<b>Hydrologic Function</b>	The capacity of an area to capture, store, and safely release water (from rainfall, run-on, and snowmelt) and to resist or recover after disturbance		The overall current condition of the soil and site stability and hydrologic function is good.

### Resource Brief: Grasslands

Grasslands at the park are an important part of its cultural heritage. Consultations with the Cheyenne and Arapaho tribes have identified protection of the landscape as one of the highest natural resource priorities at the park. The grasslands were home to native cultures and the native flora and fauna, most notably, the vast herds of buffalo, and were essential to the way of life for the plains tribes. While Sand Creek Massacre NHS is situated within the broad category of shortgrass steppe, there is also considerable variation in grasslands throughout the park ([Neid et al. 2007](#), [Roath et al. 2008](#)).

The central grassland region of North America is one of the largest contiguous grassland environments on earth (Lauenroth et al. 2008), and depending on which classification is used, there are at least three distinct grassland types: tallgrass prairie, mixed grass prairie, and shortgrass steppe (prairie). The shortgrass steppe is located in the warmest and driest area and is the least productive of all grassland types, uniquely adapted to survive drought conditions (Lauenroth et al. 2008). The species that characterize the archetypal shortgrass steppe are blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloedactyloides*).

As with most ecological communities, shortgrass prairie system driver patterns have changed. Early land use consisted primarily of Native Americans hunting the open plains for bison. In the years following the 1864 massacre, land use of the grasslands shifted to open cattle grazing, which later gave way to stock farming and other agriculture. As settlement continued, changes in fire patterns and fire frequency followed. The absence of fire is generally thought to have contributed to an increase in sand sage in the southwest grassland areas. In addition to herbivory and fire, climate change is and will continue to increasingly impact the shortgrass prairie region, creating changes in temperature and precipitation patterns and amounts ([Morgan et al. 2008](#)), which in turn will affect the plants and animals native to the shortgrass ecosystem.



**Grassland at Sand Creek Massacre NHS. NPS Photo by Heidi Sosinski.**

## Exotic Plants


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Presence of Invasive Species	Significance of Impact		<p>29 exotic species have been identified at the park. Ranking the highest in significance of impact were the field bindweed (<i>Convolvulus arvensis</i>), Kentucky bluegrass (<i>Poa pratensis</i>), cheatgrass (<i>Bromus tectoruma</i>), and yellow/white sweetclovers (<i>Melilotus officinalis/Melilotus alba</i>). Cheatgrass is well known for its ability to dramatically change an ecosystem sometimes irreversibly. Field bindweed is an aggressive competitor, especially during dry conditions.</p> <p>Known distributions of the highest ranked species have been mapped. Overall, the sweetclovers and kochia (<i>Kochia scoparia</i>) appear to be the most widely distributed throughout the park.</p> <p>Invasive species have been directly linked to the replacement of dominant native species (Tilman 1999), the loss of rare species (King 1985), changes in ecosystem structure, alteration of nutrient cycles and soil chemistry (Ehrenfeld 2003), shifts in community productivity (Vitousek 1990), reduced agricultural productivity, and changes in water availability (D'Antonio and Mahall 1991). Many NPS parks are faced with significant challenges in control and management of these pests.</p> <p>The majority of the invasive plants at the park are found along the high traffic and disturbance corridors, including road sides and trails. In addition, the majority of exotic species are easily controlled due to their biologic characteristics and establishment on only the edge of the park. A park-wide survey for exotic species found 57% of all plots sampled contained no exotic plants (2012). The park treats 100 acres of exotics annually by mowing, chemical application, and re-seeding.</p>
Invasive Species Eradication	Feasibility of Control		<p>A variety of invasive species ranked highly difficult to control are present in the park, including field bindweed, prickly Russian thistle (<i>Salsola tragus</i>), and yellow/white sweetclovers. However, distribution of these species primarily along roadsides and trails simplifies abatement effort.</p>
Location and Distribution of Invasive Plants	Proportion of High Priority Blocks Infested		<p>Prickly Russian thistle and Kochia were by far the most widespread throughout areas with high risk of new invasions (e.g., along roads, trails and boundaries) between 2011 and 2013 (<a href="#">Struthers et al. 2013</a>), with 56% and 49% detection rates, respectively.</p>
	Proportion of Interior Blocks Infested		<p>More than half (57%) of the blocks surveyed for exotics were exotics-free in 2013 park-wide survey. Of the exotics detected, Kochia and prickly Russian thistle were the most common, detected in 26% and 23% of plots, respectively (<a href="#">Struthers et al. 2013</a>).</p>

Birds				<a href="#">web</a> ▶
Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale	
<b>Species Occurrence</b>	Temporal Context		Of 64 bird species observed at the park in 2005 or 2006, 42 were detected in more recent surveys (in 2009–2012). Twenty-two were not detected in recent surveys. However, each of the 22 species were either outside of their normal breeding range or breeding habitat for them, and only “possibly exist” at the park.	
	Spatial Context		Forty-one species were observed during 2001–2005 regional surveys that have the potential to occur at the park, but were not detected during recent surveys. However, only 16 of the 41 species are within their normal breeding ranges. Of the 16 species, 12 are in the “limited to none” breeding habitat class and four are in the “possibly exists” class. Therefore, there is no particular concern with having not observed these 41 species during recent surveys at the park.	
	Conservation Context		Eighteen native species that have been reported to occur at the park are listed by one or more organization as being of conservation concern. Of these, we consider seven species to have high conservation potential at the park; these are species that are within their normal breeding range and have sufficient habitat at the park to support their breeding. All of the seven species have been observed during all four years of recent surveys (2009–2012), except for the Burrowing Owl, which was not detected in 2010–2012 (since the black-tailed prairie dog population crashed). However, periodic episodes of plague in prairie dogs are not unusual and given the association between burrowing owls and prairie dogs, their current absence does not warrant concern.	

## Resource Brief: Landbirds

Landbirds are a conspicuous component of many ecosystems, and changes in landbird populations may be indicators of change in the biotic or abiotic components of the environment upon which they depend (Canterbury et al. 2000; Bryce et al. 2002). Landbirds are also highly detectable and can be efficiently surveyed with the use of numerous standardized methods (Bibby et al. 2000; Buckland et al. 2001). In addition to being good indicators of ecosystem change, landbird communities are inherently valuable.

The condition of landbirds at the park was assessed using species occurrence (presence/absence). The study evaluated species occurrence in three contexts: a temporal context, a spatial context, and a conservation context. The primary sources of information for the assessment were annual breeding season surveys conducted by Rocky Mountain Bird Observatory (RMBO) in 2009–2012, a bird inventory and survey by RMBO in 2005, a rare vertebrate species inventory by the Colorado Natural Heritage Program in 2006, and surveys conducted by RMBO in the surrounding region in 2001–2005.

A total of 72 bird species have been reported to occur at the park, with 50 of the species occurring within their primary breeding ranges. The temporal species occurrence comparison found that, of 64 bird species detected at the park in 2005 or 2006, 42 were detected in recent surveys. Twenty-two were not detected in recent surveys. However, each of the 22 species were either outside of



**Burrowing owls at Sand Creek Massacre NHS. NPS Photo.**

## Resource Brief: Landbirds (continued)

their normal breeding range or breeding habitat or them only “possibly exists” at the park. The spatial comparison found that 41 species were observed during the 2001–2005 RMBO regional surveys that have the potential to occur at the park but were not detected during recent RMBO surveys at the park. However, based on the status of their breeding ranges and breeding habitat preferences, we do not have any concerns with the list of 41 species.

Eighteen native species that have been reported to occur at the park are listed by one or more organization as being of conservation concern. Of these, seven species are considered to have high conservation potential; these are species that are within their normal breeding range, and sufficient habitat exists at the park to support their breeding. All of the seven species have been observed during all four years of recent surveys, except for the Burrowing Owl. This species has not been observed in the three most recent years of surveys (2010–2012); the species has not been detected since the black-tailed prairie dog population was decimated at the park. Overall, the condition of landbirds at the park is good.

Prairie Dogs				<a href="#">web</a> ▶
Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale	
Presence of Prairie Dogs	Area of Prairie Dog Colony		The north colony decreased from 9.88 acres occupied in 2009 to 0 acres in 2010. The south colony decreased from 153.20 acres occupied in 2009 to 0 acres in 2010. The sylvatic plague is thought to have killed all prairie dogs in and adjacent to the park in early 2010, and no prairie dogs have been observed since that time.	
	Density of Prairie Dogs per Acre		The density of prairie dogs in the north colony decreased from 13.3 prairie dogs per acre (measured in 2006) to 0 in 2010. The density in the south colony decreased from 17.8 prairie dogs per acre in 2009 to 0 in 2010. The sylvatic plague killed prairie dogs in the north and south colonies in early 2010, and no prairie dogs have been observed at the park since that time.	

## Resource Brief: Prairie Dogs



**A black-tailed prairie dog feeding near a burrow in Wind Cave National Park. NPS Photo.**

Prairie dogs are an important component of the ecosystems they inhabit. They directly and indirectly affect grasslands through their grazing and burrowing and as prey (Kotliar et al. 2006). Through their foraging and clipping of vegetation to maintain their habitat, as well as the mixing of subsoil and topsoil during excavations, prairie dogs affect the redistribution of minerals and nutrients, encourage penetration and retention of moisture, and affect plant species composition (Kotliar et al. 2006). Prairie dog burrows and colony sites provide shelter and nesting habitat for a variety of animals (e.g., burrowing owls), and many animals prey on prairie dogs (e.g., American badgers, bobcats, ferruginous hawks).

In early 2010, the black-tailed prairie dog colonies on the park were decimated by sylvatic plague, with no apparent survivors. As of early 2013, the colonies have not returned. However, because of the significant ecological role that prairie dogs play in the landscape, and because they may eventually return to their once-inhabited towns, the park included them in their Natural

Resources Condition Assessment. Primary information sources for the assessment were a 2006 rare vertebrate species inventory conducted by the Colorado Natural Heritage Program, the park’s prairie dog management plan and environmental assessment (Sovell et al. 2008), and a study on the prairie dog populations at the park (Pigg and Cully 2010). Our assessment looked at changes in the area occupied/density of prairie dogs over time. These measures were estimated for both prairie dog colonies in some years from 2001–2009.

## Dark Night Sky


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Anthropogenic Light</b>	Anthropogenic Light Ratio (ALR) — Average Anthropogenic Sky Glow: Average Natural Sky Luminance		A photic environment is described as the physical amount and character of light at a particular location, irrespective of human perception. The NPS Night Sky Program characterizes a park's photic environment by measuring both anthropogenic and natural light. All-sky Light Pollution Ratio (ALR) is a measure of light pollution calculated as the ratio of median Anthropogenic Sky Glow to average Natural Sky Luminance. ALR for Sand Creek massacre National Battlefield is 0.22, which is considered good condition. While the populations of Denver and Colorado Springs have grown over the past four years (10.6% and 7.1%), trend is neutral due to the large distance of these cities to the park, 250 km and 200 km respectively.

## Resource Brief: Night Sky Resources

The night sky has been a source of wonder, inspiration, and knowledge for thousands of years. Unfettered night skies with naturally occurring cycles of light and dark are integral to ecosystem function as evidenced by the fact that nearly half the species on earth are nocturnal. The quality of the nighttime environment is relevant to nearly every unit of the NPS system as the nighttime photic environment and its perception of it by humans (the lightscape) are both a natural and a cultural resource and are critical aspects of scenery, visitor enjoyment, and wilderness character.

### Condition and Functional Consequences

Night sky quality at Sand Creek Massacre National Historic Site is good with a median ALR of 0.22. This is considered a good condition for non-urban parks. At these light levels, the Milky Way is visible from horizon to horizon and may show great detail, with fine details such as the Prancing Horse. Zodiacal light (or “false dawn” which is faint glow at the horizon just before dawn or just after dusk) can be seen under favorable conditions, and there is negligible impact to dark adaptation of eyesight in any direction. The park's night sky resources are more susceptible than brighter locations to degradation from anthropogenic light sources.

### Assessment

One way the Natural Sounds & Night Sky Division (NSNSD) scientists measure the quality of the photic environment is by measuring the median sky brightness levels across a park and comparing that value to average natural night sky luminance. This measure, called the All-sky Light Pollution Ratio (ALR), can be directly measured with ground based measurements, or when these data are unavailable are modeled. The GIS model, calibrated to ground based measurements in parks, is derived from the 2001 World Atlas of Night Sky Brightness, which depicts zenith sky brightness (the brightness directly above the observer). Anthropogenic light up to 200 kilometers from parks may degrade a park's night sky quality, and is considered in the neighborhood analysis. This impact is illustrated in the corresponding ALR map with a 200 km ring around the park center.

The ALR thresholds are applied spatially to the park. For both urban and non-urban parks, the designated condition (green, amber, red) corresponds to the ALR level that exists in at least half of (median condition) the park's landscape (table below). Thus it is probable that a visitor will be able to experience the specified night sky quality. It is also probable that the majority of wildlife and habitats found within the park will exist under the specified night sky quality. For parks with lands managed as wilderness, the designated condition is based on the ALR level that exists in more than 90% of the wilderness area.

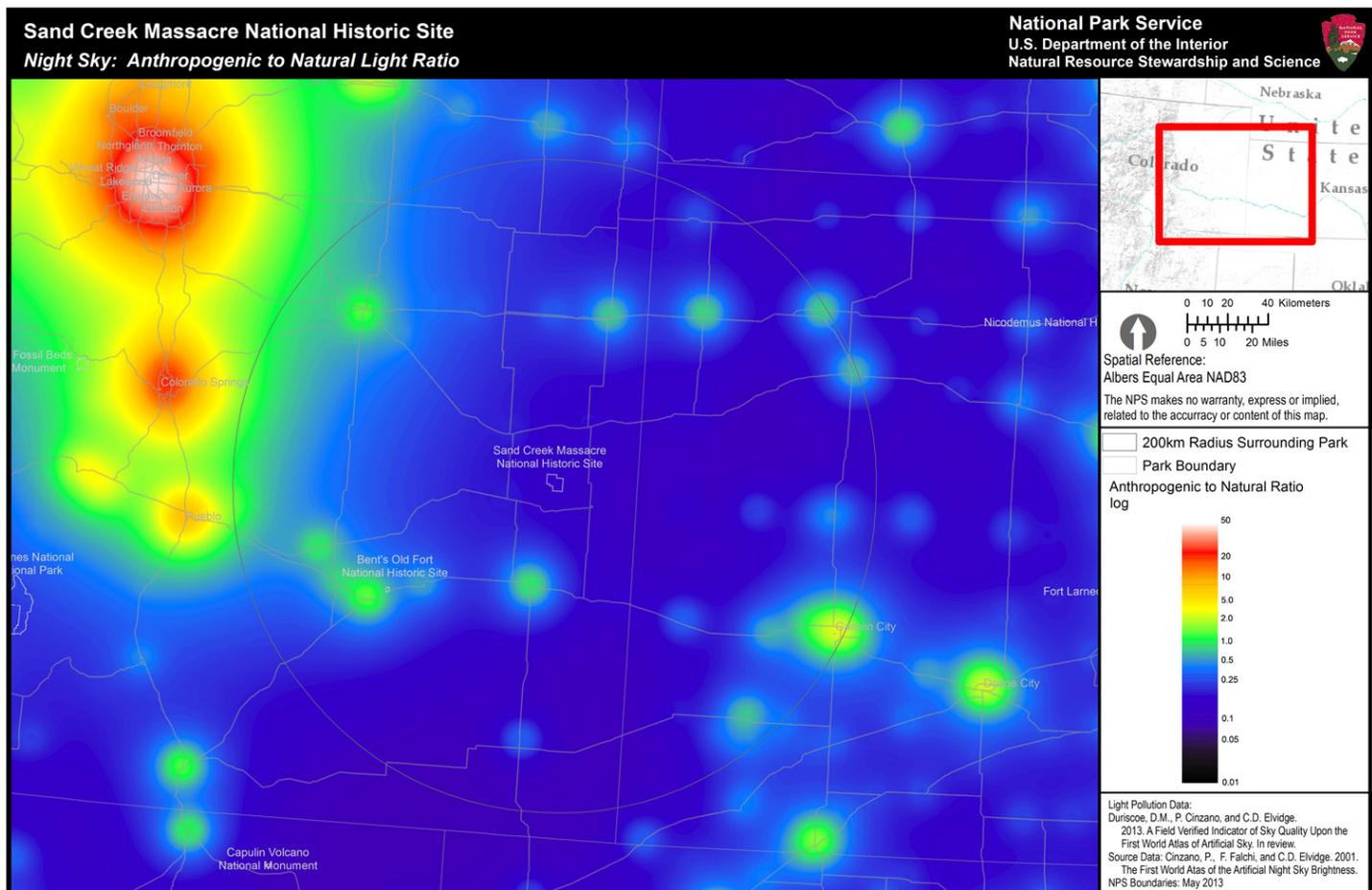
### Criteria for Impact

Two impact criteria were established to address the issue of urban and non-urban park night sky resources. Parks within urban areas, as designated by the U.S. Census Bureau, are considered less sensitive to the impact of anthropogenic light and are assessed using higher thresholds of impact. Parks outside of designated urban areas are considered more sensitive to the impact of anthropogenic light and are assessed using lower thresholds of impact. According to the U.S. Census Bureau, Sand Creek Massacre National Historic Site is categorized as non-urban, or more sensitive (U.S. Census Bureau 2010). Learn more in the document [Recommended Indicators of Night Sky Quality](#), and the NPS Natural Sounds & Night Skies Division [website](#).

## Resource Brief: Night Sky Resources (continued)

### Thresholds for Level 1 and 2 Parks

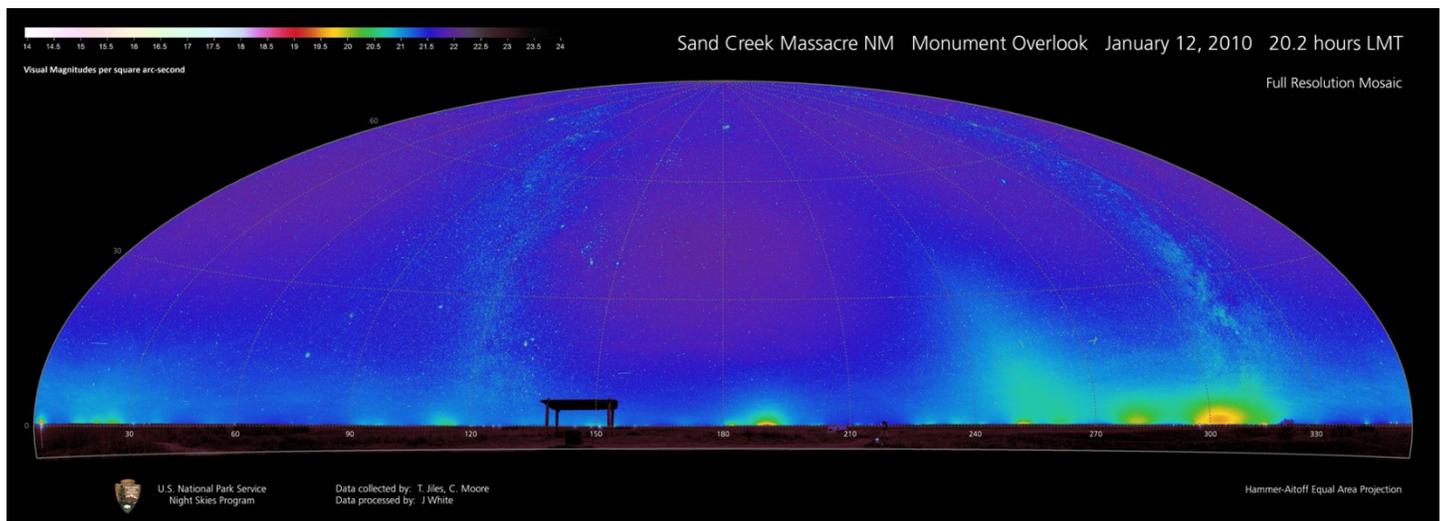
Indicator	Threshold for Level 1 Parks – Non-Urban	Additional Threshold for Areas Managed as Wilderness	Threshold for Level 2 Parks – Urban
<p>Anthropogenic Light Ratio (ALR)— Average Anthropogenic All-Sky Luminance : Average Natural All-Sky Luminance</p> <p>Light flux is totaled above the horizon (the terrain is omitted) and the anthropogenic and natural components are expressed as a unitless ratio</p> <p>The average natural sky luminance is 78 nL</p>	<p>ALR &lt; 0.33 (&lt;26 nL average anthropogenic light in sky) <i>At least half of park area should meet this criteria</i></p>	<p>ALR &lt; 0.33 (&lt;26 nL average anthropogenic light in sky) <i>At least 90% of wilderness area should meet this criteria</i></p>	<p>ALR &lt; 2.00 (&lt;156 nL average anthropogenic light in sky) <i>At least half of park area should meet this criteria</i></p>
	<p>ALR 0.33–2.00 (26–156 nL average anthropogenic light in sky) <i>At least half of park area should meet this criteria</i></p>	<p>ALR 0.33–2.00 (26–156 nL average anthropogenic light in sky) <i>At least 90% of wilderness area should meet this criteria</i></p>	<p>ALR 2.00–18.00 (156–1404 nL average anthropogenic light in sky) <i>At least half of park area should meet this criteria</i></p>
	<p>ALR &gt; 2.00 (&gt;156 nL average anthropogenic light in sky) <i>At least half of park area should meet this criteria</i></p>	<p>ALR &gt; 2.00 (&gt;156 nL average anthropogenic light in sky) <i>At least 90% of wilderness area should meet this criteria</i></p>	<p>ALR &gt; 18.00 (&gt;1404 nL average anthropogenic light in sky) <i>At least half of park area should meet this criteria</i></p>



NPS Natural Sounds & Night Skies Division and NPS Inventory and Monitoring Program MAS Group 20130617

**Regional view of anthropogenic light near Sand Creek Massacre National Historic Site. White and red represents more environmental influence from artificial lights while blues and black represent less artificial light. This scale shows regional context and how far reaching the impacts of artificial lighting can be. While the park may be influenced by artificial light it still maintains more naturalness than surrounding areas and serves as a harbor of dark skies.**

## Resource Brief: Night Sky Resources (continued)



Panoramic image of all (natural and anthropogenic) sources of light as observed from Monument Overlook at Sand Creek Massacre National Historic Site in 2010. This image was captured with highly sensitive photographic equipment in order to demonstrate the extent of sky glow from human light sources. White and red represents more environmental influence from artificial lights while blues and black represent less influence. Images with less anthropogenic light may display celestial objects like stars or the span of the Milky Way.

### Acoustic Environment



[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Acoustic Impact Level</b>	A modeled measure of the noise (in dBA) contributed to the acoustic environment by man-made sources.		The condition of the acoustic environment is assessed by determining how much noise man-made sources contribute to the environment through the use of a national noise pollution model. The mean acoustic impact level at the park is 0.8 dBA, meaning that the acoustic environment is in good condition. Overall, long-term projected increases in ground-based ( <a href="#">Federal Highway Administration 2013</a> ) and aircraft traffic ( <a href="#">Federal Aviation Administration 2010</a> ) indicate a deteriorating trend in the quality of acoustic resources at this location.

## Resource Brief: Acoustic Environment

To characterize the acoustic environment, the National Park Service has developed a national model of noise pollution (Mennitt et al. 2014). This model predicts the increase in sound level due to human activity on an average summer day. The model is based on measured sound levels from hundreds of national park sites and approximately 100 additional variables such as location, climate, vegetation, hydrology, wind speed, and proximity to noise sources such as roads, railroads, and airports. The model reveals how much quieter parks would be in the absence of human activities. The quality of the acoustic environment affects visitor experience and ecological health. Acoustic resource condition, both natural and cultural, should be evaluated in relation to visitor enjoyment, wilderness character, ecosystem health, and wildlife interactions. Learn more in the document [Recommended indicators and thresholds of acoustic resources quality for NPS State of the Park Reports](#), and the NPS Natural Sounds and Night Skies Division [website](#). Additionally, long-term acoustic monitoring was conducted in the park in 2009 and 2011 to provide an estimate of natural ambient sound levels, and to gather information about noise sources in the park. Results from this study are summarized in a natural resource report ([Lynch 2011](#)).

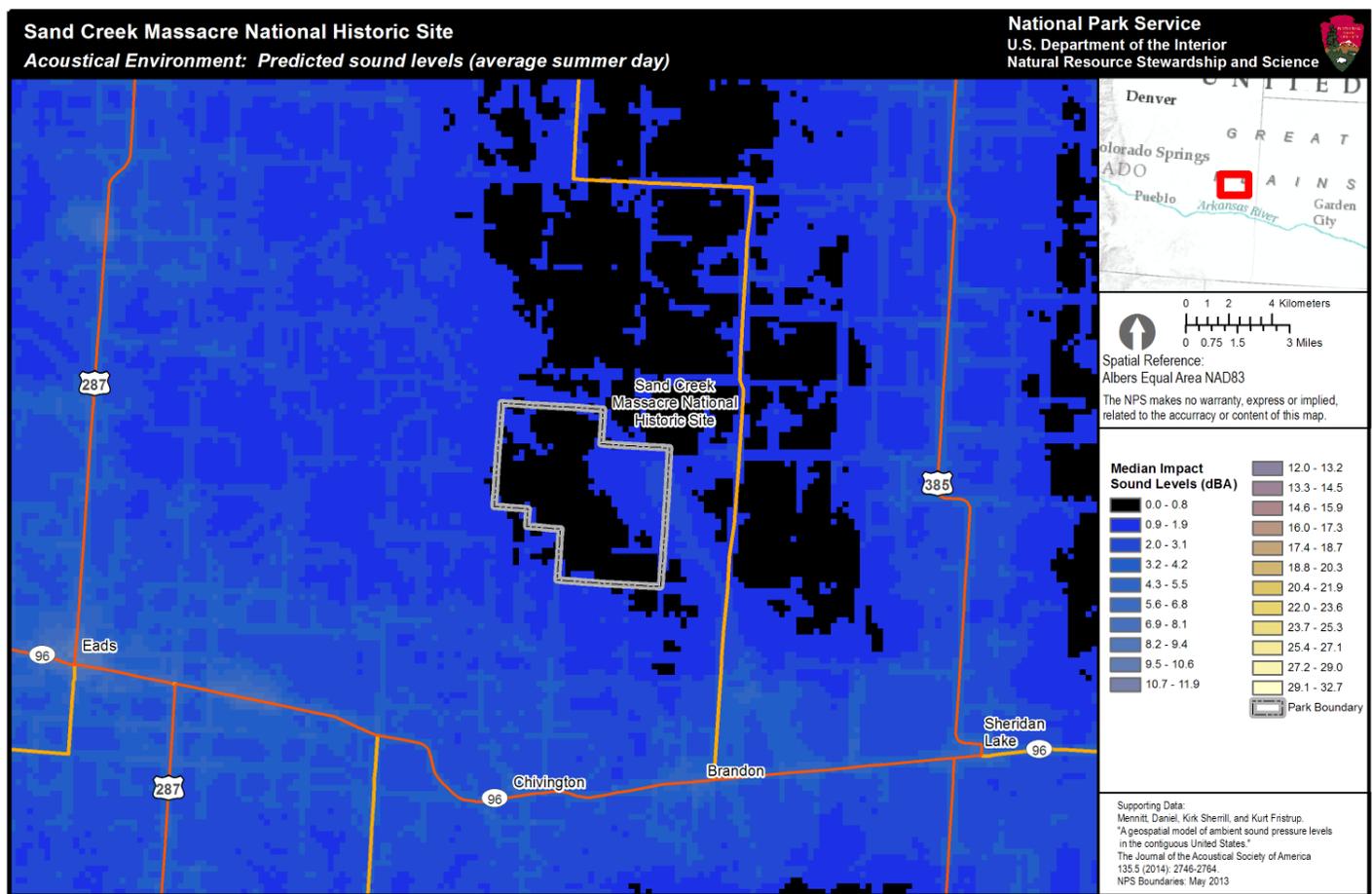
## Resource Brief: Acoustic Environment (continued)

### Criteria for Condition Status/Trend

For State of the Park Reports, NPS has established acoustic standards (green, amber, red) and two sets of impact criteria for urban parks and non-urban parks. A park's status (urban or non-urban) is based on data from the U.S. Census Bureau (U.S. Census 2010). Parks outside designated urban areas typically possess lower sound levels, and exhibit less divergence between existing sound levels and predicted natural sound levels. These quiet areas are highly susceptible to subtle noise intrusions. Park units inside designated urban areas typically experience more interference from noise sources. Condition thresholds for non-urban parks are listed in the table below. Just as smog limits one's ability to survey a landscape, noise reduces the area in which important sound cues can be heard. Therefore, thresholds in the table are also explained in terms of listening area.

### Condition thresholds for the acoustic environment in non-urban parks

Indicator	Threshold (dBA)
Acoustic Impact Level  A modeled measure of the noise (in dBA) contributed to the acoustic environment by man-made sources.	Threshold $\leq 1.5$ <i>Listening area reduced by <math>\leq 30\%</math></i>
	$1.5 < \text{Threshold} \leq 3.0$ <i>Listening area reduced by 30–50%</i>
	$3.0 < \text{Threshold}$ <i>Listening area reduced by <math>&gt; 50\%</math></i>



NPS Natural Sounds & Night Skies Division and NPS Inventory and Monitoring Program MAS Group 20151022

Map of predicted acoustic impact levels in the park for an average summer day. The color scale indicates how much man-made noise increases the sound level (in A-weighted decibels, or dBA), with 270 meter resolution. Black or dark blue colors indicate low impacts while yellow or white colors indicate greater impacts. Note that this graphic may not reflect recent localized changes such as new access roads or development.

## Resource Brief: Recent Climate Change Exposure

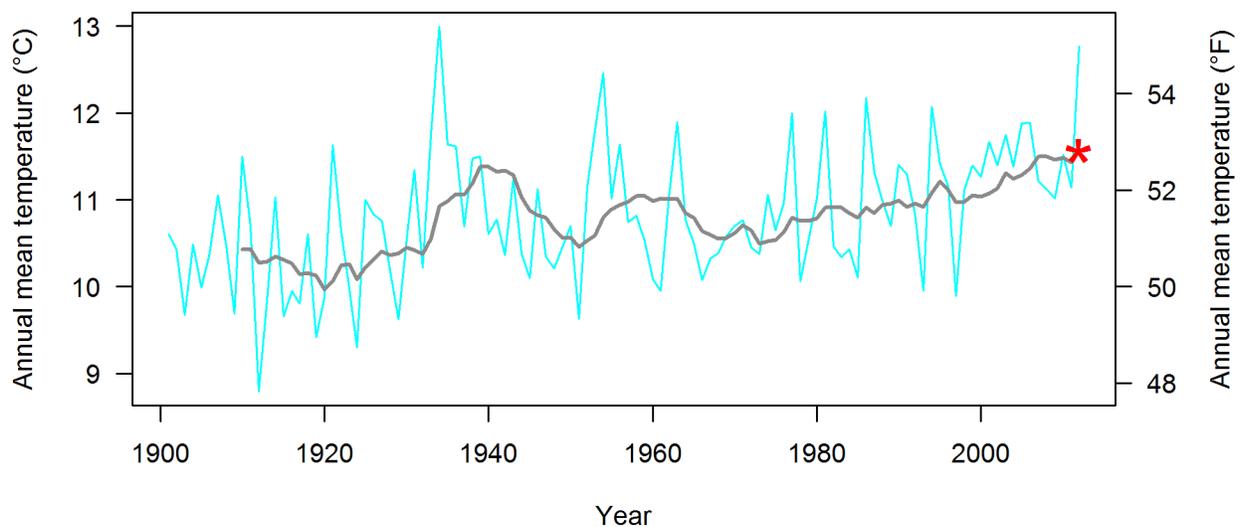
To understand the park’s recent “climate change exposure”—that is, the magnitude and direction of ongoing changes in climate, we investigated how recent climate compares to historical conditions (see [Monahan & Fisichelli 2014](#) for updates to the basic climate inventories for 289 national park units). We evaluated climate change exposure by asking which of 14 biologically relevant climate variables recently (past 10–30 years) experienced “extreme” average values relative to the 1901–2012 historical range of variability. We define “extreme” conditions (e.g., extreme warm, extreme wet) as, on average, exceeding 95% of the historical range of conditions.

### Methods

To evaluate recent climate within the context of historical conditions at Sand Creek, we used the following methods (also illustrated in the figure below):

- For each temperature and precipitation variable, we analyzed data within three progressive time intervals, or “moving windows,” of 10, 20, and 30 years to calculate a series of averages over the entire period of analysis (1901–2012).
- We compared the average temperature and precipitation values for each of the most recent 10, 20, and 30-year intervals (2003–2012; 1993–2012; and 1983–2012) to those of all corresponding intervals across the entire period of 1901–2012. These results (expressed as percentiles) describe “recent” conditions relative to historical conditions. As an example, a temperature percentile of 80% means that recent conditions were warmer than 80% of the historical range of conditions.
- We then averaged the percentiles of the most recent 10, 20, and 30-year time periods and classified variables <5th percentile or >95th percentile as “extreme.”

See [Monahan & Fisichelli \(2014\)](#) for a detailed explanation of methods, and the figure below for an example analysis applied to annual mean temperature at the park.



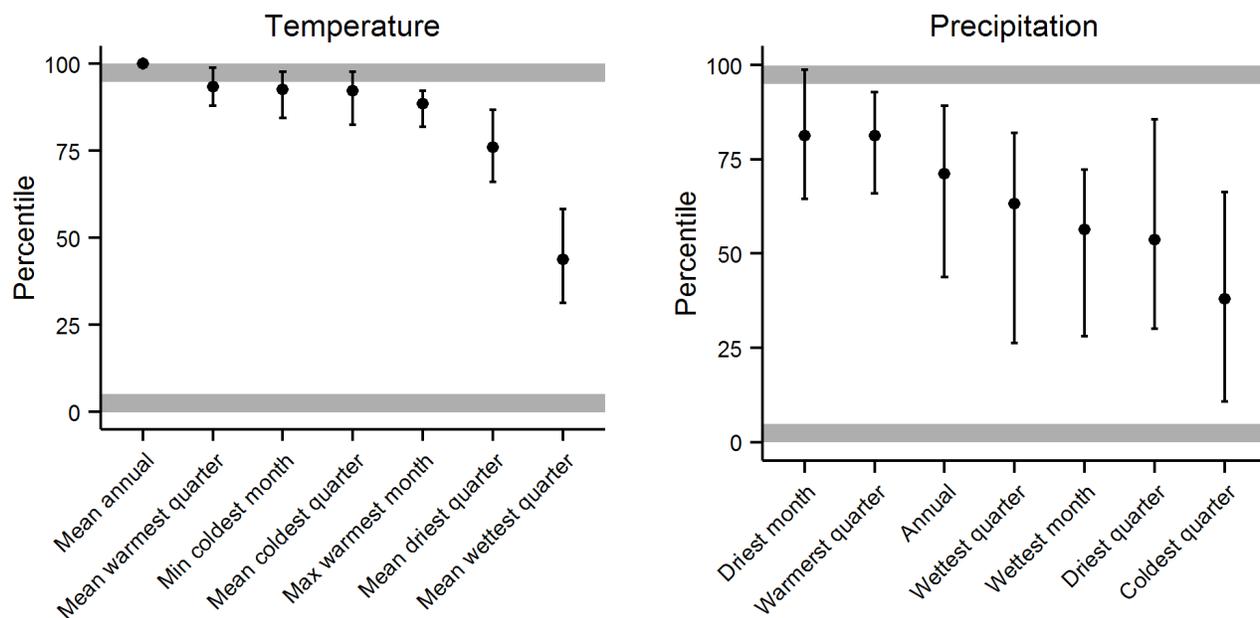
**Recent annual mean temperature at Sand Creek Massacre National Historic Site (including areas within 30-km [18.6-mi] of the park’s boundary). The blue line shows temperature for each year, the gray line shows temperature averaged over progressive 10-year intervals (10-year moving windows), and the red asterisk shows the average temperature of the most recent 10-year window (2003–2012). Here, the most recent 10 years was warmer than 100% of the historical range of conditions (see recent percentiles for all temperature and precipitation variables in the figures below).**

## Resource Brief: Recent Climate Change Exposure (continued)

### Results

Recent percentiles for 14 temperature and precipitation variables at Sand Creek appear in the figures below. Results for “extreme” variables at the park were as follows:

- One temperature variable was “extreme warm” (annual mean temperature).
- No temperature variables were “extreme cold.”
- No precipitation variables were “extreme dry.”
- No precipitation variables were “extreme wet.”



**Recent temperature and precipitation percentiles at Sand Creek Massacre National Historic Site (including areas within 30-km [18.6-mi] of the park’s boundary). Black dots indicate average recent percentiles across the 10, 20, and 30-year intervals (moving windows). Variables are considered “extreme” if the average percentiles are <5th percentile or >95th percentile (i.e., the gray zones, where recent climate is pushing the limits of all observed climates since the year 1901). Black bars indicate the range of recent percentiles across 10, 20, and 30-year moving windows.**

Key points for interpreting these results:

- Recent climatic conditions are already shifting beyond the historical range of variability.
- Ongoing and future climate change will likely affect all aspects of park management, including natural and cultural resource protection, park operations, and visitor use and experience.

## 2.2. Cultural Resources

Archeological Resources			<a href="#">web</a> ▶
Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Knowledge	Sufficient research is conducted to understand the relationship of the park's archeological resources to the historic contexts for the park.		Nearly the entire park is on the National Register of Historic Places. Any future archeology will be managed at that level of significance.
	Archeological resources are identified and evaluated using appropriate anthropological and historical contexts.		Surface surveys using metal detectors have been conducted on +/- 30% of the area within the current boundary of the park. Additional pedestrian surveys have been conducted for every undertaking within the park and continue to be performed for every undertaking in compliance with the requirements of the National Historic Preservation Act. Subsurface investigation accompanies the metal detector surveys, but additional surface and subsurface investigations will be completed to answer specific resource questions as they arise.
	Number of archeological context statements.		There is an archeological context statement for southeastern Colorado but it is not applicable to SAND's period of significance.
	Scope of archeological resources in the park is understood and a determination has been made whether or not they are a fundamental or other important resource.		Yes, the fundamental resources and values have been identified in the park's General Management Plan, including archeological resources.
	Percentage of archeology baseline documents with current and complete information.		According to the NPS Intermountain Regional Archeologist, the two required archeological baseline studies are the Archeological Overview and Assessment and the Identification and Evaluation Study. SAND has neither of these (0%), but they would be helpful to the park so the park will seek to have them completed in the future. In the meantime, the park is completing a Resource Stewardship Strategy, including cultural resources, and also has an excellent understanding of its archeological resources and comprehensive documentation of all the inventories, determinations of eligibility, etc. that have been completed since the park was authorized in 2000.
	The distribution and types of archeology sites is understood.		Yes, the primary archeological record of the site is the Sand Creek Massacre, dated November 29–30, 1864. There are also archeological sites related to the 20th-century ranching uses. There is very little known pre-contact archeology—a few scattered lithic artifacts at best.
	The mechanisms affecting site stability and taphonomic influences are understood.		SAND has had numerous geomorphological, soils, and hydrological studies completed and has an excellent understanding of these processes. See Chapter 3 and References section.

## Archeological Resources (continued)

[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Knowledge</b> (continued)	Percentage of sites with known date ranges associated with a research theme.		The archeology of the whole site is associated with research about the Sand Creek Massacre. Other known historic sites are associated with the post-massacre ranching occupation of the area, which has been thoroughly research for a national register eligibility determination for the Dawson ranch complex. Combined, the two research themes total about 99% of the known archeological resources.
<b>Inventory</b>	Percentage of park intensively surveyed.		Intensive surveys are those related to undertakings for the purposes of compliance with Section 106. These total +/- 10% of the park. These intensive surveys will continue as undertakings arise, adding knowledge of the site's resources.
	Percentage of survey data included in the Geographic Information System (GIS) meeting current cultural resource standards.		100% of survey data is included in the NPS Intermountain Region GIS map catalog.
	Percentage of archeological resources with complete, accurate, and reliable State site forms.		100%
	Percentage of archeological resources with complete, accurate, and reliable data in the Archeological Sites Management Information System (ASMIS).		100%
<b>Documentation</b>	Percentage of known sites with adequate National Register documentation.		There are six known archeological sites within the park boundaries. 100% have adequate NR documentation, but only one is on the NR.
	Percentage of known sites with Determination of Eligibility (DOE) documentation.		100% have DOE's, whether formal or informal.
	Percentage of archeological materials cleaned, conserved, studied, cataloged, and properly stored.		86% according to the Collections Management Report. A small backlog is cleaned and studied but needs to be cataloged and placed into the appropriate microclimate housing.
	Percentage of records documenting archeological resource conservation, cataloging, and storage maintained as a part of the archeological collection.		100% of the collection is routinely maintained.

## Archeological Resources (continued)

[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Documentation</b> (continued)	Park base maps are prepared showing the location and distribution of archeological resources, the nature and extent of archeological identification activities, and the types and degree of threats and damages.		Base maps are current, showing the location and distribution of archeological resources and the project/survey area boundaries (assuming this is what is meant by “nature and extent of archeological identification activities”) but does not show “types and degrees of threats and damages” (this is documented in ASMIS). All new data are added to base maps as they are acquired.
	Percentage or number of sites without assessed and defined threats and damages.		0% – condition assessments are completed every five years.
	Research results are disseminated to park managers, planners, interpreters, and other NPS specialists and incorporated into appropriate park planning documents.		Yes. All reports are filed in the park library, posted on the park shared drive, and new results discussed at park planning meetings.
<b>Certified Condition</b>	Percentage of archeological resources certified as complete, accurate, and reliable in the Archeological Sites Management Information System (ASMIS) in good condition.		67%

## Resource Brief: Archeological Resources

Archeological resources include both surface and subsurface remains of past peoples on the landscape. SAND is unique in that the most of the known archeological sites are directly related to the specific events of November 29–30, 1864. The Sand Creek Massacre Site is listed on the National Register of Historic Places. Five additional archeological sites have been identified at SAND and registered with the state of Colorado—none have been determined eligible for the National Register of Historic Places. The park conducts additional archeological investigations as needed for compliance purposes under Section 106 of the National Historic Preservation Act.



**Mechanically excavated unit in advance of tornado shelter placement. NPS Photo.**

SAND continuously pursues funding to locate additional geographic locations through archeology for key events associated with the 1864 events. Archeological sites associated with the later ranching era have also been identified at the park—these locations are monitored and protected, but not actively investigated because they do not contribute to the mission of the park. Site condition assessments are conducted for all known archeological sites within the park boundaries on a five-year cycle. Though some wind erosion is expected to occur during drought years, the condition of the archeological sites has remained overall stable. The sensitive nature of the Sand Creek Massacre Site is protected by closure to the public and staff, unless special permission is granted in consultation with affiliated tribal officials.

## Cultural Anthropology


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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Knowledge</b>	Sufficient research is conducted to understand the relationship of the park's ethnographic resources to the historic context(s) for the park.		Yes – this has been the focus of the park since its authorization in 2000.
	The scope of resources significant to affiliated groups associated with the park is understood and a determination has been made whether or not they are a fundamental resource or other important resource or value.		Yes – the park has legislated relationships with its four associated tribes and the local community as represented by its Board of County Commissioners and has worked hand-in-hand with them—in addition to public meetings—in developing the park's GMP, which identifies all fundamental resources and values important to all stakeholders.
	Percentage of cultural anthropology baseline documents with current and complete information.		The two essential cultural anthropology baseline documents, according to the NPS Ethnography website, are the Ethnographic Overview and Assessment and the Traditional Use Study. SAND has the Ethnographic O&A and does not need the Traditional Use Study, so we have 50%, and that's fine for us.
	Traditionally associated groups, and the legislative, regulatory, or policy basis for relationships with them, are identified.		Totally. These relationships are the foundation upon which the park was built, beginning with the authorizing legislation.
	Planning documents contain current information on traditional resource users and uses, the status of ethnographic data, and the legislative, regulatory, policy, or other bases for use.		All planning documents contain current information on traditional resource users and uses, and the historical, legislative, regulatory, policy, or other bases for use.
	Percentage of cultural anthropology reports and publications entered in the Integrated Resource Management Applications (IRMA) database with appropriate restrictions for access to sensitive information.		The Ethnographic Overview and Assessment is not yet in IRMA, pending further tribal consultation.

## Cultural Anthropology (continued)

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Knowledge</b> (continued)	Research results are disseminated to park managers, planners, interpreters, and other NPS specialists and incorporated into appropriate park planning documents.		Yes. All reports are filed in the park library, posted on the park shared drive, and new results discussed at park planning meetings. Tribal input, concerns, etc. are the basis of the park's operations.

### Resource Brief: Cultural Anthropology

Collaboration between the Cheyenne and Arapaho Tribes and the National Park Service began long before the park was established, during the multi-disciplinary study to locate the massacre site and determine its significance for inclusion in the national park system. In 1999–2000, the NPS study team worked in close collaboration with Cheyenne and Arapaho descendants of the massacre to record oral histories that would assist in the effort to locate the massacre site. The Sand Creek Massacre Oral History project was guided by representatives of the Northern and Southern Cheyenne and Arapaho Tribes. More than 30 descendants of the massacre documented their families' oral histories, passed down through multiple generations.

The stories were published as part of the site location study that was sent to Congress, assisting in the ultimate passage of legislation authorizing establishment of the Sand Creek Massacre National Historic Site. The documentation of these stories and the relationships forged between the NPS and the Tribes during the site location study have formed the basis for the



**Cheyenne and Arapaho President and Legislators sign tribal legislation contributing to the establishment of the Sand Creek Massacre National Historic Site, 2005. NPS Photo.**



**Cheyenne and Arapaho runners beginning the 2016 Spiritual Healing Run from the Sand Creek Massacre NHS to Denver. NPS Photo.**

management of the park throughout the history of its establishment and development. Cheyenne and Arapaho historical and cultural knowledge of the Sand Creek Massacre informs every facet of the management of the national historic site to this day. Additional partners for consultation include the Board of County Commissioners for Kiowa County, Colorado and History Colorado with whom the park also regularly consults on a variety of issues.

In 1999, Northern Cheyenne descendants created the Sand Creek Massacre Spiritual Healing Run and in 2001 the NPS joined in hosting portions of the annual event. Now in its 18th year and including all four Cheyenne and Arapaho Tribes, the multi-day, non-competitive run is intended to share the history of this horrific event with the public and connect tribal youth with their histories and cultural identities. Runners and their supporters

participate in a 180-mile relay from the massacre site to Denver, praying for their ancestors as well as spiritual healing for the current generations who continue to experience the trauma of the past.

The run concludes at the State Capitol, following a route that symbolizes the trail of human trophies carried by U.S. Army troops to Denver for public display following the massacre. The Spiritual Healing Run is the main annual event held at the park, and has contributed beyond measure to the Cheyenne and Arapaho Tribes' connection to the Sand Creek Massacre landscape and relationship to the national historic site.

## Cultural Landscapes


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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Knowledge</b>	Cultural landscapes are identified and evaluated using appropriate historical contexts.		<p>No Cultural Landscapes have been identified or documented at the park.</p> <p>Early in the park's development the NPS decided to evaluate the landscape for its National Register eligibility as an Ethnographic Landscape rather than as a Cultural Landscape. This premise should be revisited. The Sand Creek Massacre Site is on the National Register of Historic Places but not as a Traditional Cultural Property or Cultural Landscape.</p>

## Historic Structures


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Knowledge</b>	Historic Structures are identified and evaluated using historical contexts.		The park has no historic structures. All structures on the site are modern NPS administration facilities and none are historic or NR eligible.

## History


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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Knowledge</b>	Sufficient research is conducted to understand the national significance and historical contexts for the park.		Yes. There is extensive research about the history of the Sand Creek Massacre. A Special Resource Study was completed in 2000 documenting the national significance of the site leading to its establishment as a National Historic Site. The site is on the National Register of Historic Places for its national significance. A General Management Plan has been complete, plus about fifteen years' worth of additional historical research since the park was established and research continues on a daily basis.
	Sufficient research is conducted to establish the reasons for park establishment and a history of the NPS management of the site.		Yes. There is extensive research about the history of the Sand Creek Massacre. A Special Resource Study was completed in 2000 documenting the national significance of the site leading to its establishment as a National Historic Site. The site is on the National Register of Historic Places for its national significance. A General Management Plan has been complete, plus about fifteen years' worth of additional historical research since the park was established and research continues on a daily basis. An administrative history has been compiled and is being completed. A popular, prize winning non-fiction book has been written about the establishment of the park.
	Percentage of history baseline documents with current and complete information.		The two primary NPS history baseline documents are the Historic Resource Study and the Administrative History. The latter is in preparation and the former has not been begun.

## History (continued)

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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Knowledge</b> (continued)	Research supports cultural resource management.		Historical research results regularly inform and influence locations for future archeological research. Potential areas of cultural and cultural resources sensitivity throughout the site are known, based upon in-depth research into primary source documentation.
	Research at the appropriate level of investigation (exhaustive, thorough, or limited) precedes planning decisions involving cultural resources.		Compliance processes regularly take place before any ground disturbing activities occur, and at the appropriate level (reconnaissance, intensive, etc.).  ALL planning decisions are made in consultation with the four associated tribes. The history of the Sand Creek Massacre is well known and the cultural resources related to it within the site boundaries are thoroughly understood, so all planning decisions involving cultural resources inherently are based upon appropriate levels of research.
	Research is conducted by qualified scholars.		Yes. The park has a team of five Sand Creek scholars (three non-NPS and two NPS) who regularly conduct research that informs park decisions and the park's understanding of its history. Additionally, many historians write about Sand Creek, the most recent being a prize-winning non-fiction account of the establishment of the national historic site.
<b>Inventory</b>	Cultural resources are inventoried and evaluated in consultation with State Historic Preservation Officers (SHPOs).		Recent conversations with the Regional Compliance Coordinator have indicated that the SHPO would like more communication with the park regarding cultural resources compliance. The park will be meeting more regularly with the SHPO in the future. However, it should also be noted that representatives of the state's Office of Archaeology and Historic Preservation, which houses the office of the SHPO, regularly attend the park's tribal consultation meetings.
	Percentage of cultural resources listed in appropriate Service-wide inventories, including the National Register.		100% of known cultural resources are listed in appropriate NPS inventories and the National Register.
	Research data are accessioned as part of the park's museum collection.		Yes, research data are added to the museum collection as appropriate. Most of the park's archives are digitized and housed at the park with originals at the Western Archeological and Conservation Center (WACC). Other research data are accessioned into the park library and digitally on the park's server.
<b>Documentation</b>	Percentage of historic properties with adequate National Register documentation.		100% of known sites have adequate NR documentation, regardless of whether or not they are on the National Register. Only the Sand Creek Massacre archeological site is on the National Register and has adequate documentation. All other known sites (both archeological and historic) have been determined to be not National Register eligible, and also have documentation from the SHPO to that effect.

## Museum Collections


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Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Knowledge	Sufficient research and analysis exists to understand the relationship of the park's museum collection to the historic context(s) for the park.		The collections are centered on the park's defining historic events of November 1864 and are utilized in conjunction with ongoing primary source research.
	Scope of museum collection in the park is understood and a determination has been made whether or not they are a fundamental or other important resource.		A Scope of Collections Statement has guided museum acquisitions and accessions since 2011, ensuring that all collections are appropriate to the mission of the park. Artifacts and physical remains of the Sand Creek Massacre are identified in the enabling legislation as a primary resource of the park.
	Percentage of museum collection baseline documents with current and complete information.		33% of the museum collection baseline documents are current. Funding for additional museum baseline documents is being pursued from NPS funding sources.
	Affected Native Americans are consulted concerning items of cultural affiliation.		The Cheyenne and Arapaho Tribes are regularly consulted about potential additions to the museum collections and any special needs or handling guidelines for the collections.
	Affected Native Americans are consulted regarding Native American human remains, associated or unassociated funerary objects, sacred objects, or objects of cultural patrimony in accordance with the Native Americans Graves Protection and Repatriation Act (NAGPRA).		The Cheyenne and Arapaho Tribes are regularly consulted about potential additions to the museum collections through acquisition or archeological means in order to identify objects or remains that fall under NAGPRA guidelines.
	Park has an Inadvertent Discovery Plan that involves curatorial staff.		Yes, a plan was completed in consultation with the tribes beginning in 2013. It was originally created for a specific project but has since been expanded to be an ongoing plan for future investigations.
	Museum curator is included in permit review and informed about park resource projects that may affect collections.		Yes, the museum curator is the park permit coordinator for issuance of research permits and is routinely informed about park resource projects that may create or affect collections.

## Museum Collections (continued)

[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Inventory</b>	Archival and manuscript collections are surveyed and described in the Interior Collections Management System (ICMS) and finding aids are produced.		The park has been working with archive specialists at the NPS Western Archeological and Conservation Center (WACC) to accomplish the cataloging and produce finding aids for the archival collections. As of FY15 close, 44% of park archives were cataloged.
	Percentage of existing collection that is accessioned and cataloged.		As of FY15, 46.27% of park collections were accessioned and cataloged.
	Scope of Collection is consistently implemented; items or objects are researched to determine their appropriateness for inclusion in the museum/archive collection.		Yes, the Scope of Collections (2011) is consistently used in the evaluation of items or documents prior to their incorporation into the museum collections.
<b>Documentation</b>	Accession and deaccession files are complete with all appropriate signatures.		Yes. Fortunately due to the relatively young age of the park, current standards for the completion of accession and deaccession files were implemented consistently from an early point. Legacy issues are few to non-existent.
	Percentage of cataloged records with completed descriptive fields (beyond required fields).		Approximately 80% of cataloged records have completed description fields beyond the currently required fields. Identification of required fields is currently under review and may change in the near future so this will need to be re-evaluated.
<b>Certified Condition</b>	Percentage of museum collection reported in CMR and checklist report in good condition.		15% is cataloged in good condition or better in the Interior Collection Management System.
	Percentage of museum collection storage facilities in the Facility Management Software System (FMSS) with a Facility Condition Index (FCI) indicating good condition.		The park utilizes the NPS Western Archeological and Conservation Center in Tucson and the multi-park museum facility at Bent's Old Fort National Historic Site to house the park's museum collections with no storage facility at the park.

## Resource Brief: Museum Collections

Management of the park's museum collections is guided by standards described in the NPS Museum Handbook and current curatorial science. Currently the park has only one of the ten core documents required for park museum programs. The park's Scope of Collections Statement guides all collection acquisitions and accessions into the museum collection. Tribal consultation regularly occurs as part of evaluating potential acquisitions, whether historical or archeological in nature. The sensitivity of potential objects is always considered in terms of access and research potential, as well as special housing needs. Park administrative records are also maintained according to records management guidelines produced by the National Archives and Records Administration in support of the NPS. The park has a strong digital collection initiative in order to facilitate future access to the wealth of research provided by other cultural resource divisions.

The park does not currently operate a museum storage facility but relies on the multi-park facility at Bent's Old Fort National Historic Site and the regional NPS repository in Tucson. The Western Archeological and Conservation Center ([WACC](#)) is dedicated to the preservation and study of museum collections within the Intermountain Region of the National Park Service. The Museum Services Program at WACC provides expertise in professional conservation, museum, archival, and library management assistance to park staff and partners. Staff here curates 14.5 million objects and archives on behalf of over 70 parks, preserving this valuable part of America's heritage and making it accessible for research.



**Sergeant J.J. Brown's Starr Carbine, used at the Sand Creek Massacre. Acquired by the park in 2015 for the museum collection.**

## 2.3. Visitor Experience

### Visitor Numbers and Visitor Satisfaction

[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Number of Visitors</b>	Number of visitors per year		Annual Visitation has been rising since 2011, when the park received 3,935 visitors. In 2014, the park experienced a peak visitation of 7,402 during the 150th Anniversary of the massacre. The annual visitation for 2015 was 5,887 visitors, which is a marked increase over previous years.
<b>Visitor Satisfaction</b>	Percent of visitors who were satisfied with their visit		In 2015, the park visitor satisfaction score was 91%, and rose to 94% in 2016. Though visitors still voice concerns over lack of permanent facilities, the park General Management Plan has identified strategies that will address these concerns as the park develops.

### Interpretive and Education Programs – Talks, Tours, and Special Events


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Education Programs</b>	Number and quality of programs, and number of participants		In FY 2015, the park General Management Plan was completed and in 2016 the park is in the process of developing its long-term Interpretive Plan. Park interpretive and educational programs will continue to develop and be refined as the GMP and long-term interpretive plans are implemented.  The park has not developed a comprehensive curriculum-based education plan, but staff continues to work with area educators to plan and present formal education programs. Educational program development will follow the completion of a Long-range Interpretive Plan in FY 2017.
<b>Ranger Programs</b>	Number and quality of programs and attendance		In FY 2015, staff presented a total of 479 formal interpretive programs.
<b>Off-site Programs</b>	Number of programs and attendance		The number of off-site programs continues to increase each year. Sixteen off-site programs were presented in FY 2015. These continue to increase each year as visitation and staffing increase.
<b>Special Events</b>	Variety and longevity of events, community involvement		Every year since 1999 the Cheyenne and Arapaho Tribes have held the Sand Creek Massacre Spiritual Healing Run from the massacre site to the State Capitol in Denver. The event is open to the public and the community supports the event. The park and its partners often participate in events on site and in the nearby community of Eads, Colorado. Researchers working at the park provide programs, tribal representatives and descendants have conducted special programs for the community, book signings related to Sand Creek and other such special events take place as they arise.

## Resource Brief: The 150th Sand Creek Massacre Anniversary Commemoration

November 29, 2014 marked the 150th year since the Sand Creek Massacre. The entire year was marked with significant events at the park, throughout the state and even nationwide. Commemorative events on-site included a special Cheyenne and Arapaho Spiritual Healing Run. Although the run has taken place annually since 1999, this year was a special event with many tribal and other dignitaries and over 1,000 visitors participating in the one-day event.

The Spiritual Healing Run continued for the next four days, ending 180 miles later on the State Capitol steps in Denver, Colorado. There, Colorado Governor John Hickenlooper took the unprecedented step of formally apologizing to the Cheyenne and Arapaho Tribes on behalf of the State of Colorado. Further, the Governor established the Sand Creek Massacre Commemoration Commission made up of tribal, state, federal, and private representatives for the purpose of commemorating the 150th year events, and long-term outcomes such as supporting the NPS Research and Learning Center and developing statewide curricula about Sand Creek.

At the national level, Northwestern University, Denver University, and the United Methodist Church all commissioned special investigative reports about the role of the perpetrators of the massacre in the founding of their individual institutions. One of these reports has been published as a major contribution to the literature on the Sand Creek Massacre.

On June 21, 2014, over 700 members of the Rocky Mountain Conference of the United Methodist Church made a spiritual pilgrimage to the park. In addition, the National Park Service and the Smithsonian Institution co-sponsored a special public Sand Creek Massacre 150th Symposium including the nation's foremost Sand Creek Massacre scholars, tribal representative, and massacre descendants. The entire symposium has been documented in DVD format and is available to the public. The Symposium also featured the debut of a special film produced by the NPS entitled *The Sand Creek Massacre and the Civil War*. The film was aired simultaneously at the Colorado History Center in Denver. It has since been produced as a DVD available to the public.

Finally, Rocky Mountain PBS produced a special Sand Creek Massacre episode of the show *Colorado Experience* that also aired on the eve of the massacre anniversary. These and other events were explored through various media such as *Smithsonian Magazine*, the *Wall Street Journal*, the *New York Times*, the *Denver Post*, and other major newspapers and magazines.

Altogether, the widespread attention during the 150th year made significant milestones in engaging the public and advancing discourse about the tragedy at Sand Creek towards recognition and acknowledgment of its lasting impacts on the Cheyenne and Arapaho people, the state of Colorado and the nation as a whole.



**Tribal Representatives address the crowd during the 150 Year Remembrance Event. NPS Photo.**

## Interpretive Media – Brochures, Exhibits, Signs, and Website


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
<b>Wayside Signs</b>	Condition and currency of signs		In FY 2014, park staff produced a Welcome & Orientation sign for visitors, in addition to the seven existing waysides. The park's waysides won an award from the National Association for interpretation several years ago. A new park entrance sign was constructed in 2014. In 2015, the park prepared drafts of four new off-site interpretive signs for placement in three gateway communities. In 2016, the park began its Comprehensive Interpreting Planning efforts, which will address current and future wayside exhibits, both on and off site.
<b>Park Directional Signs (off-site)</b>	Usefulness, quantity, and placement		The park works with Kiowa County and the State of Colorado to maintain highly visible and informative highway signs directing visitors to the park.
<b>Audio-visual Media</b>	Availability and currency of park films		In FY 2014, a film connecting the story of the Sand Creek Massacre to the Civil War was completed and shown to the public. That same year Rocky Mountain PBS produced a film on the story of the Sand Creek Massacre. Since then, Cheyenne and Arapaho Television produced <i>Sacred Steps</i> , a film describing the Sand Creek Massacre and the annual Spiritual Healing Run event. These films join the park dedication film and the Canyons and Plains Regional Heritage Sites films, which are periodically used to support off-site programs.
<b>Print Media</b>	Park Brochure		In 2014, the park coordinated the development of a six card set of "Civil War to Civil Rights" trading cards. In 2015, park staff coordinated the development of two joint-park site bulletins. In 2016, the park coordinated development of two additional joint-park site bulletins and began work to revise its park brochure. The park has produced numerous site bulletins covering history, natural resources, and safety. These are available to visitors on-site and on the park web site.  In 2017, the park is working with the NPS Harper's Ferry Center to produce a new park map and brochure.
	Park Information Card		In FY 2014, park staff revised its "rack card" which continues to be distributed to area welcome centers, museums, and other NPS and State Parks. In 2015 and 2016 there was an increase in requests for park information from other local visitor and information centers.
<b>Websites</b>	Currency and scope of website		In FY 2015, the park website was revised into compliance with NPS Centennial standards. In 2017 the park is working on completing a social media plan in preparation for creating a park Facebook page.

## Scenic Resources


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Scenic Views	Scenic views quality & protection		The park has undertaken viewshed analyses, buried overhead powerlines, mitigated potential oil and gas development impacts, maintained and restored native vegetation, and planed its interpretive trail with minimal impacts visible to the public. An additional two miles of overhead powerlines are proposed for burial in the near future.

## Sense of Place


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Solitude, Quietness, Remoteness	Viewshed and soundscape remain unimpacted		<p>The park is located in a rural agricultural setting, which maintains much of the integrity of the landscape as it existed at the time of the Sand Creek Massacre. There is little development within the park boundaries and the General Management Plan has identified a preferred alternative that will maintain the park's "sense of place" into the future. The preferred alternative limits public access to much of the park and limits the NPS's footprint.</p> <p>The park has completed several viewshed analyses, an acoustical monitoring study, and night sky evaluations and determined that the viewsheds and soundscapes remain unimpacted (see cultural and natural resources sections).</p>

## Safety


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Number of Law Enforcement Incidents	Recordable incidents		The park has had no recordable law enforcement incidents since it opened to the public in 2007.
Number of Accidents or Injuries	Recordable incidents		The park has had three recordable employee accidents since it opened in 2007, with no lost time. The park has had no recordable visitor accidents or injuries since the park opened in 2007.

## Partnerships


[web](#) ▶

Indicators of Condition	Specific Measures	Condition Status/Trend	Rationale
Partnerships	Quality and effectiveness of official and unofficial partnerships		<p>The park works in close collaboration with its legislated partners including the Northern and Southern Cheyenne and Arapaho Tribes, the State of Colorado and Kiowa County. It also maintains close working relationships with park neighbors and numerous other informal partners including History Colorado, Colorado Preservation Inc., Canyons and Plains of Southeast Colorado, Kiowa County Economic Development Foundation, Colorado Parks and Wildlife, Western National Parks Association, park neighbors and others. These partnerships have been in place since the NPS began the site establishment process in 2001 and are solidly in place.</p>

## 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 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 (FMSS) 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. 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 2010/ 2015	FCI 2010/ 2015	Condition Status/Trend	Rationale
<b>Buildings</b>	6 / 5	0.002 / 0.021		The park has 5 buildings including a modular office, maintenance shop, 2 vault toilets, and a ground level tornado shelter. An old barn, used by the previous landowner, was removed in 2009. All current buildings are in good stable condition. A Facility Security Assessment was completed in 2015. The addition of a contact station, identified in the GMP, would remove the multiple uses of a single facility for visitor orientation and on-site office facilities.
<b>Trails</b>	1 / 1	0.000 / 3.227		<p>Current condition of the park trails is not appropriately captured by the FCI alone. General maintenance is up-to-date, and trails are in good condition. Deferred maintenance outstanding in the FMSS database reflects future, unfunded additions of new and improved infrastructure as defined in the parks General Management Plan.</p> <p>The 2016 General Management Plan (GMP) recommended a 1.5 mile trail system. This park trail system is divided into two distinct trail units, the Monument Hill Trail (a distance of .5 miles) and the Bluff Trail (a distance of 1 mile). A Trails Evaluation and Recommendations report was completed by the NPS for the park in 2014. This report made recommendations regarding accessible trail design, trail surface design and interpretive panel locations.</p> <p>Beginning in 2016 with the completion of the GMP, the park began to implement the recommended trail upgrades including placing packed crusher fine material for accessibility on the initial 0.5 miles of the trail system and building the first permanent interpretive stone sign base. The Bluff Trail is a primitive mowed trail, but benches and interim interpretive signage have been installed along it. While requests for funding for additional interpretive and accessible improvements have been prepared and submitted, they are currently unfunded.</p>

## Overall Facility Condition Index (continued)

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Asset Category	Number of Assets 2010/ 2015	FCI 2010/ 2015	Condition Status/Trend	Rationale
<b>Waste Water Systems</b>	1 / 1	0.000 / 0.000		Two leach fields exist in the park, one for the modular office building and one for the Maintenance shop. Both are in good condition.
<b>Water Systems</b>	3 / 3	0.000 / 0.000		The park's four water systems are all in good condition. They include one potable well and three fire suppression wells. Two of the fire suppression wells are classified as stock wells. These two stock/fire suppression wells are pumped using solar power. A Water Rights Assessment for these park wells was completed in 2016 by the NPS.
<b>Unpaved Roads</b>	2 / 3	0.000 / 0.000		The three roads in the park are all in good condition. Roads include the 0.5 mile road to park headquarters, a 0.5 mile access road to the park overlook, and 6 miles of 2-track fire roads.
<b>All Others</b>	8 / 5	0.670 / 0.247		The park has completed a variety of infrastructure improvements, including adding new interpretive signage, adding an interpretive pull-out near the park entrance, and burying electrical utility lines along the park boundaries to improve the park's viewshed. Installation of solar panels on the maintenance shop is funded and planned for 2018. The existing park facilities are generally in good shape, but additional new improvements as identified in the General Management Plan remain unfunded.

# Chapter 3. Summary of Key Stewardship Activities and Accomplishments

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## Activities and Accomplishments

When the park was established, the only infrastructure present was the remnants of the private ranch headquarters that existed at the time of establishment. Since that time, the NPS has removed the former ranch house and other outbuildings and replaced them with a small modular building, a maintenance shop, and other minor developments. The former ranch roads have become visitor trails and park management access roads or have been revegetated. Vault-type comfort stations have been installed, as well as wayside exhibits, visitor parking areas, and so forth. Per the park's authorizing legislation, a cemetery or repatriation area has been established for the interment of human remains and other objects that may be repatriated from museums or found on site. The park has been operating under an interim management plan since establishment and has just completed its first General Management Plan as well as many other plans, discussed below. More importantly, the park has retained close working relationships with its tribal, state, and county partners, all of whom are deeply involved in the park's management planning and activities. The park has 9.5 permanent employees and visitation has increased to about 6,000–7,000 annually. In 2015, after 13 years of collaboration with the State of Colorado and with the assistance of the Colorado State Historical Fund and the Civil War Trust, the park acquired an additional 640 acres of State Trust Land, bringing the park total acreage to 3,025.

## Natural Resources

Since before its formal establishment, the park has been involved in countless natural resources inventories, surveys, plans, and studies. The park is now involved in a pilot project among the NPS Southern Plains Inventory and Monitoring Network, the NPS Exotic Plant Management Team, the NPS Southern Plains Fire Management program, and the High Plains Group of parks to develop a long-term natural resources management strategy, focusing on vegetation management. The pilot project has gained attention and is being considered as a service-wide model for park resources management approaches in the future.

Since about 2003, well before the park was officially established, it has been involved in extensive baseline natural resources research. Completed projects to date include, among many others:

- Geoarchaeological Assessment of the Sand Creek Massacre Site, Kiowa County, CO, Laramie Soils Service, Laramie WY 1999
- Geophysical Investigations at the Sand Creek Massacre Site, NPS/IMR Support/Santa Fe Office Cultural Resources 1999
- Preliminary Assessment of Wetland, Riparian, Geomorphology and Flood Plain Conditions at SAND NHS/NPS/WRD/NRTR/2005
- Sand Creek Massacre National Historic Site Bird Inventory/RMBO/SOPN 2005
- Potential Groundwater Sources for a Potable Water Supply at Sand Creek Massacre Site/NPS/WRD 2006
- Trip Report for Evaluation of Fish Species at SAND NHS/NPS/WRD 2006
- Special Soil Survey Report (Draft) NPS/USDA-NRCS 2006
- Riparian Forest Age Structure and Past Hydroclimatic Variability, Institute of Arctic & Alpine Research, University of Colorado, Boulder 2006
- BEOL/SAND Vegetation Classification Project by Colorado Natural Heritage 2006
- Environmental History of Sand Creek Massacre National Historic Site /CSU Department of History 2007
- Pollen Analysis of Sediment Cores Recovered from SAND NHS/University of Nevada, Reno 2007
- Site Inventory Range of Natural Variability/CSU/Department of Forest, Rangeland, Watershed 2007
- Vegetation Classification and Mapping, A Report for the Southern Plains Network/NPS/SOPN/NRTR 2007
- Rare Vertebrate Species Inventory/NPS/SOPN/NRTR 2008

- Prairie Dog Management Plan and Environmental Assessment (Draft) NPS/SOPN/NRR 2008
- Status and History of Prairie Dogs in Colorado and at Sand Creek/ Colorado Natural History Program/ CSU 2008
- Resource Stewardship Strategy (Draft)/NPS 2009
- Exotic Plant Monitoring in the Southern Plains Network Project Report/NPS/SOPN/NRTR 2009
- Geomorphic Assessment of Big Sandy Creek Travel Report/NPS/WRD 2011
- Sand Creek Massacre National Historic Site Restoration Plan/NPS/Lady Bird Johnson Wildflower Center, University of Texas, Austin TX 2011
- Geomorphic and Hydrologic Assessment of the Historic Channel Position of Big Sandy Creek through SAND (Draft) 2012
- Geomorphic and Hydrologic Assessment of the Historic Channel Position of Big Sandy Creek through SAND (Draft) NPS/WRD 4/13
- Natural Resource Condition Assessment/NPS/SOPN/NRR 2013
- The Insects of the Sand Creek Massacre National Historic Site 2013
- Riparian Condition Assessment for Big Sandy Creek/NPS/WRD/NRR 2014
- General Management Plan/Environmental Assessment/NPS June 2015
- Water Resources Division, Water Rights Branch Trip Report to SAND/NPS/WRD April 2015
- Water Rights Assessment by Gwen Gerber, NPS/ WASO 2016
- Fire Management Plan EA/IMR April 2016
- Fire Management Plan EA/IMR 2017
- Based upon extensive completed research, initiated long-term resources management strategy in collaboration with the Southern Plains Inventory and Monitoring Network, the Exotic Plant Management Team, and the Southern Plains Fire Management program.
- Completed acoustic monitoring which determined that during both winter day and night, sound levels are lower than what an average human ear could detect.
- Vegetation community inventories and exotic plant surveys have been completed for the entire park and the presence of exotic plant species is minimal.
- All measures of soil stability and hydrologic function indicate that conditions are good and even improving.
- No exotic plants are found in more than half (57%) of park-wide exotic plants monitoring plots! In addition, all park staff participates in monitoring for new plant introductions and/or establishments, which promotes the rapid response necessary in controlling exotic plants.
- The identification of rare species or species of conservation concern at Sand Creek Massacre NHS is noteworthy. Several factors make the Historic Site favorable habitat to the rare species mentioned, including the periodic presence of water in an arid landscape and an intact shortgrass prairie and sage shrubland that provides necessary habitat. NPS management has been key in making these conditions possible, due to the removal of agricultural production and grazing since the site has come under NPS management. The park does continue to monitor these indicators to ensure that trends remain constant or are improving.
- A recent aquatic insect survey at the park found two species uncommon to Colorado (Kondraitieff and Durfee 2010). The Blackfronted Forktail, a damselfly, is common to western marshes and springs and is uncommon in Colorado. The Bleached Skimmer, a dragonfly, is a localized species of eastern Colorado and regionally uncommon; it was commonly found at the park. This dragonfly is ranked, according to the Colorado Natural Heritage Program, as globally vulnerable and critically imperiled.
- In 2016 the park completed a Water Rights Assessment plan, Vegetation and Exotic Plant Management Strategy, Fire Management Plan, initiated a prescribed burning program as a management tool, grazing research study, and completed the park's General Management Plan.

- The park acquired 640 acres increasing park size to 3,025 acres. This new full section of land has an existing grazing lease until 2022. Monitoring protocols will measure the pros and cons of grazing within this specific ecosystem.

## Cultural Resources, Tribal Relations, and Partnerships

The Sand Creek Massacre site is a sacred site that is imbued with deep cultural meaning and value. Much of the park's cultural efforts are those surrounding its relationships with the Cheyenne and Arapaho Tribes and other partners. The park has worked in close coordination and consultation with representatives and governments of the Northern and Southern Cheyenne and Arapaho Tribes since 1998. The Tribes have been involved in the development of every park planning document, resource stewardship project, and interpretive development since the initial site location studies almost 20 years ago. These relationships have remained intact, strong, and trustful since the very beginning of the efforts to establish the national historic site. In addition to the partnerships with the four tribes, the park has maintained strong relationships with park neighbors, county officials and community leaders, state officials, the Colorado History Center, Congressional delegations, and others.

These include:

- Cultural Resources Research is a high priority for the park. The park has conducted numerous cultural resources research projects as well as National Historic Preservation Act ("Section 106") compliance projects, all of which have contributed to the understanding, documentation, and stewardship of its cultural resources. A list of publications the park has been involved with is located in the References Section of this document.

Additionally, the park has:

- o Hired a full-time permanent tribal liaison and shares a cultural resources specialist/curator position with High Plains Group.
- o Archeologically surveyed approximately 50% of park lands.
- o Completed the park's first General Management Plan based upon tribal preferred alternative.
- o Acquired numerous significant archival collections and digitized park archives.
- o Developed an extensive park library according to NPS standards.
- o Managed and maintained museum collections in keeping with NPS standards.
- o Completed conversion to NPS standard records management system.
- o Annually hosted Cheyenne and Arapaho Spiritual Healing Run from Sand Creek Massacre Site to Denver.
- o Assisted Tribes with repatriation of remains of several victims of the Sand Creek Massacre and interred them on site according to proper tribal protocols.
- o Completed an Ethnographic Overview and Assessment; managed the ethnographic landscape in collaboration with local Tribes.
- o Remained up-to-date and in good standing regarding cultural resources and "Section 106" compliance.
- o Worked closely with NPS Geological Resources Division to identify potential threats from oil and gas development in the region surrounding the park and make proactive efforts to mitigate potential impacts on the park's extensive viewshed.
- o Worked closely with Colorado Army National Guard on and EIS to protect park soundscapes from military overflights.
- o Worked for about five years on extensive archeological, historical, hydrological and geomorphological research to determine the historic configuration of the stream channel, which is important to the stewardship of park resources and the interpretation of the site.
- o Identified and managed 1864 period cottonwood trees with significant cultural values in collaboration with the Tribes.
- o Continues extensive genealogical and primary document historical research in collaboration with a team of subject matter experts and tribal representatives.

## Visitor Experience

Visitation has steadily increased each year since the park was established in 2007, with a peak year of over 7,000 visitors in 2014 during the 150th commemoration of the Sand Creek Massacre. The park is open to visitors seven days per week from 9:00 am to 4:00 pm, April 1 through November 30, and during weekdays only from December 1 to March 31. Despite limited visitor facilities, visitor satisfaction as measured by visitor surveys remains consistently high (99% in FY 2016).

- The park and the Cheyenne and Arapaho Tribes visited the U.S. Holocaust Museum and Memorial in Washington D.C. and initiated a dialogue about possible future partnerships to examine comparative studies of genocide. The park has also initiated similar conversations with the International Coalition of Sites of Conscience.
- In conjunction with Postmodern Company, the park completed a 55 minute documentary film entitled *The Sand Creek Massacre and the Civil War*. In 2015 the film won the Blue Pencil Gold Screen Award for documentary film from the National Association of Government Communicators. The documentary, along with an additional film documenting the park's dedication ceremony in 2007, is currently being produced by the Western National Parks Association for sale in the park bookstore as well as other related outlets.
- The park completed its first General Management Plan and a Foundation Document in 2016.
- The park's first Long Range Interpretive Plan is currently underway and all interpretive themes have been developed and approved in consultation with the Cheyenne and Arapaho Tribes.
- Park staff and tribal partners have been working for several years with History Colorado, the state's primary history museum, to develop a Sand Creek Massacre exhibit at the state level.
- Park staff, tribal partners, and History Colorado are working with the One Earth Future Foundation regarding the development of a Sand Creek Massacre Memorial at the State Capitol.
- The NPS has been working in partnership with Kiowa County for more than 10 years on the rehabilitation of a historic building on the main street of the park's gateway community to serve as a Visitor and Research Center. As of this date, the County and numerous funders have contributed more than \$2.5 million to the rehabilitation project, while NPS is in the process of acquiring design services for tenant finishes for its portion of the facility. The facility will contextualize the visitor experience at the massacre site itself.
- The park has worked in partnership with a six-county non-profit heritage tourism organization to develop off-site interpretive signage about the Sand Creek Massacre.
- The park collaborated with Fort Larned National Historic Site, Bent's Old Fort National Historic Site, and Washita Battlefield National Historic Site to produce three joint site bulletins about Major Edward "Ned" Wynkoop, the Family of William Bent, and Cheyenne Peace Chief Black Kettle, and with Castilla de San Marcos about Cheyenne and Arapaho survivors of the Sand Creek Massacre who were later imprisoned at Fort Marion, Florida. These site bulletins will be distributed at each of the above named national parks and represents one method of uniting separate NPS sites that share common stories. Other similar projects are planned for the future.
- After thirteen years of joint efforts, the park acquired 640 acres of former state land for inclusion in park boundaries. The addition brings the park's total acreage to 3,025. The new addition will enable development of a pull-out with wayside exhibits to orient visitors to the massacre site upon arrival. The park's listing on the National Register of Historic Places was amended in 2016 to include the additional acreage.
- The park is working to develop funding requests to implement the visitor services facilities identified in the Preferred Alternative of the General Management Plan. The park currently maintains 1.75 miles of primitive interpretive trails and interim wayside exhibits, along with Western National Park Association bookstores in two locations.
- Park staff assists other local heritage sites including Bent's New Fort, the privately-owned archeological site of the remains of Bent's New Fort and Fort Lyon, from which the attack on Sand Creek was launched in 1864. Further, the park collaborates with the county-owned historic site of Boggsville, a 1860s community on the Arkansas River with ties to some of the people associated with Sand Creek, and Camp Amache, a municipally-owned National Historic Landmark, which preserves the remains of a WWII Japanese-American internment camp. The two sites are currently developing their shared histories of human rights violations by the United States government and their common contributions to the study of civil rights in America.

## Park Infrastructure

The foundation of the current on-site infrastructure is the private ranch headquarters, which was acquired in 2005 as the core portion of the authorized park boundaries. While the private home was demolished upon acquisition by the NPS, the former ranch roads were retained and have become both service roads and the basis for the visitor trail system.

- The former ranch maintenance shop and office have become the park's maintenance shop, conference room, and potable water treatment facility. Added to these existing facilities are an 800 ft<sup>2</sup> modular building, which serves as offices for five staff members, as well as visitor contact station and Western National Parks Association sales outlet.

- NPS also added a tornado shelter, two vault toilet facilities, and mowed parking areas and a modest picnic area.
- A reinternment (cemetery) area has been established pursuant to the park's authorizing legislation for the interment of massacre-related human remains and related objects that are repatriated to the descendant tribes from museums and private individuals, or that may be found on-site.
- The park is powered completely by electricity with no natural gas or propane, although the park's maintenance facility will be solar powered by fiscal year 2018.
- Installation of an on-demand hot water heater has reduced energy consumption.
- Installation of a low-flush toilet plus vault toilets for the public has reduced water consumption.
- Improvements have been completed to the maintenance shop to support park stewardship activities.
- As of this writing, the park is in the process of acquiring design services for infrastructure improvements per the Preferred Alternative of the General Management Plan, in addition to preparing internal funding proposals for implementation of designed improvements.

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

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The creation of the Sand Creek Massacre National Historic Site began with the passage of the 1998 Sand Creek Massacre Site Study Act, which mandated the National Park Service to conclusively identify the massacre site location and determine its suitability for inclusion in the national park system. From 1999 to 2000, the National Park Service worked in close collaboration with the Northern and Southern Cheyenne and Arapaho Tribes and the State of Colorado to intensively research the location of the massacre site and develop recommendations to Congress regarding the significance of the massacre in the nation's history and the suitability of the site as a national historic site. Based upon the resulting reports and testimony at numerous Congressional hearings, the Sand Creek Massacre National Historic Site Establishment Act was passed in 2000. The next seven years were spent in developing, strengthening, and maintaining close working relationships among the NPS, the four Cheyenne and Arapaho Tribes, Kiowa County officials, the State of Colorado, and members of Congress to acquire enough of the authorized 12,500 acres of land to formally establish the national historic site. The many trials and tribulations encountered and overcome during these seven years have been documented in the award winning book *A Misplaced Massacre: Struggling over the Memory of Sand Creek* by historian Ari Kelman.

Despite many, many obstacles, in April 2007 the Sand Creek Massacre National Historic Site was formally established. The establishment was viewed by the Cheyenne and Arapaho descendants as a great victory, enabling a long-suppressed story to finally be accurately and sensitively told, and for the sacred site to be preserved in perpetuity for future generations. Since 2007, the close working relationship between the tribes and the National Park Service has remained intact, strong, and trustful in the effort to develop the site in a manner appropriate to the subject. The Tribes participated in every step of the development of the park's first General Management Plan, the host of completed natural and cultural resources inventories and baseline studies, and the current Long Range Interpretive planning process, bringing the park to its current, carefully developed state.

In 2014, the 150th year since the Sand Creek Massacre, public attention to the site and the subject of the Sand Creek Massacre reached an all-time high. The park had over 7,000 visitors. The United Methodist Church made its pilgrimage to the massacre site and identified its role in the tragedy as an act of repentance for the Church as a whole. Northwestern University and Denver University published major reports investigating how each institution commemorates their shared founder, Territorial Governor John Evans, who was complicit in the Sand Creek Massacre. A major symposium on the Sand Creek Massacre was held at the National Museum of the American Indian in Washington, D.C. Colorado Governor John Hickenlooper established a statewide commission to commemorate the Sand Creek Massacre and for the first time in history, delivered a public apology to the Cheyenne and Arapaho Tribes on behalf of the State of Colorado. Media coverage of Sand Creek included the *Los Angeles Times*, the *Wall Street Journal*, the *New York Times*, the *Denver Post*, *Smithsonian Magazine*, Rocky Mountain Public Television, and many others. For the first time, public discourse about the Sand Creek Massacre turned from debates and controversy to recognition, acknowledgment, and healing.

As of this writing, it has been eighteen years since the first of four pieces of legislation related to the Sand Creek Massacre site was passed. The national historic site has been established for almost ten years, nearly every major planning document and resource study has been completed or is in progress, and relationships between the park and the four tribes, as well as every other partner, are solidly in place. The Cheyenne and Arapaho Tribes are in their eighteenth year of the annual Spiritual Healing Run from the massacre site to Denver. The History Colorado Center is developing a new Sand Creek exhibit in Denver and a privately funded Sand Creek Massacre memorial is being placed at the State Capitol. The public, major universities, the United Method Church, other institutions such as the International Coalition of Sites of Conscience, and others are keenly interested in the relevancy of the Sand Creek Massacre to issues facing us in our contemporary world.

Although the General Management Plan (GMP) has identified the most basic facilities needed to fulfill the park's legislated mandates into the next several decades, implementation of those plans is just beginning. The GMP identified modest developments including improvement of visitor trails for accessibility and public safety, and a small visitor contact station to alleviate having the park's visitor services, park store, and administrative offices in an 800 square foot modular building. The total cost of improvements identified in the GMP is just over \$3,000,000—relatively modest for the completion of an entire park's development needs. Currently, the park is in limbo between being a new park that was never fully developed, and no longer being “new.” It has been established for nearly ten years, and in the meantime, almost twenty newer parks have been established. As of this writing, park and Intermountain Region staff are working together to find the best alternatives for moving implementation of the GMP's preferred alternative forward.

Concurrently with the development of the site itself, is the development of the planned off-site visitor services and research center in the park's gateway community of Eads. The need for development of an off-site visitor services facility was anticipated in the park's 2000 authorizing legislation. The Act directed the National Park Service to interpret the significance of the massacre site and to manage it to help prevent such atrocities from ever occurring again. The development of a visitor center and a research facility is an essential component of fulfilling these mandates. The former NPS Intermountain Regional Director advised that construction of such a

facility within park boundaries would constitute impairment to the massacre site's sensitive cultural landscape and that it be developed off-site. The park's authorizing legislation included development of off-site support facilities within Kiowa County, but did not include authorization for expenditure of federal funds for such development. Since NPS did not have authority to fund off-site development, it was decided to have a separate planning process for the facility and not include it within the GMP. In 2007, Kiowa County officials, in consultation with NPS, purchased the historic "Murdock Building" in the park's gateway community to meet the joint needs of the county and the NPS including NPS administrative offices, visitor center and research center and a county senior citizens' center. In consultation with the NPS Intermountain Region leasing specialist and the federal U.S. General Services Administration, the NPS determined that sharing the county-owned building was the most feasible alternative. The project was considered a "win-win" for both NPS and the rural community, as it fulfills NPS's policy mandates to utilize historic buildings before leasing newer properties, and it would contribute to the downtown renewal and economic development of an impoverished rural community.

The approval for leased space was signed by the Regional Director and the NPS Comptroller in August, 2007. In 2008, the park submitted a base increase request in anticipation of additional staffing needs for the facility; however the request was not funded before the base increase request process came to a halt in 2010. Since 2008, a host of partners including the State Historical Fund and the Colorado Department of Local Affairs has so far contributed more than \$2.5 million to Kiowa County to rehabilitate the building. With a bi-partisan effort among Colorado's Congressional delegation, the authorization needed to allow NPS to expend appropriated funds on a non-NPS owned facility was included in the 2015 National Defense Authorization Act. The park and NPS Intermountain Regional staff then developed an internal funding request of just over \$1,000,000 for the 2016 Centennial Challenge and Helium Act Fund sources to fund the tenant finishes necessary for NPS to occupy its portion of the building; however, neither fund source was deemed appropriate for this use. Thankfully, in 2016, the NPS Intermountain Regional Office identified year-end funds for the design and construction drawings for the tenant finishes for the intended NPS-occupied portions of the facility. In addition, the General Services Administration delegated leasing authority for the property to the NPS, which will allow NPS to initiate leasing negotiations with Kiowa County as tenant finishes become a reality and NPS gets closer to actual occupancy of the building. The Intermountain Regional Office staff is also working closely with the Washington, D.C. office to identify possible fund sources that will enable construction of the tenant finishes after the design and construction drawings are completed. Finally, park staff is developing a funding proposal for the design and installation of exhibits in the Visitor Center component of the Eads facility, which is projected to take several years, if and when funding is awarded. Park and NPS Intermountain Region staff are cautiously optimistic that this model historic preservation partnership project, featured in a statewide historic preservation film in 2012, will come to fruition in the near future, roughly 20 years after the park was authorized for establishment and 13 or more years after the park was established and opened to the public.

By 2018, another challenge will face the park: staff turnover and succession planning. The permanent staff of the Sand Creek Massacre National Historic Site grew from one project director in 2001, to about four by the time the park was officially established and opened to the public in 2007, to 7.5 today, in addition to 2–3 non-permanent staff members during various parts of the year. Many of these employees have been with the park for a decade or more, and a few have been with it since the initial site location study in 1999, before the park was even authorized for establishment. These employees, especially in concert with a well-established and long-term group of tribal representatives and other subject matter experts, constitute an irreplaceable body of knowledge about the Sand Creek Massacre, the massacre site itself, and the history and creation of the national historic site. Half of this permanent staff is eligible for retirement by 2018, and one exceedingly knowledgeable ranger who had been with the park since before it was established retired this year. In addition, many of the tribal representatives who have been integral to the park's founding and foundational management planning have already passed away. The knowledge that is lost with each and every departing individual could easily leave huge gaps in the background information necessary for new managers, administrators and tribal partners to make informed decisions, especially for such a sensitive site built upon long-term tribal relationships. In anticipation of these significant retirements and turnover of long-term permanent staff and tribal representatives, the park must implement a comprehensive method for gathering institutional knowledge. The visitor experience could be threatened and a major loss of institutional knowledge could occur if an ongoing comprehensive method of data collection and information transfer is not completed prior to staff departures. An ongoing administrative history is one important component of capturing some of this institutional knowledge; recording interviews to document staff oral histories is another extremely important component that has not yet been undertaken.

Currently, the park's three major challenges and considerations for park management planning include:

1. Implementing the relatively minor improvements and developments identified in the Preferred Alternative of the GMP;
2. Completing the tenant finishes to the park's off-site visitor and research center and administrative facility in the gateway community of Eads and completing the leasing process; and
3. Transition management planning for an anticipated turnover of 50% of the park's permanent staff in 2018.

Other minor key issues and challenges identified in the park's Foundation Document include:

**Mineral Leasing.** Sand Creek Massacre National Historic Site lies on an oil and gas play (positive investment) known as the Las Animas Arch. The long history of oil and gas activity includes sporadic discoveries and development of traditional sandstone and

limestone reservoirs. Several wells have been drilled, produced, and eventually capped in what is now Sand Creek Massacre National Historic Site. The Atoka and Cherokee shales in Kiowa County and neighboring counties are geologically less attractive, but have sparked leasing interest—improving economics and technologies could make the shale plays here viable. Subsurface mineral rights on the historic site are currently held by individual landowners. Private mineral ownership and a possibility that undeveloped oil and gas resources occur beneath the historic site creates the potential for additional drilling inside the historic site. At the moment, all inholdings within the park authorized boundary have been leased. Drilling outside the park has occurred in the recent past and may very well continue in the future. Potential impacts on cultural and natural resources from drilling and production activities adjacent to the historic site would likely consist of visual and sound intrusions on the cultural landscape and visitor experience. It is vital to work with stakeholders to help ensure that any future drilling and/or resource extraction surrounding the historic site would be done in concert with management goals and objectives, and to minimize impacts to park resources and visitor experience within the authorized park boundary.

**Potential Wind Infrastructure.** The enabling legislation for Sand Creek Massacre National Historic Site directs the National Park Service to preserve as closely as practicable, the 1864 cultural landscape. In 2013, the park proposed to remove the last human-made intrusion to the viewshed within the park’s control by burying three miles of powerlines, thus removing a visual intrusion while still maintaining the power grid. The lack of structures and utilities in the area contributes to historic authenticity with the extensive viewsheds to the north, east, and south. Scenic and historic viewsheds are considered an important contributing factor to a positive visitor experience. Currently, there is a proposed transmission line for wind generated power two miles outside the authorized park boundary. This transmission line has the potential to impair the historic viewsheds in the park. The park has submitted official comment on the proposed construction of the transmission lines; however, further measures may be necessary in order to protect and conserve the views and vistas within the authorized park boundary should the proposal progress.

**Maintaining Tribal and Partner Relationships.** Encouraging and maintaining partnerships between the National Park Service and the representative of the Cheyenne and Arapaho tribes and descendants is essential to the success of the historic site. The park staff continues to develop and maintain strong relationships with History Colorado, Kiowa County, park neighbors, the State of Colorado, and especially the Cheyenne and Arapaho tribes. These relationships must be maintained by future park administrations for the park to remain successful.

# References

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See the [State of the Park Report for the Park 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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**See Also:**

[Collection of Natural Resource-Related References](#)

[Collection of Cultural Resource-Related References](#)

[Collection of Visitor Experience-Related References](#)

# Glossary

See the [State of the Parks home page](#) for a link to a complete glossary of terms used in State of the Park reports. Definitions of key terms used in this report are as follows:

Key Term	Definition
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.
Cultural Landscapes 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.
Cultural Landscape Report (CLR)	A Cultural Landscape Report is the principal treatment document for cultural landscapes and the primary tool for long-term management of those landscapes. It guides management and treatment decisions about a landscape's physical attributes, biotic systems, and use when that use contributes to historical significance.
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 more than 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.
Facility Condition Index (FCI)	FCI is the cost of repairing an asset (e.g., a building, road, bridge, or trail) divided by the cost of replacing it. The lower the FCI number, the better the condition of the resource.
Foundation Document	A park Foundation Document summarizes a park's purpose, significance, resources and values, primary interpretive themes, and special mandates. The document identifies a park's unique characteristics and what is most important about a park. The Foundation Document 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.
General Management Plan (GMP)	A General Management Plan is a strategic planning document that outlines the future management of a National Park Service site for the next 15 to 20 years. The plan will set the basic philosophy and broad guidance for management decisions that affect the park's resources and the visitor's experience.

Key Term	Definition
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.
Historic Resource Study (HRS)	The historic resource study is the primary document used to identify and manage the historic resources in a park. It is the basis for understanding their significance and interrelationships, a point of departure for development of interpretive plans, and the framework within which additional research should be initiated.
Historic Structures Report (HSR)	The historic structure report is the primary guide to treatment and use of a historic structure and may also be used in managing a prehistoric structure.
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.
Integrated Resource Management Applications (IRMA)	The NPS-wide <a href="#">repository</a> for documents, publications, and data sets that are related to NPS natural and cultural resources.
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.
List of Classified Structures (LCS)	LCS is an inventory system that records and tracks the condition of the approximately 27,000 historic structures listed in the National Register of Historic Places that are the responsibility of NPS.
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.
Native American Graves Protection and Repatriation Act (NAGPRA)	A federal law passed in 1990. NAGPRA provides a process for museums and federal agencies to return certain Native American cultural items (e.g., human remains, funerary objects, sacred objects, objects of cultural patrimony) to lineal descendants and culturally-affiliated Indian tribes and Native Hawaiian organizations.
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, historical, or sociological features and assets associated with parks. Resource management includes the knowledge, understanding, and long-term stewardship and preservation of these resources.

Key Term	Definition
Southern Plains Network (SOPN)	One of 32 I&M networks established as part of the <a href="#">NPS Inventory and Monitoring Program</a> . The <a href="#">Southern Plains Network</a> comprises 11 parks in Colorado, Kansas, New Mexico, Oklahoma, and Texas.
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.
Wilderness	A designation applied to certain federal lands set aside for preservation and protection in their natural condition, in accordance with the <a href="#">Wilderness Act of 1964</a> .