



RECORD OF DECISION

KNIFE RIVER INDIAN VILLAGES NATIONAL HISTORIC SITE ARCHEOLOGICAL RESOURCES MANAGEMENT PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT

The Department of the Interior, National Park Service (NPS), has prepared this Record of Decision for the Knife River Indian Villages National Historic Site Archeological Resources Management Plan / Final Environmental Impact Statement (plan/final environmental impact statement). This record of decision has been prepared in accordance with the requirements of the National Environmental Policy Act of 1969, as amended (NEPA), its implementing regulations (40 Code of Federal Regulations [CFR] 1500–1508), the Department of the Interior's NEPA regulations (43 CFR 46), and NPS Director's Order 12: *Conservation Planning, Environmental Impact Analysis and Decision-Making* and its accompanying handbook. The record of decision includes a summary of the purpose of and need for action, synopses of the alternatives considered and analyzed in detail, a description of the selected alternative, the basis for the decision, and a description of the environmentally preferable alternative. A non-impairment determination for this record of decision is appended as attachment A.

BACKGROUND

On October 26, 1974, Public Law 93–486 authorized the Knife River Indian Villages National Historic Site (park) as a unit of the national park system. The park was established with three distinct purposes: (1) preservation of historic and archeological resources, (2) interpretation of historic and archeological resources, and (3) study of those resources for the benefit of the public.

Situated on the river bluffs and floodplains along the Missouri and Knife Rivers, the 1,748.8-acre park conveys the story of thousands of years of human habitation in what is now North Dakota. Archeological evidence of human occupation at the park represents centuries of habitation prior to Lewis and Clark's journey westward. The archeological record provides valuable insight into the development of economies of trade, hunting, agriculture, and Northern Great Plains native communities, including the Hidatsa, Mandan, and, to a lesser extent, the Arikara. A number of linked prehistoric and historic archeological sites are associated with the park. The park is also known for its connection to the Lewis and Clark expedition. Sacagawea and her husband Charbonneau, a French fur trader, were living at the villages when Lewis and Clark recruited him to interpret for their expedition westward. The park is tasked with the preservation and interpretation of these resources for the public.

Sixty-eight known archeological sites are associated with the park, including major and minor villages, peripheral and off-village activity areas, cemeteries, trails, farmsteads/homesteads, other historic sites, and debris scatters. These sites reflect early use of the area by nomadic, prehistoric

hunter-gatherer groups through the establishment of permanent earthlodge villages by the ancestors of the modern Mandan, Hidatsa, and Arikara peoples. Big Hidatsa, Sakakawea, and Lower Hidatsa are three large village sites that are interpreted for the public. These sites remain some of the best-preserved examples of earthlodge villages along the Missouri River. The Big Hidatsa site is the largest village in the park and a national historic landmark and includes more than 100 visible earthlodge depressions as well as fortification trenches and linear earthen mounds. Forty-three additional archeological sites are listed on the National Register of Historic Places as contributing elements to the Knife River Indian Villages National Historic Site Archeological District.

The villages remained inhabited until the mid-1800s when the villagers moved upstream to what eventually became the Fort Berthold Indian Reservation. The lands surrounding the abandoned village sites were disbursed as homestead claims under the Homestead Act and farmed until the park was authorized in 1974. The archeological record at the park provides a clear timeline and tells the story of the convergence of American Indian cultures with European-American traders, the effect of the introduction of new technology on hunting and agriculture, and the effects of disease on large Northern Plains villages.

The park is tasked with the preservation and interpretation of the archeological resources for the public. The National Park Service supports this goal with a visitor center, administrative offices, maintenance facility, replica earthlodge, trails, and interpretive displays. The interpretation and management of the park has become increasingly complicated because of several threats to the preservation of archeological resources.

PURPOSE OF AND NEED FOR ACTION

The purpose of the plan/final environmental impact statement is to provide a framework for proactive, sustainable archeological resource management at the park. The National Park Service has identified four major threats to archeological resources at the park. While riverbank erosion is the most visible and documented threat, additional threats result from infrastructure location, pocket gopher activity, and vegetation encroachment. A standard set of management actions is needed to address these threats. These actions should:

- provide a proactive and coordinated approach to resource management
- maximize archeological resource preservation, while allowing natural processes to the extent possible
- allow for management that adjusts to the resource condition with an appropriate response mechanism
- provide for visitor use, traditional tribal use, education, and research opportunities

OBJECTIVES AND DESIRED CONDITIONS IN TAKING ACTION

The plan/final environmental impact statement will achieve the following objectives to address the associated desired conditions:

Objective 1. Preserve archeological sites in an undisturbed condition unless it is determined through an informed decision-making process that disturbance or natural deterioration is unavoidable.

Desired Conditions

- Archeological sites are protected in situ (in their original location) to the maximum extent possible.
- Archeological sites are identified and inventoried, and their significance is determined and documented.
- Sites are prioritized for preservation using an established process.

Objective 2. Improve preservation and storage of archeological resources in the museum collections.

Desired Conditions

- The park's collection is housed in a climate-controlled location, free of water infiltration and environmental fluctuations, which meets NPS collections standards.
- Museum collections related to archeological sites are acquired, accessioned, catalogued, preserved, protected, and made available for access and use according to NPS standards and guidelines.
- Museum collections are preserved for the long term through recommended conservation treatments performed by professional staff.
- Full curation of museum collections is achieved. Any deficiencies documented in a collection condition survey are corrected.
- The park's collections are made accessible for tribal, research, and interpretive purposes.
- The special needs of the museum objects and records are incorporated into the park's Museum Collections Emergency Operation Plan and Structural Fire Plan.

Objective 3. Promote tribal involvement in archeological resource management and decision-making.

Desired Conditions

- Tribal connection to the park is fostered, supported, and maintained.
- The park consults with traditionally associated American Indian nations to identify, record, and evaluate sensitive resources and traditional cultural properties.
- The park is managed as a national register eligible-traditional cultural property in consultation with the tribal historic preservation officer.
- Protection of culturally important sites is an integral component of park management actions.

Objective 4. Foster tribal collaboration in preservation, research, and interpretation of archeological resources.

Desired Conditions

- Sensitive archeological information is maintained in a manner acceptable to the tribes and in compliance with NPS policy.
- The park gathers traditional ecological knowledge to assist park management and provide cultural education.

- Additional collaborative research occurs through the involvement of the park and traditionally associated tribes.

Objective 5. Develop archeological resource interpretation and research opportunities to expand knowledge of Northern Plains tribal history, culture, and lifeways.

Desired Conditions

- The park has a sustainable research program that includes development of a long-range research design to guide archeological investigations.
- The park fosters an active interdisciplinary research program that enhances interpretive programs, ethnographic collections, and resource stewardship.
- Research efforts focus on how the culture, agriculture, economy, and lifestyle of Northern Plains tribes developed, and this information is used to develop and enhance park interpretation.
- The information included in the baseline inventory of archeological sites is expanded through application of current research techniques and innovative methods (e.g., geophysical technologies). New information addresses knowledge gaps and the content and condition of the resources.
- The replica earthlodge is available as an interpretive and educational aid and is maintained in good condition.
- Exhibits in the visitor center interpreting archeological resources remain current, and space is provided to present new information developed from interdisciplinary research.
- Additional collaborative research occurs through the involvement of the park and the State Historical Society of North Dakota.

ALTERNATIVES CONSIDERED

The plan/final environmental impact statement provides a suite of proactive management tools to preserve archeological resources with site-specific mitigation recommendations. These management tools and mitigation measures can be found in chapter 2 of the plan/final environmental impact statement. The alternatives analyzed in the plan/final environmental impact statement include Alternative 1: No Action, Alternative 2: Relocate Facilities in the Park, and Alternative 3: Locate Facilities Off-Site (Option 1: Purchase Land and Construct New Maintenance Facilities Off-Site or Option 2: Lease Space to Relocate New Maintenance Facilities Off-Site). The National Park Service identified alternative 3 as the preferred alternative in the plan/final environmental impact statement. This alternative has been selected for implementation and is described in a separate section below under “Selected Alternative.” Each alternative, including actions and elements common to the alternatives, is described in detail below.

ACTIONS COMMON TO ALL ALTERNATIVES, INCLUDING NO ACTION

Archeological Resources Management

The management of archeological resources on NPS lands is mandated by law and policy. NPS management policies are derived from a suite of historic preservation, environmental, and other

laws, proclamations, executive orders, and regulations. Archeological resource management at the park will continue in a manner consistent with these legislative and regulatory provisions and with implementing policies and procedures, including the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 *Federal Register* 44716–740), NPS *Management Policies 2006*, and Director's Order 28a. In accordance with these policies and procedures, archeological resources will be managed in situ (i.e., in their original place or position), unless the removal of artifacts or physical disturbance is justified by research, consultation, interpretation, preservation, or protection requirements. In the event of catastrophic bank erosion, salvage activities and data recovery will take place.

All alternatives (including the no action) include the following archeological resources management measures.

- The archeological site condition assessment program and follow-up ranger monitoring will continue as part of the broader regional and national efforts to assess and track overall archeological site conditions. The archeological site condition assessment program was initiated in 2006 as a NPS-wide program to record the condition of all archeological sites. Annual site condition assessments will be conducted, with support from the Midwest Archeological Center (MWAC), for select sites, including the three main villages and Elbee sites, at intervals of between one and five years depending on the site.
- MWAC staff will continue to provide advice on section 106 consultation and Planning, Environment, and Public Comment projects, enter projects into the Project Management Information System, coordinate research projects, and act as an extension of park staff in an advisory capacity. MWAC staff will also continue to provide archeological services, house collections on a temporary basis until they are returned to the park or to a designated storage facility, and administer the Archeological Sites Management Information System and geographic information systems databases for the park.
- Park staff will continue to comply with the standard operating procedure for disposition of artifacts in situ. This procedure provides a protocol for dealing with artifacts that are found by park staff or visitors.
- The park will continue to conduct regular consultations with the Mandan, Hidatsa, and Arikara Nation (MHA Nation), including occasional assistance with ongoing archeological efforts at the park.
- Tribal historic preservation officer / state historic preservation officer consultation will continue, as needed, with both annual updates and consultation on specific actions occurring to meet the requirements of sections 106 and 110.
- Site interpretation will continue in accordance with the Knife River Indian Villages Comprehensive Interpretive Plan.
- A parkwide Native American Graves Protection and Repatriation Act (NAGPRA) action plan for inadvertent discoveries and project-specific plans for the intentional archeological excavation of human remains or NAGPRA items will be completed and followed in the event that human remains or NAGPRA items are in jeopardy of damage, loss, or theft. Intentional excavation of NAGPRA items and human remains

will only occur in direct consultation and coordination with the tribal historic preservation officer / state historic preservation officer.

- Public and private partnerships will be sought to achieve management objectives, find opportunities for information sharing (e.g., host a research conference), and/or enter into agreements with federal, state, or local jurisdictions to further resource protection.

Tribal Consultation and Coordination

All alternatives include the following measures related to tribal consultation and coordination.

- Tribal monitoring assistance could occur at the request of the tribe(s) for archeological investigations or other activities.
- Park staff will seek to involve tribal members in site prioritization, interpretive programs, and ethnographic research. Park staff will provide opportunities for tribal events and involve tribal youth in park programs.
- The park will continue to consult with tribes per Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," and with the Department of the Interior's Tribal Consultation Policy.

Interdisciplinary Scholarly Research

All alternatives include the following measures related to interdisciplinary scholarly research at the park.

- Archeological research will be encouraged as part of the park's mission. All research projects will be required to follow NPS policies and strive to limit the disturbance necessary to collect the information needed to address defined research questions.

Pocket Gophers

Park staff will continue to comply with the standard operating procedure for disposition of artifacts in situ as it relates to artifacts uncovered by pocket gopher activity. This procedure provides a protocol for dealing with artifacts that are found by park staff or visitors. As stated in the standard operating procedure, priority is given to leaving archeological items in situ (i.e., in their original place). However, if park management determines that unusual or rare archeological items should be recovered, cataloged, and stored in the museum collections, these activities will be completed in accordance with the standard operating procedure and other applicable NPS guidance and regulations.

Vegetation Management

All alternatives include the following measures related to vegetation management in conjunction with archeological resource management activities.

- Nonnative vegetation management will proceed as outlined under the existing *Northern Great Plains Exotic Plant Management Plan* or other sound ecological management practices. Management will include chemical, manual, biological, prescribed fire, and mechanical methods.

- Northern Great Plains Inventory and Monitoring staff will continue annual monitoring of vegetation plots.
- The park will continue opportunistic native prairie restoration in areas with low and medium densities of archeological resources as defined by the prescribed fire program. The native prairie restoration process typically includes burning, chemical application, and reseeding. Current native prairie establishment activities include precision prairie restoration and reintroducing forbs into the revegetated native prairie.
- In accordance with the *Knife River Indian Villages National Historic Site Fire Management Plan* and Vegetation Inventory and Monitoring Program, study plots will continue to be marked with either buried rebar stakes or an alternative method that will not affect the identification and interpretation of archeological resources.

Infrastructure

All alternatives include the following measures related to infrastructure in the park.

- Relocation of trails in response to riverbank erosion will continue as needed. Trails will continue to be mowed paths with no additional treadwork.
- The replica earthlodge will continue to be maintained as an interpretive exhibit.
- Maintenance of existing bank stabilization structures to protect County Road 18 will continue. The park will cooperate with state and county agencies to develop an action plan dealing with relocating roads in case of emergency and for ensuring access to park areas and private property.

Museum Collections

The management of the museum collection at the park will continue to comply with NPS policies, including *NPS Management Policies 2006*, Director's Order 24: *NPS Museum Collections Management*, Director's Order 28, and procedures set forth in the *NPS Museum Handbook* and *NPS-28: Cultural Resource Management Guidelines*. The following measures related to management of the museum collection will occur under all alternatives.

- A collection management plan and scope of collection statement will be maintained and updated as required. The collection management plan will provide the park with guidelines and recommendations for improving collection management at the park.
- Museum objects and specimens will be cataloged and entered into the Interior Collections Management System.
- A museum collection condition assessment will be completed. This plan will build on the collection management plan and identify collection condition and treatment needs for the museum collections.
- A checklist to ensure the facility meets NPS standards will be reviewed and updated annually. Currently the park is meeting approximately 98% of NPS standards. The primary deficiency listed in the park's Checklist for Preservation and Protection of Museum Collections is related to the basement storage.

- An annual inventory of museum property will be completed. A random sample for the accession backlog and cataloged collections and 100% inventory for controlled property inventories will be conducted.
- A selection of objects, specimens, and archives will be digitized and made available to the public and researchers via the web.
- Park staff will work with regional museum representatives on project management and funding requests.
- The Museum Collections Emergency Operation Plan will continue to be followed and updated as necessary.
- The collections will continue to be made available for interpretation, tribal needs or requests, and research activities.
- The park will continue to respond to collection research requests. Collection access requests will be reviewed and granted when appropriate.
- The museum collections will be protected from potential water intrusions.
- Implementation of integrated pest management in the museum collections facility will continue.

ALTERNATIVE 1: NO ACTION

Under the no-action alternative, management of archeological resources at the park would continue as currently implemented. Management would respond to archeological resource threats but without the benefit of site prioritization and a proactive adaptive management framework. Under the no-action alternative, existing park infrastructure would remain in place.

ELEMENTS COMMON TO THE ACTION ALTERNATIVES ONLY (ALTERNATIVES 2 AND 3)

Under alternative 2 and alternative 3, archeological resources at the park will be managed in an adaptive management framework consistent with the objectives of the plan/final environmental impact statement. Adaptive management will be used to address riverbank erosion, gopher control, and woody vegetation encroachment. Adaptive management is a continuing iterative process where (1) a problem is assessed, (2) potential management actions are designed and implemented, (3) those actions and resource responses are monitored over time, (4) data are evaluated, and (5) actions are adjusted if necessary to achieve desired management outcomes.

Decision making in an adaptive management framework involves the selection of an appropriate management action at each point in time, based on the status of the resources being managed. Because the resource threats at the park differ by archeological site, no single action or set of actions will universally address all resource problems.

Threats to archeological sites vary throughout the park and many sites are impacted by more than one threat, so park management developed a process to prioritize archeological sites based on importance and level of risk to inform management decisions. This site prioritization tool will assist park management to prioritize plan implementation in light of differential resource threats and levels of annual funding and staffing.

The goal of the adaptive management process is to protect the condition of the park's archeological resources through informed, proactive, and transparent management. The adaptive management framework is designed to detect changes to important indicators that may be caused by major threats to archeological resources at the park and to provide park managers with a method to adaptively manage and address any changes in conditions. Effective monitoring requires (1) determining the most effective indicator that can gauge when the desired condition has been achieved, and (2) selecting the standard against which the indicator will be measured. The National Park Service identified indicators and standards for managing archeological resources based on the park's purpose, significance, objectives, and desired conditions. Initial monitoring of the indicators will determine if the indicators are accurately measuring the conditions of concern and if the standards truly represent the minimally acceptable condition of the indicator. Park staff may decide to modify the indicators or standards and revise the monitoring program if better ways are found to measure changes.

Adjustments to management actions at an archeological site or the selection of management actions to be implemented at a site where actions have yet to be taken will be informed by the increased understanding gained through monitoring and evaluation.

The action alternatives elements implement all practical means to avoid or minimize environmental harm. These elements can be found in chapter 2 of the plan/final environmental impact statement in the "Mitigation Measures" section.

ALTERNATIVE 2: RELOCATE FACILITIES IN THE PARK

Under alternative 2, archeological sites, riverbank erosion, pocket gophers, and woody vegetation would be managed under the adaptive management framework described previously.

Under this alternative, the maintenance facility and museum collections storage would be moved to another location in the park, and the existing maintenance building would be removed.

The vacated basement space of the visitor center currently housing the museum collections storage could be repurposed as an educational classroom, office space, or for other uses.

The National Park Service developed criteria to identify potential sites for relocating the facilities in the park. The goal was to identify sites that

- would allow facilities to be located at least 100 feet from a known archeological site or where acceptable mitigation opportunities were available if within 100 feet
- provide road access from locations other than County Road 18
- would not be viewed from scenic vantage points in and around the visitor center
- could accommodate the projected square footage requirements

Two relocation sites in the park were identified as meeting the necessary criteria and both are part of alternative 2. The park would relocate the facilities as follows:

- Site 1—includes approximately 17,600 square feet located adjacent to the south side of the existing visitor center. The museum collections storage and supporting administrative offices would be located in an addition to the visitor center. The addition would total approximately 3,000 square feet.

- Site 2—includes approximately 65,600 square feet located south of the existing visitor center. The maintenance offices, maintenance shop, cold storage, and tractor storage would be located in a new facility of approximately 6,000 square feet built on this site.

ALTERNATIVE 3: SELECTED ALTERNATIVE

The National Park Service selected alternative 3: Locate Facilities Off-Site (option 1 or 2) because it best meets the purpose of and need for action. The selected action also meets the objectives and desired conditions outlined in the plan/final environmental impact statement.

Under alternative 3, the park will follow all actions common to all alternatives and the actions common to all action alternatives, as previously described, and will relocate the maintenance facility and/or museum collections storage to space located outside the park. The space requirements will be the same as described for alternative 2. The following options are considered under this alternative:

- Option 1: Purchase Land and Construct New Maintenance Facilities Off-Site. The park will identify suitable sites outside the park to relocate the maintenance facility and/or museum collections storage. The existing maintenance facility building will be removed. Sites for relocation of the maintenance facility and/or museum collections storage have not been identified but will need to meet the access and space requirements identified under alternative 2.
- Option 2: Lease Space to Relocate New Maintenance Facilities Off-Site. The park will implement a site selection process to identify suitable leased space for the maintenance facility and/or museum collections storage. The existing maintenance facility will be removed, and the park will enter into a General Services Administration lease agreement and build a maintenance facility to suit its needs. The museum collections storage facility will meet NPS policies, including *NPS Management Policies 2006*, Director's Order 24: *NPS Museum Collections Management*, and Director's Order 28: *Cultural Resource Management*, and procedures set forth in the *NPS Museum Handbook* and *NPS 28: Cultural Resource Management Guidelines*.

Moving the museum collections storage will occur in conjunction with consultation with the MHA Nation tribal historic preservation officer and the North Dakota state historic preservation officer. The vacated basement space of the visitor center currently housing the museum collections storage could potentially be used as an educational classroom.

In addition, in 2017 a project was completed to waterproof the exterior of the building used for museum collections storage. If the project was successful in resolving water infiltration issues, storage for museum collections will remain in its current location. If efforts to address these issues are ultimately ineffective, the National Park Service will move the storage for museum collections off-site.

The selected alternative will identify land through a General Services Administration arrangement to lease or build an off-site maintenance facility to suit park needs. While building or leasing off-site appears difficult because of limited availability of appropriate facilities outside the park, this plan/final environmental impact statement is intended to guide the park's archeological resource management actions for the next 30 years. Availability during that time is expected to change. The National Park Service will conduct a thorough analysis that considers

the availability of appropriate sites and total cost of facility ownership prior to deciding whether to relocate the maintenance facility on or off park property. If suitable property outside the park is unavailable or cost prohibitive, the National Park Service intends to relocate and construct the maintenance facility in the park (alternative 2).

BASIS FOR DECISION

The planning team evaluated each alternative based on its ability to meet the purpose of and need for action. The planning team also evaluated the objectives of the plan/final environmental impact statement against the alternatives and analyzed the potential environmental impacts. Alternative 3 was selected because implementation of this alternative will result in reduced environmental impacts, allow for adaptive management, maximize archeological resource preservation, and provide enhanced visitor and tribal use of the park. Relocation of the maintenance facility outside the park will remove an intrusive facility from surrounding important archeological sites. Visitors will have the opportunity to fully enjoy and connect with archeological sites near the removed maintenance facility. If a suitable off-site location for the maintenance facility is not found, relocation adjacent to the visitor center will consolidate development, allowing for the same visitor benefits as the off-site relocation option. Selected alternative implementation will also have long-term, beneficial impacts on the resources analyzed in the plan/final environmental impact statement by preserving them in situ where possible and minimizing existing disturbance; reducing riverbank erosion through the use of a variety of stabilization techniques; managing pocket gophers through a combination of cultural and population control methods; and preventing vegetation encroachment through the use of biological, mechanical, chemical, and prescribed fire treatments, individually or in combination with one another. A summary of the beneficial and adverse impacts associated with the proposed management tools can be found on page 65 of the plan/final environmental impact statement in the “Comparison of Impacts of Alternatives” section. The mitigation measures that will be implemented prior to or during the implementation of the selected alternative are listed on page 63 of the plan/final environmental impact statement. Park managers will proactively preserve and protect park resources by implementing the selected alternative.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

According to Council on Environmental Quality regulations implementing the National Environmental Policy Act (43CFR 46.30), the environmentally preferable alternative is the alternative “...that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives affect different resources to different degrees, there may be more than one environmentally preferable alternative.”

The National Park Service determined that alternative 3, option 2—lease and relocate facilities off-site—is the environmentally preferable alternative because it best meets the objectives of this plan/final environmental impact statement and the purposes of NEPA related to resource protection. In addition to implementing adaptive management and a wide range of management tools, the relocation of park facilities off-site to a leased space will protect resources inside the

park. This conclusion is predicated on the assumption that leased property is available. If leased property proves to be unavailable in the first year, then the environmentally preferable alternative will be alternative 3, option 1.

CONCLUSION

Among the alternatives considered, the selected alternative (alternative 3, option 1 or 2) best meets the purpose of and need for action. The selected alternative also meets the objectives of the plan/final environmental impact statement and fulfills the NPS statutory mission and responsibilities, giving consideration to cultural, economic, environmental, technical, and other factors.

The required "no-action period" before approval of the record of decision was initiated on March 16, 2018, with the US Environmental Protection Agency's *Federal Register* notification of the filing of the plan/final environmental impact statement (83 *Federal Register* 11789) .

The official responsible for implementing the selected alternative is the NPS Midwest Regional Director.

APPROVED BY:



Cameron H. Sholly, Regional Director
Regional Director, Midwest Region



Date



ATTACHMENT A—NON-IMPAIRMENT DETERMINATION

The National Park Service (NPS) prepared this non-impairment determination for the selected alternative, as described in the Record of Decision for Knife River Indian Villages National Historic Site (park) Archeological Resources Management Plan and Final Environmental Impact Statement (plan/final environmental impact statement).

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the US Department of the Interior and the National Park Service to manage units “to conserve the scenery, natural and historic objects, and wild life in the System units and to provide for the enjoyment of the scenery, natural and historic objects, and wild life in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (54 United States Code 100101).

NPS Management Policies 2006, section 1.4.4, explains the prohibition on impairment of park resources and values:

While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the National Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

As stated in section 1.4.5 of the *NPS Management Policies 2006*, an action constitutes impairment when its impacts “harm the integrity of park resources or values, including the opportunities that otherwise will be present for the enjoyment of those resources or values.” To determine impairment, the National Park Service must evaluate the “particular resources and values that will be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.”

National park system units vary based on their enabling legislation, natural and cultural resources, and mission. Likewise, the activities appropriate for each unit and for areas in each unit also vary. For example, an action appropriate in one unit could impair resources in another unit.

As stated in section 1.4.5 of the *NPS Management Policies 2006*, an impact on any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or

- identified in the park's general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated.

For the selected alternative, a determination of non-impairment is made for each of the impact topics carried forward for detailed analysis in the plan/final environmental impact statement. A description of the current state of each resource topic evaluated for impairment can be found in chapter 3 of the plan/final environmental impact statement. Pursuant to the NPS *Guidance for Non-Impairment Determinations*, impairment findings are not necessary for visitor use and experience because this impact topic is not generally considered a park resource and value and, therefore, is not subject to the written non-impairment determination found in NPS *Management Policies 2006*.

ARCHEOLOGICAL RESOURCES

Bank Stabilization Techniques

Under the selected alternative, the park will implement a range of bank stabilization techniques. Potential impacts to archeological resources from implementing bank stabilization techniques are directly related to the degree of ground disturbance associated with each technique. Impacts on archeological resources will come from ongoing disturbance from roots; excavation of bank slope to improve the angle of repose; excavation to place materials such as posts, tree revetments, root wads, riprap, retaining walls, and drains to anchor hard points or jetties, cribs, dikes, vanes, channel blocks; and grade control structures. However, the park will proactively implement bank stabilization techniques to reduce erosion, preserve archeological deposits in situ, and allow data recovery to minimize or mitigate adverse impacts, thereby enhancing the long term preservation of this resource.

Pocket Gopher Control

The park will manage pocket gophers by using a combination of cultural and population management methods, including installing surface and subsurface fencing to prevent gophers from entering an area (exclusion), habitat modification, use of fumigants and toxicants, and trapping. Similar to the other management actions, the impact of these techniques on archeological resources is directly related to their potential to cause ground disturbance. Exclusion fencing and habitat modification will have the most impact on archeological resources because of ground disturbance and mechanical vegetation treatments, while the use of fumigants, toxicants, and trapping methods will have minimal impacts because they avoid these disturbances. The implementation of minimization or mitigation measures, such as conducting archeological investigations and placing exclusion fences outside known archeological site boundaries, for treatments will ensure that impacts are not adverse. Managing the pocket gopher population will reduce rodent disturbance to archeological deposits, thereby enhancing the long term preservation of this resource.

Vegetation Management

The park will use a variety of vegetation management treatments and methods to remove woody and overgrown vegetation that adversely affect archeological sites. The work will be accomplished using biological, mechanical, chemical, and/or prescribed fire treatments, individually or in combination. Although adverse impacts from some of the proposed vegetation management methods could occur, these impacts will be avoided or minimized through the implementation of standard operating procedures, such as avoiding the use of heavy machinery when the ground is wet. Additionally, if a combination of approaches (e.g., cutting woody vegetation and applying chemicals to the stump or reseeding an area with native plants after a prescribed fire) is used, it is possible to remove vegetation from archeological sites with no adverse impacts on the resource. These vegetation management treatments, along with associated mitigation measures, will reduce the impacts of vegetative root systems on subsurface archeological deposits.

Infrastructure

The removal or demolition of the existing maintenance facility could affect archeological resources by disturbing a known archeological site. The potential exists for intact subsurface deposits to be present underneath existing structures; however, the extent and integrity of these resources near the existing structures is not known. Removing the foundations of existing facilities could increase the potential for archeological deposits to be adversely affected because the ground disturbance could extend farther underground to where these deposits may be present. However, the adaptive management plan allows these impacts to be minimized or avoided by leaving foundations in place and limiting disturbance associated with removal to areas that have been previously disturbed.

The construction of a new off-site facility may affect archeological resources if they are present. The park will conduct a National Historic Preservation Act section 106 review prior to construction to identify archeological resources and assess potential impacts. Leasing existing space off-site is anticipated to have no adverse impacts on archeological resources.

Summary

Although the selected alternative will result in some adverse impacts on archeological resources, as described above, the park will minimize adverse effects by preserving archeological deposits in situ, conducting archeological investigations, placing exclusion fences outside known archeological site boundaries, avoiding the use of heavy machinery in wet areas, and consulting with the North Dakota state historic preservation officer and the Mandan, Hidatsa, and Arikara Nation (MHA Nation) on the design and location of new facilities. In many instances, the selected alternative will allow preservation of archeological deposits in situ and reduce ongoing adverse effects, enhancing the long term preservation of this resource. Overall, cumulative impacts associated with this alternative will be beneficial. Therefore, implementation of the selected action will not result in impairment to archeological resources.

CULTURAL LANDSCAPES

Bank Stabilization Techniques

Under the selected alternative, bank stabilization techniques are likely to have both adverse and beneficial impacts on the cultural landscape. Short-term, adverse impacts include removal of established vegetation, creation of areas of barren soil, storage of materials in the cultural landscape, and use of heavy equipment. However, these impacts are generally restricted to the construction phase and for a short while after until the affected areas are vegetated to reduce the potential for nonnative species to establish. Long term, adverse impacts will include the removal of archeological deposits to construct the stabilization structures and the potential to introduce vegetation that is inconsistent with the cultural landscape. However, with proper planning, the end result will blend with the natural surroundings and will have beneficial impacts on the cultural landscape by ensuring the views remain consistent and that important areas of the landscape remain intact. Stabilization efforts will preserve the natural and cultural environment and ensure that important components of the landscape are retained.

Pocket Gopher Control

Impacts from managing pocket gophers will depend on the degree of intrusion involved with each technique used. Exclusion fencing and habitat modification will involve ground disturbance, the introduction of human-made structures, or the establishment of vegetation that will detract from cultural landscapes. The use of toxicants also require ground disturbance when applied with a burrow builder; however, the disturbance will be localized, could be easily masked, and will be less intrusive on the landscape than fencing or vegetation. Using fumigants and trapping to manage pocket gopher populations will have little to no adverse impacts on the cultural landscape. Overall, many of the adverse impacts of these approaches will be short term and could be avoided or minimized. Managing the pocket gopher population will reduce the presence of multiple pocket gopher burrows, thereby enhancing the long term preservation of this resource.

Vegetation Management

Vegetative management treatments will aim to establish native plants on the cultural landscape. Adverse impacts will occur if these treatments introduce new elements or visually change the landscape. Most adverse impacts will be short term and stem from ground-disturbing activities, such as those associated with manual treatments that result in barren areas, treatments such as prescribed fire and hydroseeding, the creation of brush piles, and vegetation die-off from chemical or biological treatments. However, completing work outside archeological sites or in areas that have been previously disturbed and maintaining or improving the vegetation associated with the cultural landscape will provide long term benefits. Archeological materials will be preserved by removing woody vegetation with root systems that affect in situ deposits; natural systems and features and vegetation will be improved by removing undesirable vegetation and promoting native vegetation; and views will be improved by removing woody vegetation that is currently affecting the views between sites.

Infrastructure

The demolition of the existing maintenance facility will have short-term, adverse impacts on the cultural landscape because of the ground disturbance associated with the action and the presence of equipment and vehicles during removal. However, relocating the maintenance facility will have a beneficial impact on the cultural landscape by removing the facility from important views from the Big Hidatsa site. The cultural landscape will not be affected by the construction or lease of off-site facilities.

Summary

Although the selected alternative will result in some adverse impacts on cultural landscapes, as described above, adverse effects will be minimized by retaining important components of the landscape, masking burrow builder disturbance, completing work outside known archeological sites and in areas previously disturbed, and consulting with the North Dakota state historic preservation officer and the MHA Nation on the design and location of new facilities. The selected alternative will preserve the natural and cultural environment and ensure that important components of the cultural landscape are retained. When combined with other past, present, and reasonably foreseeable projects, the selected alternative will result in beneficial cumulative impacts.

ETHNOGRAPHIC RESOURCES

Bank Stabilization Techniques

Under the selected alternative, bank stabilization techniques that require extensive grading or a dramatic change in angle of repose could have long term, adverse impacts on aspects of the natural environment that may be considered ethnographic resources (e.g., riverbanks). Additionally, techniques that alter the river by changing its velocity and/or seasonal flooding could affect ethnographic resources by making them inaccessible or degrading their condition. Flow diversion, energy reduction, and channel development techniques are the most likely to cause these types of adverse impacts. Archeological materials could also be adversely affected during bank stabilization efforts, but these impacts will be mitigated prior to construction. Continued consultation with the MHA Nation will ensure that adverse impacts are avoided or minimized. These measures will preserve ethnographic resources once the banks are stabilized.

Pocket Gopher Control

Some of the methods used to remove pocket gophers will affect ethnographic resources. Exclusion fencing could make accessing certain areas difficult and/or detract from the spiritual and traditional uses of some ethnographic resources. Habitat modification that removes important plants could affect uses of ethnographic resources and replace plants that are traditionally gathered and will be particularly problematic if the plants need to come from a specific area or site to be used for traditional practices. Although unlikely, the use of toxicants or fumigants could make it impossible for the tribes to collect plants from locations where these chemicals have been applied, if the chemicals have been applied to vegetation. Consulting with the tribes to identify the best methods and locations to employ pocket gopher removal activities

without disrupting traditional uses will allow for many of these impacts to be avoided or minimized.

Vegetation Management

Some native vegetation may die from the use of several of the vegetation management treatments (i.e., chemical methods, prescribed fire, and grazing) because these approaches are less targeted. However, these impacts could be avoided and/or minimized by reseeding with native plants after the removal of vegetation, excluding actions in certain areas (e.g., no chemical use or grazing on native prairie), or ensuring the prescribed fire conditions are appropriate for the plants the park wants to maintain. However, chemical use may make it impossible for tribes to collect certain plants because of concerns over residual chemicals. Undesirable plants will be reduced in order to preserve and encourage native species important to the park and the MHA Nation.

Infrastructure

The demolition of the existing maintenance facility will improve the views from the Big Hidatsa site. The site is not landscaped for visitors, and many plants and animals considered important to the tribes grow or live there. Furthermore, the removal of the maintenance facility from its location in a village site, which is considered an ethnographic resource, will be beneficial. Lastly, the construction or leasing of off-site facilities for the maintenance facility and museum collections storage will not result in adverse impacts to ethnographic resources.

Summary

Although the selected alternative will result in some adverse impacts on ethnographic resources, as described above, adverse effects will be minimized by consulting with the North Dakota state historic preservation officer and the MHA Nation, reseeding with native plants after vegetation removal, excluding chemical use or grazing on native prairie in certain areas, and ensuring prescribed fire conditions are appropriate for the plants the park wants to maintain. The selected alternative, when combined with other past, present, and reasonably foreseeable projects, will result in beneficial cumulative impacts. Ethnographic resources will continue to exist in the park and in a condition similar to current conditions, lending visitors the opportunity to learn about these resources within the park. Therefore, implementation of the selected action will not impair ethnographic resources.

MUSEUM COLLECTIONS

Bank Stabilization Techniques, Pocket Gopher Control, and Vegetation Management

Under the selected alternative, an adaptive management plan will be employed to manage riverbank erosion, pocket gopher activity, and vegetation encroachment. Many of the actions proposed under the plan may require archeological excavations or research prior to their implementation, resulting in the collection of additional archeological materials that will need to be curated and stored in the collections. None of these actions will adversely affect existing museum collections.

Infrastructure

Museum collections storage may be moved off-site under the selected alternative. Depending on the location of the new facility, it could make museum collections more difficult for the park to manage and use for interpretation. Additionally, researchers interested in the park and its collections will have to visit another location. However, relocating to a new facility will allow the park to ensure that it has the space to curate additional materials that may be recovered during activities undertaken as part of the adaptive management plan. The new space will be waterproof and the items will be housed in a facility with enough curation space for increasing collections, better preserving the integrity of these resources.

Summary

The selected alternative will not adversely affect museum collections. Museum collections will be housed in a facility with enough curation space to increase the size and number of collections, better preserving the integrity of these resources. When combined with other past, present, and reasonably foreseeable projects, the selected alternative will result in beneficial cumulative impacts. Museum collections will continue to exist in a condition similar to current conditions, lending visitors the opportunity to learn about these resources. Therefore, implementation of the selected action will not impair museum collections.

FISH AND WILDLIFE RESOURCES

Bank Stabilization Techniques

Under the selected alternative, bank stabilization techniques will largely affect mammals, birds, fish, mollusks, and invertebrates. Mammals that forage and roost near the Knife River may be disturbed or displaced in the short term during construction activities. Adverse impacts on mammals, such as bats, will be avoided or minimized by implementing procedures or precautions to ensure construction or tree removal does not occur when they may be foraging or using trees in the riparian corridor for roosting.

Birds such as waterfowl may use the river for food, shelter, and breeding habitat. Alterations to the riverbank or its flow and velocity through bank stabilization activities could decrease foraging and breeding habitat availability in the short term. In addition, waterfowl species are sometimes prey to larger raptor species such as bald eagles. If bank stabilization actions decrease the number of waterfowl on the river, larger raptor species may be affected by reduced availability of prey. Bank stabilization may also affect fish and mollusk populations through changes to river flow, water depths, turbidity, and velocity. Decreases in fish populations could affect the availability of prey to larger raptor species. Many birds present at the park nest in the trees in the riparian area adjacent to the river, and some use the riverbank for nesting and foraging on small invertebrates. Disturbed areas along the bank will be revegetated following construction; therefore, adverse impacts will be short term, except impacts associated with bank armoring, which are anticipated to occur over the long term.

Pocket Gopher Control

Pocket gopher management techniques have the potential to affect wildlife. Repellents and toxicants must be applied by hand or with burrow builders, which can result in ground disturbance. Unintentional mortality is possible when large mechanical equipment is used to administer the toxicants, especially to chicks or nesting birds. Some wildlife such as coyotes, raptors, and other scavengers may be negatively impacted through secondary or tertiary consumption of toxicants or poisons through the carcasses of poisoned gophers. However, the likelihood of secondary poisoning is low because pocket gophers spend the majority of their time underground and the carcass will likely remain underground where it will not likely be encountered by nontarget species. Following standard protocols and regulations for applying toxicants will minimize adverse effects on nontarget species. The desired condition under this alternative is to use a combination of pocket gopher control techniques that will remove pocket gophers from archeological sites in the park. As a result, the pocket gopher population in the park is anticipated to decline noticeably. However, pocket gophers are widespread throughout the surrounding area and North Dakota, and impacts on the pocket gopher populations in the surrounding area or in the context of their range in North Dakota are not anticipated. Nontarget species could enter traps and unintentional mortality could occur; however, because traps are placed underground in existing pocket gopher burrows, the potential for nontarget species mortality will be low. Following standard protocols for placing pocket gopher traps will minimize adverse effects on nontarget species. Impacts on aquatic species are not anticipated to result from pocket gopher management activities because applied toxicants are not anticipated to contact water resources.

Vegetation Management

Vegetation control methods such as prescribed fire, chemical and biological controls, grazing, or mechanical removal will result in ground and habitat disturbance. The use of vegetation management treatments, including reseeding and grazing, could result in beneficial impacts on fish and wildlife resources. Fire could result in unintentional mortality of individuals that are unable to avoid the burn area. Application of chemicals may also affect wildlife through exposure or secondary consumption. All application regulations and chemical label requirements will be followed to minimize harmful effects on wildlife, and only those chemicals approved by the National Park Service to have minimal ecological effects will be approved. Mechanical removal of vegetation is also associated with ground disturbance. Disruptions and disturbances to the ground, soil, and vegetation will result in short term, localized impacts on wildlife habitat. These activities will primarily affect terrestrial species, including birds, mammals, and reptiles. If a large mechanical apparatus was used to remove vegetation, risk of unintentional mortality coincides with its use. Impacts on aquatic species are not anticipated to result from prescribed fires, mechanical vegetation removal, or biological controls. Chemicals that are applied to vegetation as a means of vegetation control will not be applied directly to water resources. If runoff potential is high, or application is occurring near the river, nonselective herbicides that meet aquatic use standards will be used. Furthermore, if chemicals applied for vegetation control were to runoff into the river, impacts are not anticipated; the life cycle of many of the chemicals that will be approved for use is short and the chemicals have a rapid degradation rate in water.

Infrastructure Impacts

Option 1 under the selected alternative will disturb less than 1 acre of land through the construction of new facilities for maintenance and museum collections; however, because an off-site location has not been identified, it is not known what type, if any, of existing wildlife habitat will be affected. The National Park Service will have flexibility in identifying an off-site location that will contain less wildlife habitat than on-site. Option 2 under the selected alternative will lease existing space for relocation of facilities, which is not anticipated to affect fish and wildlife resources and associated habitat. Disturbance to wildlife from construction activities will be localized and temporary and the demolition of the existing maintenance structures is not anticipated to affect fish and wildlife habitat.

Summary

Although the selected alternative will result in adverse impacts to fish and wildlife resources, these impacts will be mostly short term and will be avoided or minimized by implementing procedures or precautions during chemical usage and construction activities to maintain foraging and roosting activities. The contribution of the selected alternative to cumulative impacts will be small relative to the widespread modifications to the native landscape that occurred from past actions. Functional habitat will remain present in the park to maintain sustainable populations of fish and wildlife, and these species will continue to exist in a condition similar to the current state. Current and future generations of visitors will have similar opportunities to experience these species within the park. Therefore, implementation of the selected alternative will not impair fish and wildlife resources.

SPECIAL-STATUS SPECIES

Bank Stabilization Techniques

Under the selected alternative, bank stabilization techniques will result in disturbance to the Knife River at the location of each individual project. Bank stabilization projects may require construction activities in the river channel. While construction will be temporary, it could result in a short-term loss of foraging habitat for least terns. It is not anticipated that least tern populations will be affected considering the size of the available foraging habitat in the Missouri River. Impacts on the northern long-eared bat could occur if tree removal is necessary or required, but disturbed areas will be revegetated following construction. Impacts will be localized and both short and long term.

Pocket Gopher Control

Pocket gopher control techniques will not affect least terns and northern long-eared bats.

Vegetation Management

Potential least tern foraging habitat that occurs in the Knife River in the park will not be affected by vegetation management actions. Possible roosting trees in the park are found in the riparian corridor along the Knife and Missouri Rivers. Vegetation management for the purposes of

archeological resources protection will not occur in these areas. As a result, northern long-eared bats will not be affected by vegetation management actions.

Infrastructure Impacts

No impacts on least terns or northern long-eared bats are anticipated from the demolition of the existing maintenance facility because least terns do not occur in this area and no tree removal will be required. Although off-site locations for construction of new facilities for maintenance and museum collections have not been identified, the National Park Service will not select an off-site location that will have a significant, adverse impact on special-status species. Therefore, the selected alternative will not affect special-status species.

Summary

Although the selected alternative could result in adverse impacts on special-status species, these impacts will be mostly short term and will not affect the overall population of least terns and northern long-eared bats. The contribution of the selected alternative to cumulative impacts will be small relative to past actions such as land cultivation, timber harvesting, gravel and quarry operations, and the influence of the operation of Garrison Dam on cottonwood forest regeneration. Functional habitat will remain present in the park to maintain sustainable populations of special-status species, and these species will continue to exist in a condition similar to the current state. Current and future generations of visitors will have similar opportunities to experience these species within the park. Therefore, implementation of the selected alternative will not result in impairment to special-status species.

WATER QUALITY, WATER RESOURCES, AND WETLANDS

Bank Stabilization Techniques

Under the selected alternative, bank stabilization techniques along the Knife River will affect water quality, surface elevation, flow velocity, slope, erosion and deposition processes, riverbed and banks and associated riverine and riparian palustrine wetlands, and channel morphology across various riverine spatial scales. Impacts on water quality, water resources, and wetlands may result from soil bioengineering, bank armoring, flow diversion, energy reduction, geotechnical slope stabilization, and channel development. The impacts found in chapter 4 of the plan/final environmental impact statement are briefly summarized below. Further evaluation of wetland impacts through a statement of findings will be required at the time that specific projects are implemented.

Soil Bioengineering. Soil bioengineering incorporates engineering techniques and ecological processes that use natural and living materials to protect riverbanks and riverine wetlands from erosion and stabilize and restore degraded banks. Short-term, adverse impacts on water quality from sediment loading during construction will occur using this technique. Impacts will also occur from the loss of riparian and riverine wetland functions until the vegetation is reestablished. Modification of the flow velocity of the river will have adverse impacts on hydrology; however, long term, beneficial impacts will result from the protection of the riverbanks and reduction of riverbank erosion.

Bank Armoring. Bank armoring places hardened materials on riverbanks for protection. Using this technique will deviate from the NPS *Management Policies 2006* that recommend “visually nonobtrusive” techniques that “protect natural processes to the greatest extent practicable.”

However, the impacts of shear stress and ice scour on the riverbanks may necessitate using bank armoring in place of other bank stabilization techniques to successfully protect and preserve the banks under these conditions. Adverse impacts on water quality during construction will occur from added sedimentation. Long-term, adverse impacts from the loss of riparian and riverine wetlands will also occur. However, riverbanks will be safeguarded over the long term from unnatural erosion, resulting in beneficial impacts.

Flow Diversion. Flow diversion techniques attempt to redirect flows away from eroding banks by placing structures in the river channel to reduce bank erosion. The structures usually constrict the channel width. Adverse impacts on water quality will occur during construction from added sedimentation. Long-term, adverse impacts on riverine wetlands and hydrology will also occur from the alteration of the river cross section. However, riverbanks will be safeguarded over the long term from unnatural erosion, resulting in beneficial impacts.

Energy Reduction. Energy reduction methods place structures in the stream channel to reduce the kinetic energy and erosive forces of the water flow. Adverse impacts on water quality during construction will occur from added sedimentation. Long-term, adverse impacts on riverine wetlands and hydrology will also occur from the alteration of the river cross section. However, riverbanks will be safeguarded over the long term from unnatural erosion, resulting in beneficial impacts.

Geotechnical Slope Stabilization. Geotechnical slope stabilization methods modify the riverbank to prevent slope failures and bank instability and protect the toe of the bank from erosion by regrading, soil reinforcement, and drainage measures. Adverse impacts on water quality during construction will occur from added sedimentation. Long-term, adverse impacts will also occur from the loss of riparian and riverine wetlands. However, riverbanks will be safeguarded over the long term from unnatural erosion, resulting in beneficial impacts.

Channel Development. Channel development uses large-scale modification of existing channel morphology to alter and ameliorate erosive flow regimes. Adverse impacts on water quality during construction will occur from added sedimentation. Long-term, adverse impacts on hydrology will also occur from river flow alteration. Long-term, adverse impacts could occur from riverine and riparian wetland alteration; however, long-term, beneficial impacts will occur from the creation or restoration of wetland functions.

Pocket Gopher Control

Several control techniques require temporary soil disturbance, including exclusion fencing, buffer strips, and burrow builder systems. These techniques could increase sedimentation of surrounding surface waters and alter palustrine wetlands. Habitat modification using vegetation control or flood irrigation will have adverse impacts as a result of increased sedimentation or water resources and wetland disturbance. Chemical toxicants can adversely affect the water quality of surrounding water resources and wetlands by introducing pollutants into the hydrologic system. Fumigants and gas can also enter water resources and wetlands by diffusion through damp soil; however, the risk of contamination to water sources will be low under the selected alternative. Aluminum phosphide degrades rapidly in most soil conditions and has a low

likelihood of contaminating water resources and wetlands. The use of certified applicators, application, and chemicals and fumigants under the direction and regulation of the US Department of Agriculture's Animal and Plant Health Inspection Service toxicant label and placement of toxicants and fumigants underground and in locations away from surface waters, shallow groundwater resources, or wetlands will prevent or minimize adverse impacts on these resources.

Trapping pocket gophers will not affect water quality, water resources, and wetlands. Pocket gopher control techniques will not affect hydrology or bank erosion and movement. Appropriate application practices and best management practices in the use of pocket gopher techniques will not affect water quality, water resources, and wetlands.

Vegetation Management

All vegetation management treatments involve the initial clearing of vegetation, which could temporarily increase the potential for soil erosion and associated sedimentation of surrounding surface waters and palustrine wetlands. Depending on the amount of clearing and the remaining vegetation, clearance of all vegetation will have the potential for greater impacts. Reseeding methods associated with cultural treatments will have no impact on surface waters and palustrine wetlands. Application of herbicides has the potential to adversely affect the water quality of surrounding surface waters and palustrine wetlands by introducing pollutants to the hydrologic system. The use of appropriate herbicide application methods will prevent and minimize the degradation of surface water quality. Grazing practices can introduce bacteria (e.g., *E. coli*) and nutrients into surface waters and palustrine wetlands via nonpoint sources runoff. Prescribed fires can affect both water quality and the local surface runoff regime, depending on the severity of the fire and the local fire regime. Prescribed fire removes vegetation and organic matter on the surface and exposes the soil to erosive processes. Fire can reduce the infiltration capacity of soil leading to more surface water runoff during precipitation events.

These effects can lead to short-term increases in sediment loading in local surface waters and long-term alteration to the patterns of local surface water runoff. Fire management techniques that will minimize impacts include consideration of weather, season, and fuel conditions; use of qualified crews; avoidance of steep slopes; retention of vegetative buffers adjacent to surface waters; use of appropriate firelines; and use of the lowest-intensity fire necessary. Vegetation management treatments will affect water quality; however, they will not affect hydrology, bank erosion and movement, or riverine wetlands. Overall, vegetation management practices will result in indirect, short-term, adverse impacts on water quality, water resources, and wetlands.

Infrastructure Impacts

The selected alternative will remove the existing maintenance facility in the park, which will temporarily contribute to soil disturbance. Construction activities will follow best management practices such as silt fences to minimize and prevent impacts from stormwater runoff and associated erosion. Therefore, no impacts on water quality, water resources, and wetlands will occur as a result of the off-site relocation and construction of new facilities because the area of disturbance will be small and best management practices will be followed.

Summary

Although the selected alternative will result in adverse impacts on water quality, water resources, and wetlands, actions taken under the selected alternative will follow best management practices, such as the use of sediment basins, silt fences, vegetative buffers, and erosion control blankets, to minimize these impacts. The contribution of effect under the selected alternative to cumulative impacts will be noticeable, particularly from bank stabilization, because it will affect hydrology, riverbanks, wetlands, channel movement, and water quality. However, the adaptive management process will allow for ongoing examination of, and potential revisions to, the actions described above to further minimize adverse impacts. Over the long term, riverbanks will be safeguarded from unnatural erosion, resulting in beneficial impacts. Current and future visitors will have similar opportunities to experience and learn about water resources within the park under the selected alternative. Therefore, implementation of the selected action will not result in impairment to water quality, water resources, and wetlands.

FLOODPLAINS

Bank Stabilization Techniques

Under the selected alternative, bank stabilization techniques will affect floodplain resources through direct modification in floodplain size and by altering the ability to store water, reduce peak flood flows, and infiltrate water. Impacts on floodplains may result from soil bioengineering, bank armoring, flow diversion, energy reduction, geotechnical slope stabilization, and channel development. The impacts to floodplains found in chapter 4 of the plan/final environmental impact statement are briefly summarized below.

Soil Bioengineering. Soil bioengineering incorporates engineering techniques and ecological processes that use natural and living materials to protect riverbanks and riverine wetlands from erosion and stabilize and restore degraded banks. Short-term, adverse impacts to floodplains will occur from construction activities. Long-term, adverse impacts from the loss of floodplain resource functions will also occur until vegetation is reestablished. However, the restoration of floodplain resource functions will result in long-term, beneficial impacts.

Bank Armoring. Bank armoring places hardened materials on riverbanks for protection. Short-term, adverse impacts will occur from construction activities. Long-term, adverse impacts will also occur through a reduction in floodplain resource function and from interrupting floodplain connections.

Flow Diversion. Flow diversion techniques attempt to redirect flows away from eroding banks by placing structures in the river channel to reduce bank erosion. The structures usually constrict the channel width. Adverse impacts could occur from the placement of flow diversion structures, indirectly resulting in channelization and floodplain resource impacts elsewhere. In comparison to other bank stabilization measures, the disturbance to banks will be minimal. The placement of diversion structures will not directly affect floodplain resources.

Energy Reduction. Energy reduction methods place structures in the stream channel to reduce the kinetic energy and erosive forces of the water flow. Indirect, adverse impacts from channelization, along with subsequent floodplain resource impacts downstream, will occur.

Geotechnical Slope Stabilization. Geotechnical slope stabilization methods modify the riverbank to prevent slope failures and bank instability and protect the toe of the bank from erosion by regrading, soil reinforcement, and drainage measures. Adverse impacts will occur from construction activities and the disconnection of the river and floodplain. However, long-term, beneficial impacts will occur as a result of improved riverine-floodplain connections.

Channel Development. Channel development uses large-scale modification of existing channel morphology to alter and ameliorate erosive flow regimes. Potential adverse impacts will occur from construction activities. However, channel development will have beneficial impacts from a reduction in flood risks and an increase in floodplain area.

Pocket Gopher Control

Habitat modification in the form of buffer strips will convert existing vegetation to planted grains but will have no impact on the functioning of the floodplain resource. Mechanical burrow builder systems and exclusion fencing will disturb the soil but will not prevent the natural and beneficial functions of floodplain resources nor will it increase risk to humans from floods. Toxicant use, fumigant use, and trapping will have no impacts on floodplain resources. Therefore, implementation of pocket gopher control techniques will result in no impacts on floodplain resources.

Vegetation Management

A large portion of the park occurs in the 100-year (1% occurrence) floodplain. All vegetation management treatments involve the initial clearing of vegetation that could temporarily degrade floodplain functioning depending on the amount of clearing and the vegetation remaining. Substantial vegetation clearing as a result of some vegetation management treatments, including controlled burns, will have the potential for greater impacts. Mechanical treatment involves some soil disturbance, which will enhance the water infiltration and water storage functions of the floodplain resource. Adding vegetation through the reseeding methods associated with cultural treatments will benefit floodplain resources over the long term. The application of herbicides will temporarily remove vegetation, resulting in short-term, adverse impacts on floodplain resources. Vegetation management practices will result in indirect, short-term, adverse impacts on floodplain resources from vegetation removal; there will be no long-term impacts because of revegetation.

Infrastructure Impacts

The selected alternative will follow Executive Order 11988 and Director's Order 77-2; therefore, construction or leased facilities will occur outside a floodplain and will not affect floodplain functions and values. No impacts on floodplain resources, human safety, or welfare from the relocation and off-site construction of new facilities and the removal of the existing facilities.

Summary

Although the selected alternative will result in some adverse impacts to floodplains, many of these are short term and actions taken under the alternative will have an overall beneficial effect. The contribution of the selected alternative to cumulative impacts will be limited because of their

localized effect. The adaptive management framework will provide beneficial impacts on floodplain resources in the unnatural altered riverine system by implementing treatment techniques that consider the overall condition of the riverine and riparian ecosystems. Over the long term, the framework could allow for dynamic equilibrium and natural processes such as the creation of new active floodplains. Current and future visitors will have similar opportunities to experience and learn about floodplains within the park under the selected alternative. Therefore, implementation of the selected action will not result in impairment to floodplains.

