



National Park Service  
U.S. Department of the Interior  
Grand Teton National Park  
Moose, Wyoming

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# Moose Headquarters Rehabilitation - Site Work Environmental Assessment

January 2010





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# Moose Headquarters Rehabilitation - Site Work

## Environmental Assessment

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### Summary

The National Park Service (NPS) proposes to conduct site improvements to the Moose Headquarters Area in Grand Teton National Park. The site improvements are needed to address conflicting vehicle and pedestrian flow caused by non-segregated use and damage to natural resources due to inadequate way-finding, user-created trails, and deficient stormwater management. The purpose of the proposal is to upgrade and improve site conditions in a way that enhances visitor experience while providing a safe, healthy, functional, and efficient working/ living environment for park employees and their families. The preferred alternative would be developed as a plan to guide the site work.

The Moose Headquarters Rehabilitation - Site Work Environmental Assessment (EA) evaluates a no action alternative and one action alternative:

Alternative A – No Action Alternative, and

Alternative B – Moose Headquarters Site Work (NPS Preferred Alternative).

The No Action Alternative describes the current condition if no site work were conducted. The NPS Preferred Alternative involves the complete reconfiguration of vehicle and pedestrian traffic within the administrative and Moose landing areas, removal of several temporary buildings, and site restoration work targeted to improve stormwater management. The proposed improvements were designed to enhance visitor safety and experience, improve working conditions for employees, improve parking and traffic flow, and reduce the built environment and improve water quality while preserving the character of the area and protecting natural and cultural resources.

Resources that are evaluated in detail in the EA include: soils, vegetation, water resources, wildlife, visitor use/ experience, and park operations. All other resources are dismissed because the project effects to those resources would be negligible or minor. No major adverse impacts are anticipated as a result of this project. Public scoping was conducted in June 2008 to assist with the development of this proposal and no major issues were raised related to the proposal.

The EA has been prepared in compliance with the National Environmental Policy Act and other associated laws and regulations to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet objectives of the proposal, 2) evaluates potential issues and impacts to Grand Teton National Park resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts.

### Public Comment

If you wish to comment on the EA, you may post comments online at <http://parkplanning.nps.gov>, or by mail to the following address:

Superintendent  
Grand Teton National Park  
P.O. Drawer 170  
Moose, WY 83012

This EA will be available for public review for 30 days. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask the park in your comment to withhold your personal identifying information from public review, there is no guarantee that they will be able to do so.

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# CHAPTER 1 - PURPOSE AND NEED

## Introduction

Grand Teton National Park, Wyoming, managed by the National Park Service (NPS), was established by an act of Congress on February 26, 1929 and expanded to its current size in 1950. Moose, Wyoming (Figure 1) is located inside Grand Teton National Park, 0.25 miles west of the intersection of the southern terminus of the Teton Park Road and U.S. Highway 26/89/191 and 14 miles north of Jackson, Wyoming. It is the center for park operations within Grand Teton National Park with more than 75 percent of park employees duty stationed there. The Moose Headquarters Area includes the park headquarters, visitor use areas, administrative and maintenance facilities, and a United States Post Office. The Craig Thomas Discovery and Visitor Center, the only year-round visitor center within the park, is located across Teton Park Road from the Moose Headquarters Area. The Moose Headquarters Area is bordered to the west by NPS employee housing, to the east by the Snake River and associated river access, and to the south by Teton Park Road, which is a primary park access road used by both employees and the general public. Figure 2 shows the locations of the major components described within the Moose Headquarters Area.

Currently, management guidance for the Moose Headquarters Area comes from the *1991 Teton Corridor: Moose to North Jenny Lake Development Concept Plan/Environmental Assessment*. The 1991 plan addresses future development along the Teton Park Road corridor, including the following areas: Jenny Lake, Lupine Meadows, Highlands, Beaver Creek, and Moose. While this plan did specifically analyze additional employee housing at Moose and some minor administrative changes at the headquarters area, the actions proposed in this environmental assessment (EA) are different than those proposed in the 1991 plan, most specifically related to site issues associated with the Moose boat landing area, stormwater management, and the segregation of visitor, residential employee, and park operations functions within the administrative area. Actions proposed in this EA serve to alleviate specific conflicts among disparate uses and maintenance and operations problems within the Moose Headquarters Area that have arisen since the 1991 plan was approved.

## Background

Several issues exist in the Moose Headquarters Area that are not optimal for park employees and operations. Visitation rates have increased in the Moose area over the past 50 years, causing damage to park resources and facilities. Use of the Moose boat landing area by commercial river operators and the general public has increased dramatically. There are approximately 65,000 park visitors guided on Snake River float and fishing trips annually, predominantly late-May through September, along with approximately 20,000 self-guided private users. The Moose boat landing area, with its two landing ramps and three associated parking areas, does not provide sufficient capacity to accommodate the number and type of boat trailers and shuttle vehicles that use this area, as permitted under the *Snake River Management Plan* (NPS 1997) and concession contracts.



Figure 1. Project Location



Figure 2. Overview of Moose Campus including the Moose Headquarters Area

In its current configuration, as shown in Figure 2, there is effectively a circular route surrounding the administrative area that provides access/departure for concessioners and private boaters on the Headquarters and Moose Landing Roads, with heavy traffic at times between the concessioner parking and staging area, the boat landing customer pick-up area, and public float trip parking area. There are two boat ramps with associated space for vehicles to turn around and back in toward the river to load or unload boats. This area often becomes congested due to inappropriate overflow parking by concessioner clients and heavy concessioner traffic. The concessioner parking area to the north is used for picking up boats coming off the river, for rigging, and as a waiting area for operators. Concession operation vehicles depart the boat landing area and concessioner parking area by traveling through the administration facility which often results in traffic congestion and spillover to the administrative area that results in safety hazards and a negative experience for those who use the area. The public float trip parking area is located to the south on the Moose Landing Road adjacent to the boat landing customer pick-up area and near the bus parking area (Figure 3). Additional users enter the area from the Craig Thomas Discovery and Visitor Center for a variety of uses, which include joining river trips, viewing wildlife, and exploring north to the Menor's Ferry Historic District. Confusion exists as to where to park (at the Craig Thomas Discovery and Visitor Center, in front of the former Visitor Center, or in the current river access parking area) and how to move between these areas without getting lost. Circulation proves to be particularly confusing to visitors who are visiting the park for the first time.



**Figure 3. Views of boat ramp and public parking area along the Moose Landing Road**

The capacities of the existing parking lots within the Moose Headquarters Area are insufficient for park employees, visitors, and concessioners who use the boat ramp area. In addition to typical passenger vehicles, there are numerous large vehicles and trailers that need to be accommodated in this area. Tour buses also use this area for both pick up and delivery of tour participants for river float trips. The crowded situation results in boat trailers being loaded and unloaded, large and small moving vehicles, and intermingled pedestrian traffic. In addition, the crowded commercial vehicle parking area used by shuttle vehicles with boat trailers is surrounded by the NPS maintenance area, resulting in potential conflicts among commercial operators, NPS heavy equipment, construction activities, and public and administrative pedestrian traffic.

Employee traffic entering the Moose Headquarters Area encounters unregulated, two-way traffic once inside the parking area. Because the maintenance and administration buildings share the same access roads with the housing area, daycare center, former Visitor Center, and boat and fishing parking, vehicle traffic can be congested and confusing. Employee personal vehicles are typically parked to the south and west of the Moose Maintenance Building and to the north of the Administration Building (Figure 4). Maintenance and emergency vehicles are located to the east,

north, and northwest of the Moose Maintenance Building and in the works yard (Figure 4). The parking area on the south side of the former Visitor Center / Administration Building originally served as public parking for the former Visitor Center. Since the new Craig Thomas Discovery and Visitor Center and associated parking area were built south of Teton Park Road, the former Visitor Center parking area has been used primarily for overflow public parking, overflow parking for vehicles associated with river access, including RVs and vehicles with boat trailers, and some employee parking. There are four asphalt parking spaces and eight gravel parking spaces at the Western Center for Historic Preservation and Jenny Lake Sub-district Ranger Office. These buildings are located northwest of the concessioner boat rig parking area and are segregated from other areas within the administrative area.



**Figure 4. Views of employee parking area and works yard area.**

Numerous mobile or temporary structures and pre-engineered buildings exist to the east of the Moose Maintenance Building (Figure 5). These facilities were added sporadically over the years and suffer from numerous code deficiencies, poor indoor air quality, unsafe interior and exterior pedestrian circulation, and poor site drainage that causes extensive ice buildup in parking and outdoor pedestrian areas.



**Figure 5. View of temporary buildings and Moose Maintenance Building.**

There is a lack of designated walkways within the Moose Headquarters Area to provide connectivity between various user areas. As a result of this and inadequate way finding, user-created trails have been created that result in natural resource damage. There are no formal trails for boaters leaving the river along the Moose Landing Road; however, users have created a network of trails to access public parking, pickup areas, and the nearby woods, perhaps because they do not know where the nearest restroom is located. Pedestrian access across the road is currently uncontrolled and confusing creating safety concerns and the potential for conflict. The lack of a clear trail contributes to an unsafe overlap of pedestrians and river access vehicles as visitors linger in the asphalt areas used for parking, boat rigging, customer pickup, and through traffic because there is no clear trail

or signage indicating where they should go. Because there is no designated route for visitors traversing the riverside area, they walk along the road in the traffic lanes without a designated crossing point to return to the parking area.

An informal trail connects to the Menor's Ferry Historic District, which is north of the concessioner parking area beyond the project area. There are several picnic tables near the river and one vault toilet in the boat landing drop off site in the public float trip parking area. No restrooms are located at the north end of Moose Landing Road. Often, due to a lack of signs or a clear trail indicating where to go, people getting off boats do not know where they are in relation to parking areas or the nearest restroom facility.

There are numerous deficiencies with respect to current stormwater management within the Moose Headquarters Area. The park has a stormwater management plan but no infrastructure in place within the Moose Headquarters Area to manage stormwater. Sheet flow from existing paved areas, including contaminants from heavy equipment and other vehicle maintenance, drains haphazardly, or in many areas, merely ponds on the pavement. Because the site is relatively level, pooling occurs at numerous locations in the existing parking areas. Ponding creates icy conditions in winter and risks to employee and visitor safety. Sheet flow of runoff water also occurs and causes problems when it flows toward the river, adjacent vegetated areas, and landing areas (Figure 6). There is no treatment of stormwater runoff and no means for minimizing or filtering runoff before it flows into the Snake River. Soils adjacent to the river are shallow, underlain by cobble, and have low pollutant-filtering ability. Permanent and temporary NPS buildings have been placed on what was at one time the perimeter of the maintenance area, adjacent to the landing area, resulting in more impervious surface and development directly adjacent to the riverside visitor use area.



**Figure 6. Views of west bank of Snake River in Moose.**

In order to address conflicts between disparate uses (e.g., Moose boat landing area) and other existing site issues at the Moose Headquarters Area, the site work detailed in this EA is being proposed. This site work is proposed to address deficient stormwater management and visitor and employee/resident safety issues by segregating uses and allowing for improved pedestrian and vehicular traffic flow in and around the Moose Headquarters Area.

## **Purpose and Need**

The purpose of the proposal is to upgrade and improve site conditions in a way that enhances visitor experience while providing a safe, healthy, and functional and efficient working/ living environment for park employees and their families. The preferred alternative identified would be developed as a plan to guide the site work rehabilitation.

The site work proposed in this EA addresses conflicting vehicle and pedestrian flow caused by non-segregated use and damage to natural resources due to inadequate way-finding, user-created trails, and deficient stormwater management.

The proposed site work is needed to address these conditions while meeting the needs of all user groups who access the Moose Headquarters Area, namely:

- Park visitors accessing the area as self-guided recreational users or as concessioner-guided river raft trip customers;
- Concessioner operators accessing the area for raft and fishing trip customer pick up, rigging, etc.;
- Residents of the Moose housing area accessing the Moose Headquarters Area, Post Office, multi-use pathway, Craig Thomas Discovery and Visitor Center, Moose landing area, Menor's Ferry, etc.;
- Employees who enter the area to access their office or work space; and
- Park operations conducted in the area (e.g., emergency response, heavy vehicle maintenance, facilities maintenance, snow removal).

The following objectives should be accomplished as part of the comprehensive planning process for management and development of the Moose Headquarters Area over the next 15-20 years:

- Segregate incompatible uses throughout the site.
- Provide for safer and more efficient pedestrian and vehicle traffic within the administrative area for employees and residents.
- Provide for safer and more efficient pedestrian and vehicle traffic within the Moose landing area for visitors and concessioners.
- Improve the interpretive experience for visitors in the Moose area.
- Resolve stormwater management deficiencies to protect vital water resources.
- Reduce the built environment in the Moose Headquarters Area.
- Produce no unacceptable impacts or impairment as a result of this project.

## Appropriate Use

Sections 1.4 and 1.5 of the *NPS Management Policies 2006* (NPS 2006) directs the NPS to ensure that allowed park uses would not cause impairment of, or unacceptable impacts on, park resources and values. A new form of park use may be allowed within a park only after a determination has been made in the professional judgment of the responsible NPS manager that it would not result in unacceptable impacts.

Section 8.1.2 of the *NPS Management Policies 2006* (NPS 2006) provides evaluation factors for determining appropriate uses. All proposals for park uses are evaluated for:

- Consistency with applicable laws, executive orders, regulations, and policies;
- Consistency with existing plans for public use and resource management;
- Actual and potential effects on park resources and values;
- Total costs to the NPS; and
- Whether the public interest would be served.

NPS managers must continually monitor all park uses to prevent unanticipated and unacceptable impacts. If unanticipated and unacceptable impacts emerge, the responsible NPS manager must engage in a thoughtful, deliberate process to further manage or constrain the use, or discontinue

it. More information on the definition of unacceptable impacts as cited in §1.4.7.1 of the NPS *Management Policies 2006* can be found in Chapter 3 of this document.

Administrative areas are common and vital facilities in most park units. Proper location of materials and appropriate methods would ensure that unacceptable impacts to park resources and values would not occur. The proposed site improvements are consistent with the Grand Teton National Park Master Plan (1976) and other related park plans and are an acceptable use at Grand Teton National Park.

## **Impairment and Conservation of Park Resources and Values**

The NPS *Management Policies 2006* (NPS 2006) require analysis of potential effects to determine whether or not actions would impair park resources. The fundamental purpose of the National Park System, established by the Organic Act (16 USC 1, Sec. 1-4) and reaffirmed by the General Authorities Act (16 USC 1a-1 through 1a-8), as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values.

However, the laws do give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within the park, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values. An impact to any park resource or value may, but does not necessarily, constitute impairment, but an impact would be more likely to constitute impairment when there is a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. A determination on impairment is made in Chapter 3 for the natural resource impact topics carried forward for analysis.

In addition to mandating the prevention of impairment, the Organic Act requires that the NPS prioritize conservation over use whenever the two are found to be in conflict. The NPS complies with this mandate by ensuring that a proposed use of the park would not result in unacceptable impacts to park resources and values.

## **Relationship to Other Plans and Policies**

In addition to the National Environmental Policy Act of 1969 (NEPA), the following laws and executive orders guide NPS management of facilities, visitor services, and natural and cultural resources and have relevance to this project: the Endangered Species Act of 1973 (ESA); the National Historic Preservation Act of 1966 (NHPA); the Clean Water Act of 1972 (CWA); the NPS Organic Act of 1916; Americans with Disability Act of 1990 (ADA) and the Architectural Barriers Act of 1968; Executive Order 11988: Floodplain Management; Executive Order 13514; Energy Independence and Security Act of 2007 (Section 438); and the Wild and Scenic Rivers Act.

Policies are guiding principles or procedures that help managers make day-to-day decisions. The primary source of guidance is the NPS *Management Policies 2006* (NPS 2006). Policy topics that are relevant to the Moose Headquarters Rehabilitation site work include cultural resource management; interpretation and education; park facilities including campgrounds and commercial visitor services; and transportation systems and their components. The policies include guidance for administrative offices and maintenance structures. This proposal is consistent with the NPS *Management Policies 2006* which state the NPS will provide visitor and administrative facilities that are harmonious with park resources, compatible with natural processes, esthetically pleasing, functional, water-efficient, and as welcoming as possible to all segments of the population (NPS 2006). NPS facilities and operations would demonstrate environmental leadership by incorporating sustainable practices to the maximum extent practicable in planning, design, siting, construction, and maintenance.

Another source of NPS policies are Director's Orders (DOs), contained in the NPS Directives System and posted online at <http://data2.itc.nps.gov/npspolicy/DOOrders.cfm>. DOs with relevance to this project are: DO-2: Park Planning; DO-6: Interpretation and Education; DO-12: Conservation Planning, Environmental Impact Analysis, and Decision-making; and DO-77: Natural Resource Protection.

Other planning and NEPA documents with relevance to the Moose Headquarters Rehabilitation - Site Work EA are:

#### **Grand Teton National Park Master Plan (1976)**

The 1976 Master Plan addresses the park's purposes, its resource values, its relationship to the regional environs, and the means by which its resources may best be managed. The Master Plan for Grand Teton National Park employs a land classification system that categorizes land within the park in six ways. The Moose Headquarters Area is an example of a Class II land classification: General Outdoor Recreation (roads, campgrounds, low-density lodging, and residential and operation sites). The Master Plan states that the park should manage access points to the Snake River for scenic and fishing float trips and provide new modes of visitor access to park experiences, with less impact upon park resources. This proposal is consistent with the objective of the Master Plan which states the park should "perpetuate the natural and historic environmental values, while simultaneously providing for the visitor in a manner that brings appreciation, as well as enlightenment." Preservation of the natural setting should be considered in areas managed to provide for visitor needs.

#### **Grand Teton National Park Strategic Plan (2005)**

The 2005 Strategic Plan includes goals for visitor satisfaction with park facilities. This proposal is consistent with the 2005 Strategic Plan which discusses improvements at the park's headquarters area (Goal IIa1A) and for rehabilitation of the Moose Maintenance Building (Goal IVa10B).

#### **Foundation for Planning and Management, Grand Teton National Park and John D. Rockefeller, Jr. Memorial Parkway (2006)**

Grand Teton National Park preserves and protects the spectacular and geologically unique landscape of the Teton Range, a diversified array of wildlife, and a variety of cultural resources symbolic of the American West. The park maintains the inherent integrity of the natural resources, processes and systems, and recognizes the dynamic geological processes that continue to influence the land and environment. The park also provides visitors an opportunity to understand, enjoy and be inspired by the wonders of the park in many different ways in a manner that does not diminish its fundamental resources and values. Grand Teton National Park provides a rare combination of outdoor and educational activities and outstanding opportunities to experience natural sounds, dark night skies, solitude, appreciation, and

stewardship. Rehabilitation objectives of the Moose Headquarters Rehabilitation Plan are consistent with the mission statements for Grand Teton National Park.

### **1991 Teton Corridor: Moose to North Jenny Lake Development Concept Plan/EA**

This proposal is consistent with the 1991 Teton Corridor Plan which calls for upgraded visitor facilities at Moose, upgrades or streamlining of concessioner operations, reorganization of the maintenance area, consolidation of park operations, and improvements to circulation and separation of visitor services, maintenance, and other uses.

## **Cumulative Action Scenario**

Council on Environmental Quality (CEQ) regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time.

Cumulative impacts are analyzed by identifying other ongoing or foreseeable future actions within the vicinity of the impact area that have the potential to contribute to the effects to a resource. Cumulative impacts were determined by combining the impacts of the alternatives analyzed in this EA with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future actions that are near the project area. Given the geographical and temporal scope of this EA, the following past, ongoing or reasonably foreseeable future development activities were identified for the purpose of making cumulative effects determinations presented in Chapter 3. Unless otherwise noted NEPA compliance has been completed for the following actions and they have occurred or would occur regardless of the alternative selected in this EA.

### **Moose Entrance Station Replacement**

Compliance has been completed for replacement of the Moose Entrance Station including widening of the existing roadway to accommodate increased in-bound traffic. The purpose of the project is to improve visitor services and improve traffic flow and working conditions for park employees at the entrance station.

### **Craig Thomas Discovery and Visitor Center Construction**

A new visitor center was constructed to replace the former facility located in the Moose Headquarters Area. The new visitor center and associated circulation improvements were constructed south of the project area on the opposite side of Teton Park Road. Included in the compliance for this project was construction of an auditorium attached to the Visitor Center, which is planned for summer of 2010.

### **Multi-Use Pathway Construction**

A multi-use pathway system was approved for construction within the park. The first segment passes the project area on the north side of Teton Park Road.

### **Moose Housing Project**

The current proposal involves infilling the Moose housing area with seven two-bedroom four-plexes for a total of 56 beds.

### **Wastewater Treatment Facilities**

The wastewater treatment plant at the Moose Headquarters Area is over 50 years old and is rapidly approaching the end of its service life. The park and the Jackson Hole Airport are coordinating with

other governmental and private entities, to see if a joint project to build a connection to the Jackson Wastewater Treatment Plant is feasible or if a new wastewater treatment plant should be built in the park. NEPA compliance would be completed for this action before implementation.

### **Historic Structures Management Plan**

Grand Teton National Park is in the early phases of developing a programmatic-level planning document to provide guidance for management of historic structures. Priorities for management of historic structures would be established in order to better manage existing park historic structures and to provide guidance for project-specific and park-wide planning efforts. NEPA compliance would be completed before implementation of any actions.

### **Moose Headquarters Rehabilitation Plan**

Since 2005, the park has been working on resolving substantial health/ safety issues related to the park's headquarters and maintenance area. In order to address deferred maintenance and resolve extensive code deficiencies, the following features would be implemented as part of the Moose Headquarters Rehabilitation Plan. Facilities renovated under this plan are being targeted by the NPS for Silver Certification in the Leadership in Energy and Environmental Design (LEED) program by the United States Green Building Council, consistent with President Obama's initiative to increase the energy efficiency of federal buildings.

- **Moose Maintenance Building Rehabilitation.** The Moose Maintenance Building and former Visitor Center / Administration Building were constructed in the 1960s. In 1997/98 a second story was added to the Moose Maintenance Building, creating 16,500 additional square feet on the second floor. The project was not fully funded and the second floor space has remained unused "core and shell," unfinished and unconditioned office space for over 10 years. Since this time, numerous functional, health, and safety deficiencies have been identified within these buildings and throughout the headquarters area. Under the plan, all three floors of the Moose Maintenance Building will be rehabilitated and uses from the temporary buildings will be consolidated into the rehabilitated building, which will become the new Moose Headquarters Building. The ground floor will be reconfigured to meet code and functional needs for both office and vehicle spaces, while the upper floors will provide new office space for park staff. The majority of staff currently housed within the administration building will be moved into the renovated Moose Maintenance Building. Renovation of the building incorporates extensive energy efficiency and environmentally responsible elements implemented through a renewable ground-source heat pump, water saving and energy efficient equipment, environmentally responsible site planning, careful selection of building materials and resources, improved indoor air quality, and innovation in the design process.

Sporadic, haphazard development and the addition of several temporary office buildings over the years have resulted in facilities that are inefficient, unhealthy, and provide unsafe workplace conditions for employees. Conditions within the temporary buildings that are being used as storage facilities and for office space and administrative operations do not meet health and safety standards. The facilities suffer from numerous health and safety code deficiencies, poor indoor air quality, unsafe interior and exterior pedestrian circulation, and a poorly drained site resulting in extensive ice buildup at parking and outdoor pedestrian areas. Upon completion of the rehabilitation of the Moose Maintenance Building, employees with offices in these temporary buildings will be moved into the newly renovated building. Renovation of the Moose Maintenance Building for use as the consolidated Moose Headquarters Building will provide health and safety code compliance and additional office and work space for both personnel and maintenance functions; improve park operations and workplace efficiencies by providing a safe, healthy, and functional and efficient working

environment and consolidated offices, activities, and services for park employees; facilitate effectiveness between work groups via improved adjacencies; and achieve an overall reduction in building footprint.

- **Former Visitor Center / Administration Building Rehabilitation.** The former Visitor Center / Administration Building was also constructed in the 1960s. This building is currently being used for administrative functions and will be rehabilitated and reused as the Grand Teton Association<sup>1</sup> (GTA) Office and GTA and NPS warehouse space. All life/ safety code deficiencies associated with the building will be addressed and the rehabilitated building will be used for the GTA warehouse and offices, NPS cold storage and records management, and the Law Enforcement / Wildland Fire physical fitness training facility. The building currently has three administrative entrances on the north side of the building that will remain for both vehicle and pedestrian access to warehouse spaces. The entrance/ walkway from the former Visitor Center parking area on the south side of the building has been eliminated in order to discourage members of the public from attempting to enter the converted warehouse, given that it is no longer a visitor center.
- **Communications Facility.** A modern, waterproof telecommunication vault and a single radio tower are planned for construction on a disturbed site adjacent to the existing temporary buildings. The new water-tight vault and tower replace an outdated telecommunications vault and consolidate four existing antenna elements from the top of the Moose Maintenance Building into a single tower. The purpose of this project is to maintain core park operations during rehabilitation of the Moose Maintenance Building by reducing the potential for communications disruptions during construction and to enhance the quality of future communications as well as maintaining functionality of the Teton Interagency Dispatch Center. The new radio tower may be moved back to the Moose Headquarters Building after renovation of the building is complete.
- **Wash Bay.** A pre-engineered metal wash bay building is planned for construction northwest of the Moose Maintenance Building between the existing Headquarters Road and the housing area. During construction activities, this building will be used as a temporary facility (swing space) for emergency response vehicles to allow continuity of critical park functions and to assure emergency response to the southern areas of the park. Once all projects are completed, this facility will serve as a wash bay for NPS vehicles and equipment within the rehabilitated Moose Headquarters Area. The wash bay will provide a single vehicle washing facility to protect surface and groundwater quality, with wash water entering a pre-existing oil/water separator before going to the wastewater treatment plant for further processing.
- **Temporary Swing Space Modular Building Installation.** An additional temporary building was installed immediately south of and adjacent to the existing temporary buildings in order to facilitate the transition of employees from the former Visitor Center to the repurposed Moose Maintenance Building in order to maintain core park operations during rehabilitation of the building. Employees needed to be removed from interior construction areas in the former Visitor Center in order for workers to complete the renovation of a portion of that building for use as the GTA offices and warehouse. However, because rehabilitation of the Moose Maintenance Building is not complete, and cannot provide office space for staff at this time, a temporary location to house these employees was required.

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<sup>1</sup> Grand Teton Association (GTA) was founded in 1937 and is a cooperating association that publishes and sells educational materials. The GTA provides support for the park's educational, interpretive and scientific research programs through the sales of books and gifts.

## Scoping

Scoping is a process to identify the resources that may be affected by a project proposal, and to explore possible alternative ways of achieving the proposal while minimizing adverse impacts. Grand Teton National Park conducted both internal scoping with appropriate NPS staff and external scoping with the public and interested/ affected groups and agencies.

Internal scoping was conducted by an interdisciplinary team of professionals from Grand Teton National Park to discuss the purpose and need of the project; various alternatives; potential environmental impacts; past, present, and reasonably foreseeable projects that may have cumulative effects; and possible mitigation measures. Over the course of the project, team members visited the site to view and evaluate alternatives. Refinements to the preferred alternative were made over the course of several months to address conflicts and issues identified as part of this process.

External scoping was initiated with the distribution of a scoping letter to inform the public of the proposal, and to generate input on the preparation of this EA. The scoping letter was mailed in June 2008 to more than 800 individuals, organizations, federal and state agencies, affiliated Native American tribes, local governments, and local news organizations. During the 30-day scoping period, responses were received from one agency and four members of the public (see Chapter 4, Consultation and Coordination, for information regarding these comments). The initial proposal in the scoping notice identified additional components: employee housing at the Moose Campus and Beaver Creek, Moose water/ wastewater system upgrades, and a dedicated space for park museum collections within the Craig Thomas Discovery and Visitor Center. These components are no longer being proposed as part of this project but may be considered in the future with additional NEPA compliance.

## Impact Topics

In this section, the NPS provides an evaluation and explanation as to why impact topics either are or are not evaluated in further detail. Some impacts were dismissed from detailed study after internal and public scoping was completed and after discussions with park specialists. Impact topics were dismissed from further evaluation in this EA if:

- Impact topic resources do not exist in the project area;
- Impact topic resources would not be affected by the proposal, or the likelihood of impacts are not reasonably expected; or
- There would be minor or less effects (i.e., no measurable effects) from the proposal, and there is little controversy on the subject or reason to otherwise include the topic.

The NPS defines “measurable” impacts as moderate or greater effects. It equates “no measurable effects” as no effect, negligible, or minor effects. “No measurable effect” is used by the NPS in determining if a categorical exclusion applies or if impact topics may be dismissed from further evaluation in an EA or Environmental Impact Statement (EIS). The use of “no measurable effect” in this EA pertains to whether the NPS dismisses an impact topic from further detailed evaluation. The reason the NPS uses “no measurable effect” to determine whether impact topics are dismissed from further evaluation is to concentrate on the issues that are truly important to the action in question, as required by CEQ regulations at 1500.1(b), rather than amassing needless detail.

### Impact Topics Retained for Further Analysis

Impact topics retained for further analysis in this EA are listed separately below, along with reasons why the topic is being carried forward. For each of these topics, baseline conditions (i.e., affected environment) are described in Chapter 3 in order to facilitate an analysis of impacts.

## Soils

According to *NPS Management Policies 2006*, the NPS will preserve and protect geologic resources and features from adverse effects of human activity, while allowing natural processes to continue (NPS 2006). These policies state that the NPS will strive to understand and preserve the soil resources of park units and to prevent, to the extent possible, unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.

Soil resources are currently being impacted by erosion along the boat landings and river bank. Soils may be impacted due to construction activities associated with parking, grading, and site access. Although there would be mitigation measures designed for the project to minimize soil loss during and after construction, the action alternative would result in new ground disturbance and therefore has the potential to impact soils; therefore, this topic was retained for further analysis.

## Vegetation

The NPS is directed by the Organic Act to conserve the scenery and the natural objects unimpaired for future generations. *NPS Management Policies 2006* define the general principles for managing biological resources as maintaining all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and ecological integrity of plant communities (NPS 2006). When NPS management actions cause native vegetation to be removed, the NPS will seek to ensure that such removals will not cause unacceptable impacts to native vegetation, natural processes, or other park resources.

Non-native species, also referred to as exotic or invasive, are not a natural component of the ecosystem. Management of populations of exotic plant and animal species, up to and including eradication, would be undertaken wherever such species threaten park resources or public health and when control is prudent and feasible. Executive Order 13122, *Invasive Species*, states that federal agencies are to prevent the introduction of invasive species, provide for their control, provide for restoration of native species and habitat conditions in ecosystems that have been invaded, and minimize the economic, ecological, and human health impacts that invasive species cause.

The spread of invasive non-native species is an on-going problem throughout the highly visited and occupied portions of the park. Many of these species are designated by the state or county as noxious weeds that thrive in newly or highly disturbed areas. Several exotic species are present at the site. Four of these are on the State of Wyoming noxious weed list, and three of the four have proven very difficult to control or contain in Grand Teton National Park by biological, chemical or mechanical means.

Vegetation would be impacted by construction activities associated with parking, grading, and site access. Although mitigation measures designed for the project would minimize vegetation loss and spread of exotic species during and after construction, the action alternative would result in new ground disturbance and therefore has the potential to impact vegetation; therefore, this topic was retained for further analysis.

## Water Resources

### *Surface and Groundwater*

The CWA (33 U.S.C. §§ 1251-1387) strives to restore and maintain the chemical, physical and biological integrity of the nation's waters. The act sets up a system of water quality standards, discharge limitations, and permit requirements for any actions or proposed actions that may affect the quality of the nation's waters.

Water resources may be impacted due to construction activities associated with parking, grading, and site access. Although there would be mitigation measures designed for the project to protect water quality during and after construction, the action alternative would result in new ground disturbance and therefore has the potential to impact water quality; therefore, this topic was retained for further analysis.

### *Floodplains*

Executive Order 11988, Floodplain Management (42 Fed. Reg. 26951), DO-77-2: Floodplain Management, Procedural Manual 77-2, Floodplain Management, and other guidance documents all maintain the NPS policy of preserving floodplain values and minimizing potentially hazardous conditions associated with flooding. In the procedural manual, proposed actions are classified as fitting into one of three classes. Depending upon the action class, one of the three “regulatory floodplains’ applies (100-year, 500-year, extreme). If a proposed action is found to be in the applicable regulatory floodplain and relocating the action to a non-floodplain site is considered not to be a viable alternative, then flood conditions and associated hazards must be quantified as a basis for management decision making, and appropriate prescribed actions must be taken and a Statement of Findings prepared.

Executive Order 11988, Floodplain Management, and NPS DO-77-2: Floodplain Management Guidelines, require examination of potential impacts to floodplains and avoidance of adverse impacts associated with their direct and indirect development. The project area is located in the Snake River 500-year floodplain; therefore, this topic was retained for further analysis. A Statement of Findings is attached (Appendix A).

### **Wildlife, including Threatened, Endangered, and Special Concern Species**

NEPA calls for an examination of impacts on all components of affected ecosystems (42 USC 4321 et seq.). NPS policy is to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of plants and animals. Although proposed project activities occur almost exclusively within the existing footprint of the Moose Headquarters Area, and the associated development and level of human activity would discourage use by some species of wildlife, there is use. The project area is situated within habitat that would be used by a wide variety of wildlife.

The ESA requires examination of impacts on all federally-listed threatened, endangered, and candidate species. Section 7 of the ESA requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. (NPS sent USFWS a scoping notice in June 2008 informing them of this project and they will receive a copy of this EA to initiate consultation.) In addition, the NPS *Management Policies 2006* and DO-77: Natural Resources Management Guidelines, require the NPS to examine the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species (NPS 2006). Grand Teton National Park contains four vertebrate species listed under the ESA as threatened, endangered, or nonessential/ experimental populations and several species classified by the Wyoming Game and Fish Department (WGFD) as “Species of Special Concern” are potential residents of the project area or its surroundings. NPS policy as well as the Migratory Bird Treaty Act also requires examination of effects to migratory bird species. Grand Teton National Park provides habitat for a variety of migratory species. Many of these wildlife and bird species could occur in the project area and could be disturbed by site work activities associated with the action alternative; therefore, this topic was retained for further analysis.

## Visitor Use and Experience

According to *NPS Management Policies 2006*, the enjoyment of park resources and values by people is part of the fundamental purpose of all park units (NPS 2006). The NPS is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks, and would maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of society. Further, the NPS would provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the parks. *NPS Management Policies 2006* also states that scenic views and visual resources are considered highly valued associated characteristics that the NPS should strive to protect (NPS 2006).

The boat landing area of the Moose Headquarters Area receives heavy use during the summer months from both concessioner clients and visitors. This use often results in traffic congestion and spillover to the administrative area resulting in safety hazards and a negative experience for those who use the area. Because the maintenance and park headquarters buildings share the same access roads with the housing area, daycare center, former visitor center, and boat and fishing parking, vehicle traffic can be congested and confusing. Circulation proves to be particularly confusing to visitors who are visiting the park for the first time. The proposed project would functionally reconfigure the area currently used by visitors; therefore, this topic was retained for further analysis.

## Park Operations

Existing facilities in the Moose Headquarters Area include the former Visitor Center / Administration Building, Moose Maintenance Building, temporary administration buildings, and a wastewater treatment plant and lab among others. The Moose Maintenance Building includes offices, the Teton Interagency Dispatch Center, fire management office and cache, vehicle repair bays, a meeting room, workout room, and storage. A sand shed, work yard area, and two boat ramps are also located within the Moose Headquarters Area. There is currently space for visitor parking and access to the Moose boat landing as well as parking and access for maintenance or administrative use. Park staff – 75 percent of whom are duty stationed in Moose – consists of approximately 160 permanent employees and approximately 300 seasonal employees, most of whom are employed during the busy summer season. Several divisions comprise the park staff: visitor and resource protection, interpretation, science and resource management, facility management, business resources, and administration.

All project work would have a measurable effect on the park's staff and their daily operations. Management of new facilities (i.e., trails, parking, landscaping) would require both routine and cyclic maintenance in order to ensure that they continue to serve the purpose for which they were constructed and to reduce life-cycle costs, which would ultimately increase if not properly maintained. Similarly, operational activities associated with improvements would include control of invasive weeds along new trails, parking, or use areas. For these reasons, the topic of park operations was retained for further analysis.

## Impact Topics Dismissed From Further Analysis

A number of impact topics have been dismissed from further consideration, as listed below. During internal scoping, the park's interdisciplinary team conducted a preliminary analysis of resources to determine the context, duration, and intensity of effects that the proposed actions may have on those resources. If the magnitude of effects was determined to be at the negligible or minor level, there is no potential for significant impact and further impact analysis is unnecessary, therefore the resource is dismissed from further consideration. The rationale for dismissing these specific topics is stated below for each resource.

## Air Quality

The Clean Air Act (CAA) of 1963 (42 U.S.C. 7401 et seq.) was established to promote the public health and welfare by protecting and enhancing the nation's air quality. The act establishes specific programs that provide special protection for air resources and air quality related values associated with park units. Section 118 of the CAA requires a park unit to meet all federal, state, and local air pollution standards. The CAA classifies Grand Teton National Park as a Class I Airshed - areas that should meet the strictest standards for air quality and visibility. Further, the CAA provides that the federal land manager has an affirmative responsibility to protect air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts.

Construction activities such as hauling materials and operating heavy equipment could result in temporary increases of vehicle exhaust, emissions, and fugitive dust in the general project area. Any such emissions would be temporary and localized and would likely dissipate rapidly because air stagnation at Grand Teton National Park is not common. Overall, the project could result in a negligible degradation of local air quality, and such effects would be temporary, lasting only as long as construction. The Class I air quality designation for Grand Teton National Park would not be affected by the proposal and there would be no unacceptable impacts.

The proposed actions are consistent with §1.4.7.1 of the *NPS Management Policies 2006* (NPS 2006). There would be no measurable effects on air quality, no change in the Class I Airshed designation of the park and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

## Climate Change

Climate change has been described by many as the greatest environmental challenge facing national parks today. The very natural and cultural resources the NPS has a fiduciary responsibility to protect unimpaired for future generations are threatened. In response to the potential threats of climate change, on September 14, 2009, Secretary of the Interior Ken Salazar signed Secretarial Order No. 3289: Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources. This secretarial order established as priorities the development of environmentally responsible renewable energy on our nation's public lands, and the protection of cultural and natural resources from the dramatic effects of climate change that are already occurring. In addition, the secretarial order established a framework through which Interior bureaus will coordinate climate change science and resource management strategies to address climate change. October 5, 2009, President Barack Obama signed Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance. This executive order requires agencies to measure, manage, and reduce greenhouse gas emissions toward agency-defined targets. Subsequently, the Department of the Interior and the NPS recommend all units consider climate change during the NEPA planning process.

The following gases are called "greenhouse gases" because their increased concentration in the Earth's atmosphere creates layer of gases acting as a "greenhouse" over the Earth, resulting in warming trends: carbon dioxide (CO<sub>2</sub>), chlorofluorocarbons (CFCs), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>).

Although the site work proposed in this EA could, when combined with other projects within and outside the project area and park, slightly contribute to CO<sub>2</sub> build-up due to the loss of vegetation, when combined with other projects proposed in the area, there would be a beneficial effect on CO<sub>2</sub> emissions and climate change. The rehabilitated Moose Maintenance Building and former Visitor Center / Administrative Building are being targeted for Silver Certification in the LEED program by the United States Green Building Council, consistent with President Obama's initiative

to increase the energy efficiency of federal buildings. These buildings will incorporate extensive energy efficiency and environmentally responsible elements implemented through a renewable ground-source heat pump, water-saving and energy efficient equipment, environmentally responsible site planning, careful selection of building materials and resources, improved indoor air quality, and innovation in the design process. In addition, five energy inefficient temporary buildings would be removed and their functions relocated to the newly renovated, green buildings.

Climate change scenarios project potential changes in local conditions, including the possibility for a shift to less snowfall and more precipitation in the form of rain; however, scientists in the Greater Yellowstone Area (GYA) are currently synthesizing research and monitoring data to assess the relative confidence in these projections as applied to the local scale. This document already assesses the management of stormwater runoff and the possibilities of floods from the Snake River; flooding potential is discussed in the Water Resources section of this document.

There would be no measureable effects on climate change with the proposed actions and potential beneficial effects in combination with the Moose Headquarters Rehabilitation Plan.

The proposed actions are consistent with §1.4.7.1 of the NPS Management Policies 2006 (NPS 2006). There would be no measurable effects on climate change and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

## **Cultural Resources**

The NPS, as steward of many of America's most important cultural resources, is charged to preserve cultural resources for the enjoyment of present and future generations. Management decisions and activities throughout the National Park System must reflect awareness of the irreplaceable nature of these resources. In addition, the NHPA, as amended (16 USC 470 et seq.), NEPA of 1969 (42 USC 4321 et seq.), NPS *Management Policies 2006*, DO-28: Cultural Resource Management Guidelines, and DO-12: Conservation Planning, Environmental Impact Analysis, and Decision Making, require the consideration of impacts on cultural resources listed in or eligible for listing in the National Register of Historic Places (NRHP). The Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) requires specific actions when American Indian human remains, funerary objects, sacred objects, and objects of cultural patrimony are excavated or discovered on federal lands.

### *Section 106 of the National Historic Preservation Act*

Section 106 of the NHPA requires that federal agencies assess any undertaking for impacts to cultural resources that are listed or eligible for listing under the NRHP. Under Section 106, federal agencies must also consult with the State Historic Preservation Office (SHPO) when assessing potential impacts to cultural resources from such undertakings.

Compliance with Section 106 of the NHPA for this project is being conducted separately from this EA. A consultation letter regarding this project has been sent to the Wyoming SHPO. It is anticipated that there would be no adverse effects to cultural resources under Section 106 as a result of this project.

### *Archaeological Resources*

The DO-28B: Archaeology, affirms a long-term commitment to appropriate investigation, documentation, preservation, interpretation, and protection of archaeological resources inside park units. As one of the principal stewards of America's heritage, the NPS is charged with preservation of the commemorative, educational, scientific, and traditional cultural values of archaeological resources for the benefit and enjoyment of present and future generations. Archaeological resources are nonrenewable and irreplaceable, so it is important that all management decisions and

activities throughout the National Park System reflect a commitment to the conservation of archaeological resources as elements of our national heritage.

Grand Teton National Park is known to contain a variety of archaeological resources. The Moose Headquarters Area was inventoried for cultural resources in 1990 and no archaeological sites, artifacts, or features were identified (Connor 1990). The proposed project area is not expected to contain archaeological deposits; however, appropriate steps would be taken to protect any archaeological resources that are inadvertently discovered during construction. Because the project would not disturb any known archaeological sites, nor are there any known resources protected by the Native American Graves Protection and Repatriation Act within the project area, the effect of the project on archaeological resources is expected to be negligible.

The proposed actions are consistent with §1.4.7.1 of the *NPS Management Policies 2006* (NPS 2006). There would be no measurable effects on archaeological resources and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

#### *Historic Structures and Cultural Landscapes*

The NHPA, NEPA, DO-28: Cultural Resource Management Guidelines (NPS 1998), *NPS Management Policies 2006* (NPS 2006), and DO-12: Conservation Planning, Environmental Impact Analysis, and Decision Making, require the consideration of impacts on historic structures and cultural landscapes listed in or eligible for listing in the NRHP. According to DO-28 a cultural landscape is:

“... a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions” (NPS 1998).

This definition is further clarified by NPS Preservation Brief #36 (1994), which describes a cultural landscape as:

“...a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. Cultural landscapes are the result of the long interaction between people and the land, and the influence of human beliefs and actions over time upon the natural landscape. Shaped through time by historical land use and management practices as well as politics, property laws, technology, and economic conditions, cultural landscapes provide a living record of an area’s past, a visual chronicle of its history.”

The NPS has defined four overlapping types of cultural landscapes: historic designed landscape; historic vernacular landscape; historic site; and ethnographic landscapes. There are no historic structures or cultural landscapes within the project area. The proposed actions may have a beneficial effect on the nearby Menor’s Ferry Historic District. The project would improve public access via a new walking trail through the administrative and Moose Landing areas. The proposal would result in an immediate connection with the existing trails through the Menor’s Ferry Historic District, and a potential future trail between the Craig Thomas Discovery and Visitor Center (across the road south of the project area) and the Murie Ranch. The esthetics and visitor safety would be improved along this new visitor trail through the existing administrative area, resulting in an improved experience for visitors to the historic properties that surround the Moose Headquarters Area.

The proposed actions are consistent with §1.4.7.1 of the NPS *Management Policies 2006* (NPS 2006). There would be no adverse effects on historic structures or cultural landscapes because there are none within the project area and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

#### *Ethnographic Resources*

DO-28: Cultural Resource Management Guidelines defines ethnographic resources as any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. DO-28 and Executive Order 13007, Indian Sacred Sites, state that the NPS should try to preserve and protect ethnographic resources. While no cultural materials are known to be present within the project area, it is known that American Indian people utilized the Grand Teton area over thousands of years for hunting, gathering, subsistence and occupation. Grand Teton National Park holds many resources important to tribes, including wildlife, plants, and water. American Indian tribes traditionally associated with the park were apprised of the proposed project in a scoping letter sent out in June 2008; no responses were received.

The proposed actions are consistent with §1.4.7.1 of the NPS *Management Policies 2006* (NPS 2006). There would be no measurable effects on ethnographic resources and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

#### *Museum Collections*

The NHPA, NEPA, NPS *Management Policies 2006*, and DO-28: Cultural Resource Management Guidelines, require the consideration of impacts on museum collections. These collections can include items related to archaeology, ethnology, history, biology, paleontology, geology, and archives. No museum collection items are currently stored or exhibited in the Moose Headquarters Area.

The proposed actions are consistent with §1.4.7.1 of the NPS *Management Policies 2006* (NPS 2006). There would be no effects on museum collections and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

### **Environmental Justice**

Executive Order 12898, General Actions to Address Environmental Justice in Minority Populations and Low Income Populations, requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low income populations and communities. Because the Moose Headquarters Area would continue to be available for use by all park staff and visitors regardless of race or income, and the construction workforces would not be hired based on their race or income, the proposed action would not have disproportionate health or environmental effects on minorities or low-income populations or communities.

The proposed actions are consistent with §1.4.7.1 of the NPS *Management Policies 2006* (NPS 2006). There would be no measurable effects to environmental justice issues and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

### **Indian Trust Resources**

Secretarial Order 3175, Departmental Responsibilities for Indian Trust Resources, requires that any anticipated impacts to trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands,

assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

The proposed actions are consistent with §1.4.7.1 of *NPS Management Policies 2006* (NPS 2006). There would be no measurable effects on Indian trust resources formally recognized within the park and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

### **Land Use and Socioeconomics**

Although project actions are intended to improve site-specific operational conditions for permitted river concessioners, the proposed actions would neither change local and regional land use nor appreciably impact local businesses or other agencies. Implementation of the proposed actions could provide a negligible beneficial impact to the economies of nearby Jackson, as well as Teton County, due to minimal increases in employment opportunities for the construction workforce and revenues for local businesses and governments generated from these additional construction activities and workers. Any increase in workforce and revenue, however, would be temporary and negligible, lasting only as long as construction.

The proposed actions are consistent with §1.4.7.1 of the *NPS Management Policies 2006* (NPS 2006). There would be no measurable effects on land use and socioeconomics and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

### **Natural Soundscapes**

In accordance with the *NPS Management Policies 2006* and DO-47: Sound Preservation and Noise Management, preservation of natural soundscapes associated with park units is an important component of the NPS mission (NPS 2006). Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and durations of human-caused sound considered acceptable vary among NPS units as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

The proposed actions would occur in a developed zone of Grand Teton National Park. Existing sounds in this area are most often generated from vehicular traffic (visitors and employees entering/leaving the area), people, climate controls on the buildings, some wildlife such as birds, and wind. Because the area already contains man-made noises, rehabilitation of the Moose Headquarters Area is not expected to appreciably increase the noise levels in the general area. During rehabilitation activities, human-caused sounds would likely increase due to construction activities, equipment, vehicular traffic, and construction crews. Any sounds generated from construction would be temporary, lasting only as long as the construction activity is generating the sounds, and would have a negligible to minor adverse impact on visitors and employees. Sound generated by the long-term operation and use of the area would be the same as that currently occurring.

The proposed actions are consistent with §1.4.7.1 of the *NPS Management Policies 2006* (NPS 2006). There would be no measurable effects on soundscapes and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

## Natural Lightscapes

In accordance with the NPS *Management Policies 2006*, the NPS will strive to preserve natural ambient lightscapes, which are natural resources and values that exist in the absence of human-caused light (NPS 2006). Grand Teton National Park strives to limit the use of artificial outdoor lighting to that which is necessary for basic safety requirements. The park also strives to ensure that all outdoor lighting is shielded to the maximum extent possible, to keep light on the intended subject and out of the night sky. The existing administration/ maintenance buildings are the primary sources of light in the Moose Headquarters Area.

The proposed actions may incorporate minimal exterior lighting at the Moose Headquarters Area, but the lighting would be directed toward the intended subject with appropriate shielding mechanisms and placed only in areas where lighting is needed for safety reasons, thus preserving the ability to see the stars, planets, and Earth's moon and other natural features that are visible during clear nights in the park. Any effects would be negligible.

The proposed actions are consistent with §1.4.7.1 of the NPS *Management Policies 2006* (NPS 2006). There would be no measurable effects on natural lightscapes and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

## Prime and Unique Farmlands

In August 1980 the CEQ directed that federal agencies must assess the effects of their actions on farmland soils classified as prime or unique by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed. Unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to the NRCS there are no prime or unique farmlands in the Moose area.

The proposed actions are consistent with §1.4.7.1 of the NPS *Management Policies 2006* (NPS 2006). There would be no effect to prime and unique farmlands and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

## Wetlands

Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, where possible, adversely impacting wetlands. Further, §404 of the CWA authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process, discharge of dredged or fill material or excavation within waters of the United States. NPS policies for wetlands as stated in NPS *Management Policies 2006* and DO-77-1: Wetlands Protection, strive to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In accordance with DO-77-1, proposed actions that have the potential to adversely impact wetlands must be addressed in a Statement of Findings for Wetlands. The National Wetland Inventory program shows no wetlands present in the project area.

The proposed actions are consistent with §1.4.7.1 of the NPS *Management Policies 2006* (NPS 2006). There would be no effects on wetlands because there are none in the project area and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

## Wild and Scenic Rivers

On March 30, 2009, President Barack Obama signed into law the Craig Thomas Snake Headwaters Legacy Act as part of the Omnibus Public Land Management Act of 2009, designating 86 new wild and scenic rivers, including the Snake River Headwaters in Wyoming. Designated *wild* river

segments under the new law include the 47-mile segment of the Snake River from its source in the Bridger-Teton National Forest, crossing through Yellowstone National Park and the John D. Rockefeller, Jr. Memorial Parkway to Jackson Lake in Grand Teton National Park.

Designated *scenic* river segments under the new law within Grand Teton National Park include a 3.3-mile segment of the Gros Ventre River flowing across the southern boundary of Grand Teton National Park; a 7.7-mile segment of the Buffalo Fork of the Snake River; approximately 4 miles of Pacific Creek from the Teton National Forest boundary to the Snake River; the 24.8-mile segment of the Snake River from 1 mile downstream of Jackson Lake Dam to 1 mile downstream of Moose, Wyoming—the latter segment being the one that passes by the project area.

Because of the Snake River's inclusion into the National Wild and Scenic Rivers System, the NPS is required to protect the river's outstanding resources and free flow and will be developing a management plan within the next few years. The proposed project area is adjacent to the Snake River but no ground disturbance would occur on the river banks. Best management practices (BMPs) would be implemented to minimize the potential for erosion or sedimentation to the river channel. The proposed actions would result in a decrease in impervious surface and improvements to the stormwater management system that would subsequently improve water quality. Visual impacts due to development visible from the river would remain essentially the same or slightly improve due to the removal of buildings and the consolidation of pedestrian traffic in designated routes. There would be no measurable effects to those resources for which the river was designated.

The proposed actions are consistent with §1.4.7.1 of the *NPS Management Policies 2006* (NPS 2006). There would be no measurable effects on wild and scenic rivers and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

## **Wilderness**

Section 6.3.4.3, Environmental Compliance, of *NPS Management Policies 2006*, states that proposals having the potential to impact wilderness resources will be evaluated in accordance with NPS procedures for implementing NEPA (NPS 2006), including compliance with the Wilderness Act of 1964. Plans potentially affecting eligible, recommended or designated wilderness resources shall not propose actions that could adversely affect the wilderness characteristics and values that make them eligible for consideration or for inclusion in the National Wilderness Preservation System. The NPS will manage wilderness areas for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness (§6.1, General Statement). These policies apply regardless of category and the NPS will take no action that would diminish the wilderness of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed (§6.3.1, Wilderness Resource Management). Until that time, management decisions will be made in expectation of eventual wilderness designation.

Approximately 43 percent of the park (146,355 acres) has been identified as recommended wilderness and 7 percent (18,756 acres) has been designated as potential wilderness. A portion of this acreage is located west of Moose, approximately 1 mile away at its closest location. The Moose area is not within potential or recommended wilderness.

The proposed actions are consistent with §1.4.7.1 of the *NPS Management Policies 2006* (NPS 2006). There would be no effects on wilderness and the proposed actions would not result in any unacceptable impacts. Therefore, this topic is dismissed from further analysis.

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## CHAPTER 2 - ALTERNATIVES CONSIDERED

### Development of Alternatives

An interdisciplinary team of NPS specialists began meeting in July 2008 for the purpose of developing alternatives for proposed site work at the Moose Headquarters Area. These meetings resulted in the definition of project objectives as described in Chapter 1 (see *Purpose and Need*), and a list of alternatives that could potentially meet these objectives. The team identified a total of three action alternatives and the No Action alternative. The three action alternatives were developed during a value analysis workshop conducted in September 2009. During the workshop an NPS design team worked to refine a site layout that would best meet the needs of users of the Moose Headquarters Area. During this process, the design team considered each alternative and developed factors to facilitate comparison of the alternatives. Attributes and advantages for these factors were then identified. As a result of this workshop and subsequent internal NPS consultation, two of the action alternatives were dismissed from further consideration for reasons described later in this chapter, and the one action alternative that was carried forward for analysis was finalized.

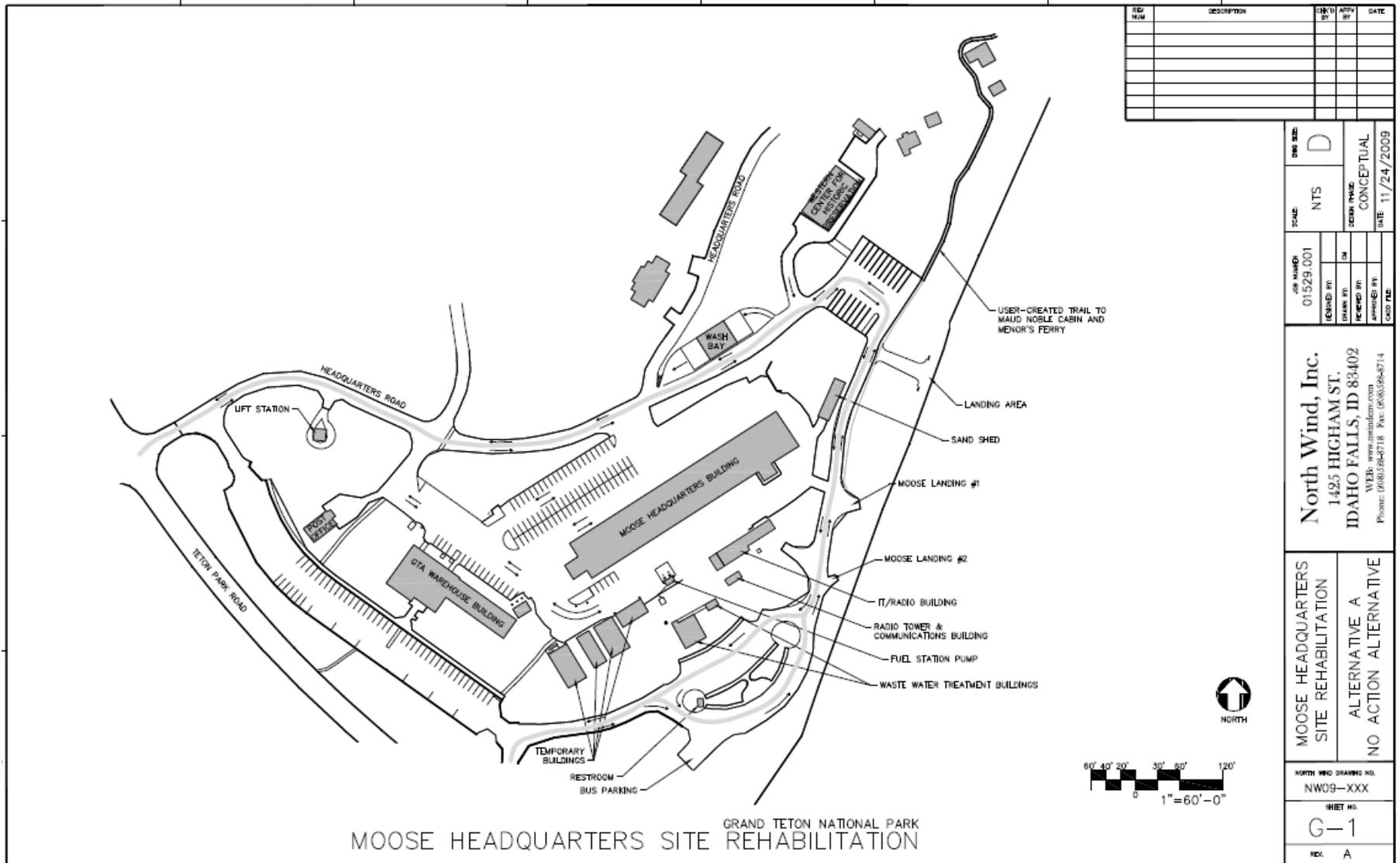
The action alternative as described below attempts to address the issues identified in the *Purpose and Need* section through a combination of management solutions and constructed solutions. The proposed approach has been refined during project development to minimize new construction and disturbance, avoid expansion of the developed footprint on site, and focus largely on those elements of new or renovated infrastructure that facilitate and support management solutions to unsatisfactory site conditions.

This chapter describes Alternative A – No Action alternative and Alternative B – Moose Headquarters Site Work (NPS Preferred alternative). This chapter also provides a description of mitigation measures for the action alternative, a description of alternatives considered but dismissed from analysis, a comparison of the alternatives in relation to project objectives (Table 1), and a comparison of impacts by alternative (Table 2).

### Alternative A – No Action Alternative

Under Alternative A – No Action alternative, site work at the Moose Headquarters Area would not occur and existing resource conditions as described in Chapter 1 would not be addressed. Should the No Action alternative be selected, future needs would be addressed as they arose and improvements would be undertaken as necessary.

The existing conditions of individual components within the Moose Headquarters Area are described below to provide a basis for comparison of the changes proposed in the action alternative. Figures 2 and 7 show the locations of the major components described within the Moose Headquarters Area.



REV. NO.	DESCRIPTION	REV. BY	DATE

DATE PLOTTED	11/24/2009
SCALE	NTS
DRG. SIZE	D
CONTRACT NO.	CONCEPTUAL
DATE	11/24/2009

**North Wind, Inc.**  
 1425 HIGHAM ST.  
 IDAHO FALLS, ID 83402  
 WEB: www.northwind.com  
 Phone: (800)594-8718 Fax: (800)594-8714

MOOSE HEADQUARTERS  
 SITE REHABILITATION  
 ALTERNATIVE A  
 NO ACTION ALTERNATIVE

NORTH WIND DRAWING NO.	NW09-XXX
SHEET NO.	G-1
REV.	A

Figure 7. Existing Site Condition (Alternative A)

**Concessioner / River Access Parking and Traffic Flow.** A circular route surrounding the administrative area provides access/ departure for concessioners and private boaters on the Headquarters and Moose Landing Roads, with heavy traffic at times between the concessioner parking and staging area, the boat landing customer pick-up area, and public float trip parking area as described in Chapter 1. Under Alternative A, no changes would be made to alleviate congestion in this area that occurs due to inappropriate overflow parking by concessioner clients and heavy concessioner traffic.

No action would be taken under this alternative to address the congestion caused by these multiple uses in this area or to separate the NPS maintenance area from the riverside visitor use area. As a result, potential conflicts between commercial operators, NPS heavy equipment, construction activities, and public and administrative pedestrian traffic would continue.

No action would be taken to provide formal trails or way finding for boaters leaving the river along the Moose Landing Road. Pedestrians would continue to cross the road in an uncontrolled manner due to the lack of a designated crossing area and walkway. There are several picnic tables near the river and one vault toilet in the boat landing drop off site in the public float trip parking area. No restrooms are located at the north end of Moose Landing Road. Often, due to a lack of signs or a clear trail indicating where to go, people getting off boats do not know where they are in relation to parking areas or the nearest restroom facility.

**Administration Parking and Traffic Flow.** Employee traffic enters the Moose Headquarters Area to access park operations (Moose Maintenance Building, former Visitor Center / Administrative Building, temporary buildings, Western Center for Historic Preservation workshop, 4 Lazy F Ranch, fuel pump, works yard, and the shipping and receiving, maintenance, and emergency vehicle bays) as well as the housing area. Employees accessing the Moose Headquarters Area enter at the west end of the administrative area via Headquarters Road and encounter unregulated, two-way traffic once inside the parking area.

There are currently 172 standard parking spaces around the Moose Maintenance Building. In addition to employee personal vehicles, fleet passenger vehicles and pickup trucks, there are numerous large vehicles accommodated on site (see Figure 4). These include: garbage packer truck(s), snow removal vehicles, wildland/ structural fire trucks, and an ambulance. Employee personal vehicles are typically parked to the south and west of the Moose Maintenance Building and to the north of the Administration Building. Maintenance and emergency vehicles are located to the east, north, and northwest of the Moose Maintenance Building. Areas directly east of the Moose Maintenance Building need to be kept open and available for smaller maintenance vehicles as they enter and exit the building. Areas west of the Moose Maintenance Building need to be kept open and available for the larger maintenance and emergency vehicles, both for maintenance and circulation.

The parking area on the south side of the former Visitor Center / Administration Building originally served as public parking for the former Visitor Center. Since the new Craig Thomas Discovery and Visitor Center and associated parking area were built south of Teton Park Road, the former Visitor Center parking area has been used primarily for overflow public parking, overflow parking for vehicles associated with river access, including RVs and vehicles with boat trailers, and some employee parking. There are 74 standard spaces, four accessible parking spaces, and eight oversized parking spaces within this parking area. A few of the parking spaces are allocated for Post Office users. No changes would be made to parking in the administration area under this alternative.

**Temporary Buildings.** Numerous mobile or temporary structures and pre-engineered buildings exist to the east of the Moose Maintenance Building (see Figure 5) that have been added

sporadically over the years. Under this alternative, these buildings would remain on site even after staff with offices in these temporary buildings are moved into the newly renovated Moose Maintenance Building. Problems associated with the building's numerous code deficiencies, poor indoor air quality, unsafe interior and exterior pedestrian circulation, and poor site drainage that causes extensive ice buildup in parking and outdoor pedestrian areas would not be addressed.

**Post Office.** Clients access the existing Post Office from the south and park in the former Visitor Center parking area. Post Office employees have two parking spaces on the north side of the building. To the east, there is a short gravel trail that lies between the former Visitor Center / Administration Building and the Post Office but this trail does not connect to any other pathways or trails and there is no connection to the housing area. Currently residents accessing the Post Office from the housing area walk on the road and through the west side of the parking area before they reach the short trail and the Post Office entrance. No changes to this area would be made under this alternative.

**Works Yard.** The works yard area is located north of the Moose Maintenance Building and south of the river concessioner parking area (see Figure 4). It is approximately 18,000 square feet and is used for operations, storing large maintenance vehicles and trailers, metal recycling, and trash containers. The area also contains a sand shed and loading dock. No changes to this area would be made under this alternative.

**Pedestrian Connectivity.** The park has constructed a multi-use/ biking pathway that runs along the north side of Teton Park Road from Dornan's to the South Jenny Lake Visitor Center. This multi-use pathway accesses the new Craig Thomas Discovery and Visitor Center to the south, but does not tie into Moose Landing Road to link to river operations. The short gravel trail that links the parking area behind the former Visitor Center / Administration Building and Post Office provides access to the Post Office (described above) but does not connect to other pathways or trails. It directs pedestrian travel, preventing the development of haphazard social trails across the grass. Moose residents, who approach the trail from the north, walk on the road until they get to the back of the Post Office where the short trail is located. An informal trail north of the concessioner parking area beyond the project area connects to the Menor's Ferry Historic District. No action would be taken under this alternative to enhance connectivity between visitor or employee use areas.

**Stormwater Management.** As described in Chapter 1, there are numerous deficiencies with respect to current stormwater management within the Moose Headquarters Area. Under this alternative, no infrastructure would be put in place within the Moose Headquarters Area to manage stormwater. Sheet flow from existing paved areas, including contaminants from heavy equipment and other vehicle maintenance, would continue to drain haphazardly, or in many areas, pond on the pavement. Because the site is relatively level, pooling would continue to occur at numerous locations in the existing parking areas, creating icy conditions in winter and risks to employee and visitor safety. Sheet flow of runoff water would also continue, causing problems when it flows toward the river, adjacent vegetated areas, and landing areas.

## Alternative B – Moose Headquarters Site Work (NPS Preferred Alternative)

Alternative B would guide management and development for the site conditions at the Moose Headquarters Area over the next 15-20 years. The main focus of the alternative is to improve site conditions at the Moose Headquarters Area while providing for visitor enjoyment of the area's natural and cultural resources. The proposed site design attempts to accommodate all of the user needs (visitors, concessioners, residents, employees, park operations) in a safe and effective manner and to accommodate park needs well into the future. The action alternative addresses: segregation of operations/ administrative and public/ visitor use areas; segregation of vehicles and pedestrians; employee and visitor parking and traffic flow/ circulation; redesign of vehicle flow patterns to and from visitor and concessioner boat landing areas; landscaping and visual screening of the administrative area; improved stormwater management; and resource protection.

The majority of the ground disturbance would be within the existing disturbance footprint of the Moose Headquarters Area although some new disturbance could occur in order to expand parking for trailers, buses, RVs, and other large vehicles. Proposed development would not expand further north than the existing northern extent of the existing concessioner parking area, with the exception of an interpretive trail, described below, which expands and formalizes an existing social trail to the Menor's Ferry Historic District. Typical construction equipment used to implement the actions proposed would include standard backhoes, graders, gravel trucks, tractor-trailers, and other necessary construction machinery. This equipment would be necessary for land clearing and leveling/grading, adding gravel or new asphalt, and landscaping. A designated area would be used for construction staging, material stockpiling, and equipment storage. This area would likely be sited in a previously disturbed area, away from visitor use areas. Portions of the existing parking area may be used for construction staging purposes as well.

The information below provides details about changes that would occur as compared to the existing conditions under the No Action alternative. Only areas where changes are proposed are described; if no change would occur to an element described in the No Action alternative under Alternative B then it is not mentioned in this section. The description of Alternative B is based on preliminary designs and the best information available at the time of this writing. Specific distances, areas, and layouts used to describe the alternative are only estimates and could change during final site design. If changes during final site design are inconsistent with the intent and effects of the selected alternative, then additional compliance would be completed, as appropriate. A representation of the proposed reconfiguration and lay out under Alternative B is shown in Figure 8.

**Concessioner / River Access Parking and Traffic Flow.** Under Alternative B, concessioner traffic would continue to be managed in a manner that is similar to the existing condition, which concessioners have developed over approximately 50 years. The continuous perimeter route for the concessioner boats and vehicles would be retained along a portion of the Headquarters Road. The concessioner parking area would also be maintained at its current location, with the same flow through circulations. Vehicle and pedestrian traffic patterns would be reconfigured; vehicle radii were considered and included in all schematic designs. Existing parking areas would be modified to better serve employees, visitors, and concessioners, including some modifications to accommodate trailers, buses, and RVs.

Traffic patterns adjacent to the existing boat landings would be improved to allow for safe, orderly access to the river. Reconfiguration of the boat ramp parking area would allow visitors and concessioners to pull through the area and turn around with boat trailers. A new vault toilet would be added near the north boat landing area and the existing restroom would be relocated near the

concessioner client parking area. The location of the former restroom would be restored to native vegetation.

A new, designated parking area for concessioner clients, complete with an associated picnic/ waiting area and restroom facilities, would be added to improve separation of visitor vehicles and pedestrians from concessioner vehicles and to discourage pedestrians from crossing into vehicular traffic. Client parking near the existing public float trip parking area would be eliminated to increase circulation and turn around space.

A comprehensive signage program would be installed throughout the Moose Headquarters Area to communicate pedestrian and vehicle traffic patterns and segregate use areas for all user groups. Raised crosswalks and intersections in conjunction with strategically placed speed dips would control vehicle speed. Directional signs and government vehicle only signs would be used to segregate areas.

Under this alternative there would be 30 boat rig parking stalls; 38 dedicated concessioner client parking stalls (including one ADA compliant stall); 175 headquarters parking stalls (including seven ADA compliant stalls); five bus parking stalls (three current and two future); and 79 regular sized stalls (including two ADA compliant stalls) and eight oversized stalls in the former Visitor Center parking area.

**Administration Parking and Traffic Flow.** Employee and public parking areas would remain near the south end of the Moose Maintenance Building and would be reorganized and segregated from the maintenance and emergency operations north of the building. Reconfiguration of the parking areas and changes in access would segregate visitors and concessioners from administrative functions and traffic in the Moose Headquarters Area.

Installation of a comprehensive signage program – described above under *Concessioner / River Access Parking and Traffic Flow* – would help with pedestrian and vehicle traffic patterns and segregation of use areas within the administrative areas of the Moose Headquarters Area as well. Bike racks, snow poles, benches, buck and rail fencing, and employee picnic tables would be located throughout the Moose Headquarters Area as appropriate.

**Temporary Buildings.** Five functionally and energy-inefficient temporary modular buildings would be removed resulting in an 8,000 gross square foot reduction in overall building space in the Moose Headquarters Area. These functions are being moved into the renovated Moose Maintenance Building. Several of the northernmost buildings would continue to be used for permanent radio and IT operations and storage. The new radio tower may be moved back to the Moose Headquarters Building after renovation of the building is complete.

**Post Office.** A multi-use residential trail to the Post Office would be created, providing linkage to the main park multi-use pathway, Headquarters Road, and the housing area. The paved residential trail would be maintained to provide an all-season trail starting at the four-way intersection and linking the Post Office to the residential area and beyond.

**Works Yard.** Under this alternative, the overall size of the works yard area would remain approximately the same but the efficiency of the space would be enhanced. A defining barrier and defined entrance to the works yard would be added. The current loading dock would be demolished and replaced with a new loading dock.

**Pedestrian Connectivity.** A new interpretive trail would be added that would provide pedestrians a designated walkway to return to their vehicles after leaving the boat landing area. Signage would be implemented to notify users to stay on the trail, help visitors get to their destination, and to provide interpretive information. Redundant ancillary user-created trails would be restored to native vegetation as appropriate. The trail would traverse the riverside area, outside of traffic lanes, with

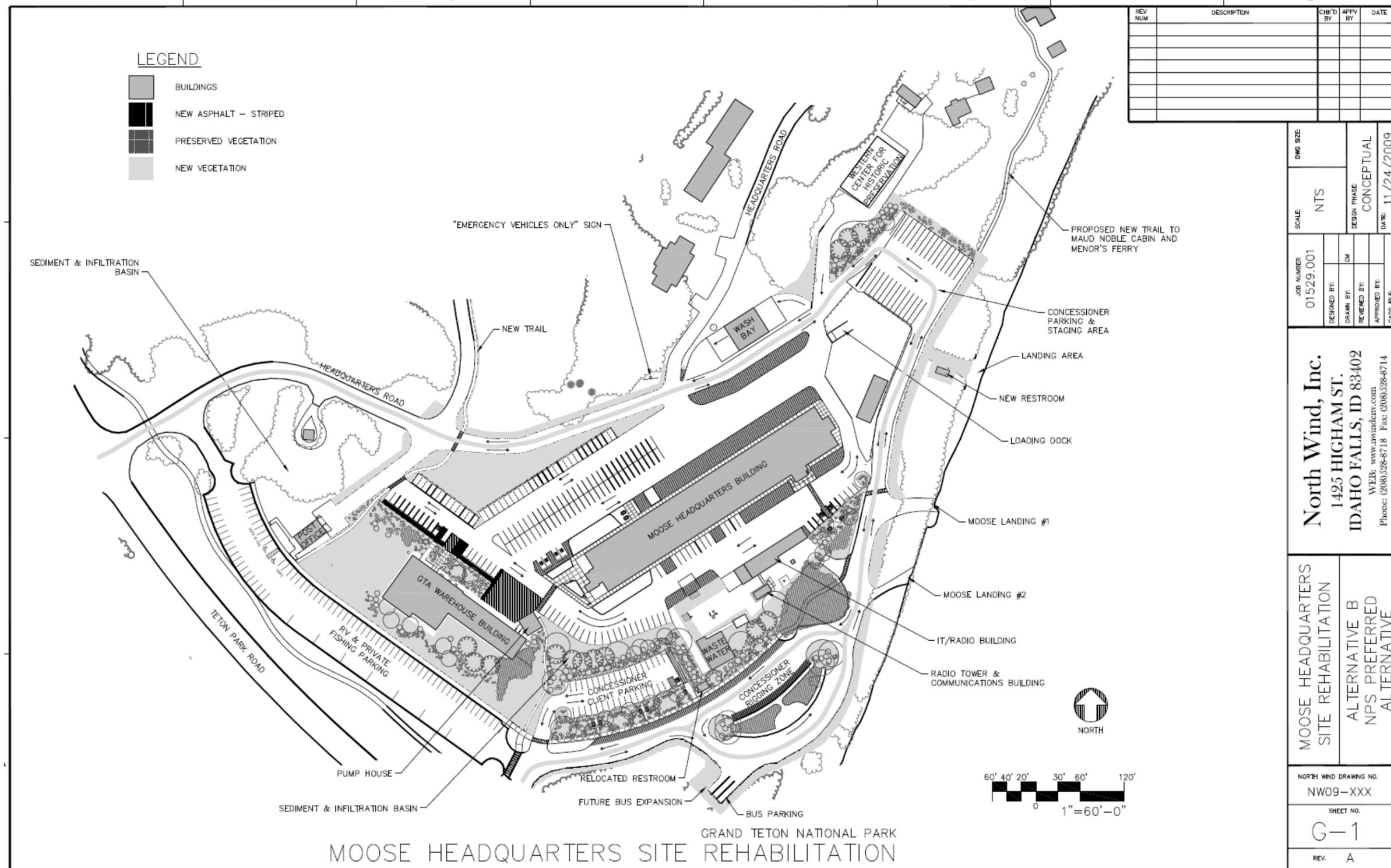


Figure 8. Alternative B Site Layout

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designated crossing points, and provide connectivity between Menor's Ferry, the multi-use/bicycle pathway, and the Craig Thomas Discovery and Visitor Center. This trail would extend north of the Moose Headquarters Area to replace an existing user-created trail that leads to existing asphalt trails within the Menor's Ferry Historic District (Figure 9). The 3 foot by 670 foot trail between the parking area and Maud Noble Cabin would be covered with pervious surface materials (3/4" crushed gravel with fines) and would be ADA compliant. This length would connect to an existing 3 foot by 1,175 foot asphalt trail that leads from the Maud Noble Cabin to Menor's Ferry. In the future the existing asphalt trail may be removed and covered with similar pervious materials to match the surface of the new trail and to provide a continuous trail connecting the Craig Thomas Discovery and Visitor Center to Menor's Ferry.

**Stormwater Management.** There would be nearly complete replacement of existing asphalt to provide positive drainage along with a reconfiguration of drainage patterns. Both gravel and asphalt may be used for resurfacing. Concrete drainage features would be provided with the maximum possible percentage of runoff from paved areas forced through new oil-water separators. Flush concrete curbs would be used on the perimeter of all asphalt paving for containment and durability of the pavement edges. Several sediment and infiltration basins would be constructed within the Moose Headquarters Area to allow stormwater to filter into the ground and multiple bio-swales would be constructed to treat surface water runoff. A gravel trench would be constructed between the Moose Landing Road and the vegetation to facilitate sediment filtration prior to flowing into the river. The new basins and improved contouring of the area would promote positive drainage (drainage from high to low areas) and reduce the amount of runoff to the adjacent Snake River. All elements of the project would be designed to result in an overall reduction in impervious surface within the Moose Headquarters Area.



Figure 9. Close-up of Maud Noble Cabin and Menor's Ferry area

## Mitigation Measures

Mitigation measures are designed to prevent or minimize adverse impacts during and after project implementation. The following mitigation measures were developed to minimize the degree and/or severity of adverse effects and are specific to the project area and to the resource issues analyzed in this document. The following measures would be implemented during the action alternatives, as needed. The NPS would obtain any required federal and state environmental permits required for this project. As part of the permitting process, additional mitigation measures could be required by other agencies.

### CULTURAL RESOURCES

- Consultation with the Wyoming SHPO would be completed prior to implementation of actions proposed in this EA.
- Should construction unearth previously undiscovered archaeological resources, work would be stopped and park staff would consult with the Wyoming SHPO, Tribal Historic Preservation Officers and/or tribes, as necessary. In the unlikely event that human remains are discovered during implementation, provisions outlined in the Native American Graves Protection and Repatriation Act would be followed.
- The NPS would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archaeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archaeological resources are uncovered during construction. Equipment traffic would be minimized in the area of the site. Equipment and materials staging areas would also avoid known archaeological resources.

### SOILS

- To minimize soil erosion at the project site, erosion control BMPs including protection measures such as sediment traps, silt fences, erosion check screens/filters, jute mesh, and hydro mulch, would be used if necessary to prevent the loss of soil. Compacted soils would be scarified and original contours reestablished.
- Excavated soil may be re-used in the project; excess soil would be stored in approved areas.
- Any fill materials would be obtained from a park-approved source and approved by the park ecologist.
- The contractors would control dust during construction by minimizing soil exposure, watering, and use of other dust prevention methods.
- If construction is not complete prior to a winter season, all disturbed areas and soil stockpiles would be protected from snowmelt impacts by using erosion control BMPs and covering dirt piles with impermeable materials.

### VEGETATION

- A revegetation plan would be developed for the project that would incorporate, among other things, the use of native species, plant salvage potential, exotic vegetation and noxious weed management, and pedestrian barriers to prevent establishment of user-created trails. The plan would incorporate screening of the warehouse and works yard as well as other structures and parking areas. Revegetation efforts would include reconstruction of the natural spacing, abundance, and diversity of native plant species.

Natural groupings of vegetation, rocks, or other natural features would be used for screening, as appropriate. Local native species would be used and there would be no irrigation needs beyond establishment.

- All areas disturbed by rehabilitation activities would be revegetated and re-contoured as nearly as possible to the style of the native landscape shortly after activities are completed. Existing trees would be preserved to the extent possible; however, a few trees would likely be removed.
- Construction would follow best practices for topsoil management, revegetation preparation and revegetation as outlined in the park ground disturbance guide.
- Disturbance zones and construction and staging areas would be fenced or clearly marked to prevent impacts to resources outside the approved construction limits.
- Pre- and post-project exotic plant monitoring would be conducted in the project area. Noxious weed control measures would be implemented and a management plan for continual maintenance would be drafted to monitor and mitigate impacts within the first 3 years of construction.
- Existing populations of exotic vegetation at the site would be treated prior to the beginning of activities.
- In an effort to avoid introduction of exotic plant species, only certified weed-free materials would be used for erosion control. Any proposed materials would be reviewed on a case-by-case basis; allowable materials for erosion control may include: rice straw, straw or hay determined by NPS to be weed-free purchased from a certified source (e.g., Coors barley straw or Arizona winter wheat straw), cereal grain straw that has been fumigated to kill weed seed, and wood excelsior bales.
- The topsoil would be re-spread in as near to the original location as possible, and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area. Conserving topsoil would minimize vegetation impacts and potential compaction and erosion of bare soils. The use of conserved topsoil would help preserve micro-organisms and seeds of native plants.
- No vegetation shall be damaged or removed without prior approval via the project documents or by park vegetation management staff.
- Construction workers and supervisors would be provided with tree pruning guidelines to minimize damage to trees during project implementation.
- Work limits, travel paths, and staging areas would be designated and enforced to mitigate impacts to park vegetation. Fencing and barriers shall be used as necessary to restrict contractor operations to these areas.

## **WATER RESOURCES**

- A Stormwater Pollution Prevention Plan (SWPPP) would be developed as part of the construction plans to provide engineering methods and techniques specific to the finalized design drawings that would minimize erosion and degradation of soils in the project area during both construction and use of the area.
- Accepted erosion BMPs, such as sediment traps, erosion check screens/filters, jute mesh, and hydro mulch, would be used if necessary to prevent the loss of soil.

- Fueling and fuel storage areas would be bermed and lined to contain spills. Provisions would be made (clay or plastic liners) for the containment and disposal of oil-soaked or contaminated soils. Construction equipment would be regularly inspected and maintained to prevent any fluid leaks. Contractors would promptly clean up any leakage or accidental spills from construction equipment, such as hydraulic fluid, oil, fuel or antifreeze.
- When construction is ended prior to a winter season, all disturbed areas and soil stockpiles would be protected from snowmelt impacts.
- New disturbance would be as far from the river as feasible.
- Hazards associated with development in the defined regulatory floodplain would be considered in the design and construction specifications would encourage a work window during low flow.

## **WILDLIFE**

- Section 7 consultation with the USFWS Wyoming Office would be completed prior to implementation of actions proposed in this EA.
- Construction workers and supervisors would be informed about the potential for special status species within the work vicinity. Contract provisions would require the cessation of construction activities if a special status species was discovered in the project area, until park staff re-evaluates the project. This would allow modification of the contract for any protection measures determined necessary to protect the discovery.
- Under the Migratory Bird Treaty Act, no migratory bird, nest, or egg can be disturbed, removed or destroyed. To minimize the potential for “taking” a nest of any protected bird species, park resource managers would survey the site before ground breaking activities commence to mitigate any potential issues in advance of site construction. Additional surveys would be conducted if the project duration occurs during the bird breeding period (May 1-August 1).
- All contractors and employees would be trained and required to comply with the park’s bear management plan and food storage regulations during rehabilitation activities. All project staff, trainees, and other personnel would be briefed about food storage needs, and bear safety protocols. Food, fuel, and other attractants would be stored and handled to minimize potential conflicts (i.e., no food, garbage, drink, trash, or food and drink containers are to be placed outside vehicles, trailers, or bear-resistant containers except during times when they are being used).
- Should bald eagle (*Haliaeetus leucocephalus*) nesting occur within the project area, construction activity would cease within ½ mile of the nest and not continue until after August 15 (the end date of closures instated to prevent nest disturbance) unless the nest failed before that date. Monitoring of eagle populations to identify and protect nests would continue and be reassessed throughout the project duration to ensure protection to nesting eagles.
- If roosting bats are found in buildings, rehabilitation work on those structures would be delayed until after the roosting period.

## **PARK OPERATIONS/ VISITOR EXPERIENCE**

- Contractors would coordinate with park staff to reduce the potential for disruption of normal park activities. Construction workers and supervisors would be informed about the special sensitivity of park values, regulations, and appropriate housekeeping.

- To minimize the potential for impacts to concessioners and visitors, variations on construction timing would be considered. Operation of heavy construction equipment would generally occur between the hours of 7 AM and 7 PM to minimize the impacts of noise from construction activities to park visitors and the natural quiet.
- Information regarding implementation of this project and other foreseeable future projects would be shared with the public upon their entry into the park (and the Moose Campus) during construction periods. This may take the form of an informational brochure or flyer about the projects distributed at the gate, postings on the park's website, posters on bulletin boards, press releases and/ or other methods. The purpose of these efforts would be to minimize the potential for negative impacts to visitor experience at the Moose Headquarters Area during implementation of this project and other planned projects during the same construction season.
- Prior to construction, an informational meeting with concessioners, project managers, and business resources staff would take place to educate concessioners on any changes to traffic flow, and any other anticipated issues that may take place in the next few years during construction. All park personnel would be educated on the changes expected in the Moose Headquarters Area for the next few years. Traffic control and education would be implemented for crossing over the concessioner route into the wash bay building.
- A traffic control plan for use during construction as approved by the park would be developed and enforced to minimize disruption to visitors and park operations and to ensure safety of the public, park employees, and residents.

### **GENERAL CONSTRUCTION BEST MANAGEMENT PRACTICES**

The construction practices listed below are subject to changes and additions when BMPs are used during construction to mitigate impacts to resources.

- To minimize the amount of ground disturbance, staging and stockpiling areas would be located in previously disturbed sites, away from visitor use areas to the extent possible. All staging and stockpiling areas would be returned to pre-construction conditions following construction. Parking of construction vehicles would be limited to these staging areas, existing roads, and previously disturbed areas.
- Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities, including material staging and storage, beyond the construction zone as defined by the construction zone fencing.
- The storage, handling, and disposal of all hazardous material and waste would comply with applicable federal and state regulations. Provisions would be made for storage, containment, and disposal of hazardous materials used on site. To minimize possible petrochemical leaks from construction equipment, all equipment would be monitored frequently to identify and repair any leaks and would be staged in designated areas suitable to contain leaking materials. Trained personnel would clean up and dispose of any leakage or spill from construction equipment such as hydraulic fluid, oil, or fuel. Fueling and fuel storage areas would be permitted only at approved locations and comply with park re-fueling guidelines.
- Fueling and fuel storage areas would be bermed and lined to contain spills. Provisions would be made (clay or plastic liners) for the containment and disposal of oil-soaked or contaminated soils. Construction equipment would be regularly inspected and maintained

to prevent any fluid leaks. Contractors would promptly clean up any leakage or accidental spills from construction equipment, such as hydraulic fluid, oil, fuel or antifreeze.

- Dust generated by construction would be controlled by spraying water on the construction site, if necessary.
- To reduce noise and emissions, construction equipment would not be permitted to idle excessively. Contractors would be required to work with NPS to devise procedures to eliminate unnecessary idling.
- All construction equipment that has the potential to leave the road would be pressure washed before entering the park.

## Alternatives Considered and Dismissed

As stated in the *Scoping* section in Chapter 1, the original park proposal considered a number of additional objectives including: addressing the deficiency of year-round employee housing at Moose; providing for a dedicated space within the Craig Thomas Discovery and Visitor Center to house and display park museum collections; and improving outdated and insufficient water and wastewater systems for the Moose area. These elements were dropped from consideration in this EA for several reasons. Year-round housing is already addressed in the 1991 Teton Corridor Development Concept Plan; the museum collection space is still in the early stages of discussion regarding the most appropriate location, and the timeframe for development of any new facility is uncertain at this time; and the water and wastewater systems will be addressed under a separate NEPA process.

Throughout the alternative development process the park considered adding additional actions to the proposal, but these elements were ultimately dismissed from consideration because of the potential for adverse effects to the natural and cultural resources of the area. For example, the original concept for the Moose boat landing area discussed modifications to in-water boat landing facilities but because of resource concerns, in-water construction was avoided. The park also originally considered expanding the river concessioner parking area to the north to meet the need for additional parking. After much deliberation park management decided to avoid further expansion in that area in order to protect the relatively undisturbed and valuable riparian and wildlife habitat. A less comprehensive approach to stormwater management was also considered, but eventually dismissed.

In addition to these individual elements, two other concepts involving the Moose landing area and river concessioner operations were considered during the value analysis workshop. Both of these actions would have eliminated the continuous perimeter route for the river concessioner boat rigs, focusing all boat rig traffic on Moose Landing Road along the river. River concessioner traffic would enter from the south entrance and head north to the concessioner rigging zone and then continue to the river concessioner parking and staging area. A one-way loop in the river concessioner parking area would require concessioner traffic to exit on the same road and leave through the south entrance. No river concessioner traffic would be allowed to enter from the north side on the Headquarters Road.

In the first concept, the river concessioner boat rig parking area would have been replaced with a turn around, and boat rigs would have been required to park within a reconfigured former Visitor Center parking area. This would have increased traffic along the river because of the extra distance to travel from the new parking area location to the boat pick up. This parking area is currently used at times by recreational vehicles and school bus operations, as overflow for concessioner client parking, and for parking public vehicles and their boat trailers. There would have been the potential for conflicts under this concept by requiring boat rigs to park in the former Visitor Center parking

area. Ultimately, this concept was eliminated due to difficulty in controlling access to this parking location and the potential for visitor confusion in combination with the loss of availability of this space for other uses (such as pathway users).

The second concept that was considered but dismissed differed in that the concessioner parking area would have been maintained at its current location, but a turn around would have been added. Both of these concepts were dismissed because they would have eliminated the continuous perimeter route for the concessioner boats and consequently the two access points to the concessioner parking area. In addition, the amount of traffic and congestion along the Moose Landing Road may have increased, causing undesirable impacts and safety concerns.

## Comparison of the Alternatives

Table 1 summarizes the alternatives and compares the ability of these alternatives to meet the project objectives (as identified in Chapter 1, *Purpose and Need*). As shown in the following table, Alternative B meets each of the objectives identified for this project, while the No Action alternative does not address all of the objectives.

**Table 1. Alternative summary and comparison of alternatives by project objectives**

	<b>Alternative A – No Action Alternative</b>	<b>Alternative B – Moose Headquarters Site Work</b>
<b>Summary</b>	Site work at the Moose Headquarters Area would not occur under the No Action alternative. Existing resource conditions would not be addressed. No action would be taken to address mixed uses, traffic congestion, and stormwater/ resource protection issues.	Alternative B would segregate operations/ administration and public/ visitor use areas; segregate vehicles and pedestrians; redesign employee and visitor parking and traffic flow/ circulation; enhance landscaping and visual screening of the administrative area; improve stormwater management; and enhance resource protection. This alternative would be developed as a plan to guide management and development at the Moose Headquarters Area over the next 15-20 years.
<b>Objective</b>	<b>Meets Project Objective?</b>	<b>Meets Project Objective?</b>
Segregate incompatible uses throughout the site.	No. The boat ramp and parking areas would remain in their current condition and no action would be taken to address vehicle and pedestrian traffic along the Moose Landing Road or within the administrative area. There would continue to be issues associated with poor traffic flow, mixed visitor/ employee uses, and inadequate parking.	Yes. Improvements would be made to the boat ramp area and to the administrative and parking areas that would lessen the issues associated with poor traffic flow, pedestrian safety, and mixed uses. The potential for conflict between concessioner and administrative uses on the Headquarters Road requires mitigation. The addition of signage and speed restrictions in combination with improved parking and access and addition of the new pedestrian trail in this area would help mitigate adverse effects.

	<b>Alternative A – No Action Alternative</b>	<b>Alternative B – Moose Headquarters Site Work</b>
Provide for safer and more efficient pedestrian and vehicle traffic within the Moose administrative area for employees and residents.	No. Continuing with the existing conditions would not address current safety issues in the administrative area. Issues with poor traffic flow, inadequate parking, mixed uses, and poor stormwater drainage, which leads to unsafe conditions when pooled water freezes in parking areas, would continue.	Yes. Reconfiguration of the parking areas and changes in access would segregate administrative functions and traffic in the administration area of the Moose Headquarters Area. Employee parking areas would be reorganized and segregated from the maintenance and emergency operations. Removal of temporary modular buildings would alleviate issues associated with these buildings. A multi-use trail would be created to link the Post Office to Headquarters Road that would provide safe access for residents from the housing area to the Post Office and other areas. A comprehensive signage program would be installed to communicate traffic patterns and segregate use areas for all user groups. Raised crosswalks and intersections and speed dips may be installed to control vehicle speed.
Provide for safer and more efficient pedestrian and vehicle traffic within the Moose landing area for visitors and concessioners.	No. Under this alternative no changes would be made to provide for safer or more efficient conditions for visitors or concessioners.	Yes. A new, designated parking area for concessioner clients complete with an associated picnic/ waiting area and restroom facilities, would be added to improve separation of visitor vehicles and pedestrians from concessioner vehicles. A pedestrian interpretive trail would be created along the boating area that would provide pedestrians a designated walkway to return to their vehicles after leaving the boat landing area as well as a connection to other visitor areas. Implementation of signage and speed control measures would help to mitigate potential conflicts associated with mixed concessioner/ visitor and administrative traffic but not eliminate these effects.
Improve the interpretive experience for visitors in the Moose area.	No. Because no changes would occur under this alternative there would be no improvements to the interpretive experience for visitors.	Yes. A pedestrian interpretive trail would be added along the boating area to provide connectivity between Menor's Ferry, the multi-use/ bicycle pathway, and the Craig Thomas Discovery and Visitor Center.
Resolve stormwater	No. This alternative does not meet the objective for	Yes. Recontouring, restoration of some disturbed areas, reducing the built

	<b>Alternative A – No Action Alternative</b>	<b>Alternative B – Moose Headquarters Site Work</b>
management deficiencies to protect vital water resources.	protecting water resources because no rehabilitation activities would occur. The amount of impervious surface on the site would not be reduced and stormwater management would not be improved.	environment, and constructing sediment and infiltration basins would all help to improve stormwater drainage and water quality.
Reduce the built environment in the Moose Headquarters Area.	No. There would be no change in the number of buildings or facilities within the project area.	Yes. Removal of five temporary buildings would reduce the built environment in the project area.
Produce no unacceptable impacts or impairment.	Yes. Unacceptable impacts or impairment of park resources would not result from this alternative.	Yes. Unacceptable impacts or impairment of park resources would not result from this alternative.

Table 2 summarizes the anticipated environmental impacts for the No Action alternative and Alternative B. Only those impact topics that have been carried forward for further analysis are included in this table. The *Environmental Consequences* chapter provides a more detailed explanation of these impacts.

**Table 2. Comparison of Impacts by Alternatives**

<b>Impact Topic</b>	<b>Alternative A – No Action Alternative</b>	<b>Alternative B – Moose Headquarters Site Work</b>
<b>Soils</b>	Effects would be indirect, local, minor, long-term, and adverse. Cumulative impacts would be long-term, local, adverse, and negligible to minor in intensity; the relative contribution of Alternative A to cumulative impacts would be negligible. Effects to soils from this alternative would not be unacceptable; there would be no impairment of soils.	Effects would be short- and long-term, minor to moderate, localized, and adverse and long-term, minor, localized, and beneficial. Cumulative impacts would be minor to moderate, adverse, long-term, and localized; the relative contribution of Alternative B to cumulative impacts would be negligible. Effects to soils from this alternative would not be unacceptable; there would be no impairment of soils.
<b>Vegetation</b>	Effects would be indirect, local, minor, long-term, and adverse. Cumulative impacts would be long-term, local, adverse, and negligible to minor in intensity; the relative contribution of Alternative A to cumulative impacts to vegetation would be negligible. Effects to vegetation from this alternative would not be unacceptable; there	Effects would be minor, short- and long-term, local, and adverse. Cumulative impacts would be local, negligible to minor, adverse and long-term; Alternative B would contribute a negligible amount to cumulative impacts. Effects to vegetation from this alternative would not be unacceptable; there would be no impairment of vegetation resources.

Impact Topic	Alternative A – No Action Alternative	Alternative B – Moose Headquarters Site Work
	would be no impairment of vegetation resources.	
<b>Water Resources</b>	Effects to surface water would be indirect, local, moderate, long-term, and adverse. Cumulative impacts would be localized, long-term, negligible to minor, and adverse and localized, long-term, negligible, and beneficial; the relative contribution of Alternative A to cumulative impacts to would be negligible. Effects to floodplains would be indirect, local, minor, long-term, and adverse. Cumulative impacts would be minor, local, long-term, and adverse; the incremental contribution of Alternative A to these cumulative impacts would be negligible. Effects to water resources from this alternative would not be unacceptable; there would be no impairment of water resources.	Effects to surface water would be negligible to minor, localized, short-term, and adverse and minor to moderate, localized, long-term, and beneficial. Cumulative impacts would be localized, long-term, negligible to minor, and adverse and localized, long-term, negligible, and beneficial; the relative contribution of Alternative B to cumulative impacts would be negligible. Effects to floodplains would be minor, local, short-term, adverse and minor, local, long-term, and beneficial. Cumulative impacts to floodplains would be long-term, negligible to minor, local, and adverse and beneficial; the incremental contribution of Alternative B to these cumulative impacts would be negligible to minor. Effects to water resources from this alternative would not be unacceptable; there would be no impairment of water resources.
<b>Wildlife, including Threatened, Endangered, and Special Concern Species</b>	Direct, indirect, and cumulative impacts to the wildlife resource would be adverse, negligible to minor and long-term as a result of implementing the No Action alternative; the contribution to cumulative effects from this alternative would be negligible. It was also determined that Alternative A “may affect, but is not likely to adversely affect” the gray wolf, yellow-billed cuckoo, and grizzly bear. Effects to wildlife from this alternative would not be unacceptable; there would be no impairment of wildlife.	Direct and indirect effects to wildlife resources would be long-term, adverse, and negligible to minor as a result of implementing Alternative B. Cumulative impacts to wildlife would be adverse, negligible to minor, and long-term; the incremental contribution to cumulative impacts from activities associated with Alternative B is expected to be negligible. It was determined that Alternative B <b>“may affect, but is not likely to adversely affect”</b> the gray wolf, yellow-billed cuckoo, and grizzly bear. Effects to wildlife from this alternative would not be unacceptable; there would be no impairment of wildlife.
<b>Visitor Use and Experience</b>	Effects would be moderate, local, long-term, and adverse. Cumulative impacts would be short-term, local, negligible to minor, and adverse and moderate, local, long-term, and	Effects would be short-term, local, minor, and adverse and long-term, local, moderate, and beneficial. Cumulative impacts on visitor use and experience would be localized, short-term, minor to

Impact Topic	Alternative A – No Action Alternative	Alternative B – Moose Headquarters Site Work
	beneficial; the relative contribution of Alternative A on visitor use and experience would be adverse, minor to moderate, local, and long-term. There would be no unacceptable effects to visitor use and experience from this alternative.	moderate, and adverse and localized, long-term, moderate and beneficial; the relative contribution of Alternative B would be moderate. There would be no unacceptable effects to visitor use and experience from this alternative.
<b>Park Operations</b>	Effects would be local, adverse, minor to moderate, and long-term. Cumulative effects would be adverse, local, minor to moderate, and long-term and local, moderate, long-term, and beneficial. There would be no unacceptable effects to park operations from this alternative.	Effects would be local, moderate, adverse and short-term and local, moderate, beneficial, and long-term. Cumulative effects to park operations would be local, moderate, short-term and adverse and local, moderate, long-term, and beneficial. There would be no unacceptable effects to park operations from this alternative.

## Identification of the Environmentally Preferred Alternative

The CEQ provides direction that the environmentally preferred alternative is "...the alternative that will promote the national environmental policy as expressed in the National Environmental Policy Act's §101." The environmentally preferred alternative is determined by applying the criteria suggested in §101 of NEPA, which states that "...it is the continuing responsibility of the Federal Government to...

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
- Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
- Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

Implementation of the No Action alternative would fail to move the NPS toward achievement of all six of the goals set forth in §101 of NEPA. Failure to address mixed use, traffic, and stormwater/resource protection issues could result in adverse effects to health, safety, visitor experience, and the natural environment. As such, trustee obligations for future generations would not be met (Goal 1), nor would the assurance of safe, healthful, productive, and aesthetically and culturally pleasing surroundings (Goal 2). The No Action alternative would not attain the widest range of beneficial uses of the environment because uses would not be segregated to ensure the maximum benefit in each area of the Moose Headquarters Area (Goal 3). In terms of Goal 4, the uses in the

Moose Headquarters Area provide a diversity of individual choices but they would not be high-quality choices due to the safety and resource protection issues already described. The No Action alternative would also fall short of achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities because of the existence of mixed uses and congestion, stormwater issues, and resource deterioration (Goal 5). Finally, because rehabilitation measures would not be implemented, the No Action alternative would not meet the goal of enhancing the quality of renewable resources and recycling depletable resources to the maximum extent practicable (Goal 6).

Alternative B meets the six goals by reconfiguring the Moose Headquarters Area parking and vehicular traffic flow, including concessioner/ passenger parking and staging areas, to mitigate existing safety hazards and provide protection for hydrologic, soil, and vegetative resources and an improved visitor experience in a manner that better accommodates future increases in public use. The comprehensive rehabilitation of the site would provide safer landing conditions for motor vehicles and boat trailer traffic; eliminate current conflicts between administrative, commercial and public uses in the Moose Headquarters Area; and rehabilitate stormwater drainage to reduce impacts to the Snake River.

Alternative B would meet trustee obligations for future generations (Goal 1) by providing protection for hydrologic, soil, and vegetative resources at the site. The comprehensive rehabilitation of the site would implement stormwater drainage improvements in the Moose Headquarters Area that would reduce the potential for impacts to Snake River water quality, riparian vegetation, and the river bank itself. Removal of five functionally and energy inefficient buildings and restoration to natural habitat of previously disturbed areas would improve water quality and protect the resources at the site for the enjoyment of future generations.

Alternative B would also meet Goal 2 of assuring safe, healthful, productive, and aesthetically and culturally pleasing surroundings and Goal 3 of attaining the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences by providing safe landing conditions through more effective control and separation of pedestrians, vehicles, and boat landing operations. Pedestrian control would be accomplished by constructing a new, designated parking area for concessioner-guided river raft trip customers, with an associated picnic/ waiting area and restroom facilities. This would preclude visitors from lingering in the asphalt areas currently used for an unsafe and inefficient mix of parking, boat rigging, customer pickup, and through traffic. Additionally, the new interpretive trail would provide a safe route for visitors traversing the riverside area that is outside of traffic lanes and with designated crossing points. Vehicular traffic flow would be improved by installing raised concrete intersections, crosswalks, and/ or speed dips to control speed and implementing an extensive signage program to reduce confusion for first time visitors.

Alternative B would also achieve Goals 4 and 5, as the rehabilitation of the Moose Headquarters Area would reduce current conflicts between administrative, commercial and public uses in the Moose Headquarters Area and would better accommodate future increases in public use. The current conflicts between administrative, commercial, and public uses in the Moose Headquarters Area would be minimized by controlling pedestrian traffic patterns, separating visitor traffic patterns from maintenance and heavy equipment operations, and implementing a comprehensive signage program throughout the Moose Headquarters Area. Implementing the proposed changes would improve visitor experience for the approximately 65,000 park visitors that are guided on Snake River float and fishing trips annually along with the approximately 20,000 self-guided recreational users, as well as employees and residents accessing the area.

Alternative B would meet Goal 6 by improving stormwater treatment, which has the potential to improve natural resource protection. Providing positive drainage, reconfiguring drainage patterns,

treating surface water runoff, and reclaiming a portion of the pervious surface with native plant species would all reduce impacts to the Snake River water quality and associated resources.

Alternative B is the environmentally preferred alternative because it best addresses these six criteria. Alternative B would provide a working environment for park employees that meets health and safety recommendations, while minimizing environmental impacts to the extent possible. Improvements made to boat ramp access, vehicle and pedestrian flow, and parking areas would create a safer, healthful, and more productive environment at the Moose Headquarters Area. After careful review of potential resource and visitor impacts, and development of proposed mitigation for impacts to the natural and human environment, the environmentally preferred alternative is Alternative B. Because it meets the purpose and need for the project, the project objectives, and is the environmentally preferred alternative, Alternative B is also recommended as the NPS Preferred alternative. For the remainder of the document, Alternative B will be referred to as the NPS Preferred alternative.

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## CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

CEQ requires that NEPA documents "succinctly describe the environment of the area to be affected or created by the alternatives under consideration" (40 CFR 1502.15). Accordingly, this chapter describes the existing conditions of the biological, physical, and social resources that would be affected by the alternatives introduced in Chapter 2. The description is intended to present the information necessary to provide a foundation for comparison of the effects of the alternatives. In addition to describing the affected environment, this chapter also analyzes the potential environmental consequences that would occur as a result of implementing the proposed project. The possible impacts of each alternative on the natural and social environments are described, in accordance with the topics identified in the *Impact Topics* section in Chapter 1.

### Methodology

The impact analysis and conclusions contained in this chapter were based on park staff knowledge of the resources and site; review of existing literature and park studies; information provided by resource specialists within the NPS and other agencies; and professional judgment. In this section, the NPS takes a "hard look" at the potential direct, indirect, and cumulative effects, or impacts, as well as impairment for each topic carried forward. Potential impacts are described in terms of type, context, duration, and intensity. Because definitions of intensity can vary for each impact topic, intensity definitions are provided separately for each impact topic analyzed in this EA. General definitions are defined as follows, while more specific impact thresholds are given at the beginning of each resource section.

- **Type** describes the classification of the impact as either direct or indirect, beneficial or adverse:
  - *Direct*: An effect that is caused by an action and occurs in the same time and place.
  - *Indirect*: An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.
  - *Beneficial*: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
  - *Adverse*: A change that moves the resource away from a desired condition or detracts from its appearance or condition.
- **Context** describes the area or location in which the impact would occur. The context or extent of the impact is described as localized or widespread.
- **Duration** describes the length of time an effect would occur. The duration of impacts is described as short-term or long-term:
  - *Short-term* impacts are temporary and effects are typically confined to the construction period, with the resources resuming their pre-construction conditions following construction.
  - *Long-term* impacts are more permanent and would last beyond the construction period, and the resources may not resume their pre-construction conditions for a longer period of time following construction.
- **Intensity** describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. The NPS equates "major" effects as "significant" effects under the terms of NEPA. The identification of

“major” impacts would trigger the need for an EIS. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed in this EA.

## Cumulative Impact Scenario

As described in Chapter 1, CEQ regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7).

Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time.

Cumulative impacts are analyzed by identifying other ongoing or foreseeable future actions within the vicinity of the impact area that have the potential to contribute to the effects to a resource. Cumulative impacts were determined by combining the impacts of the alternatives analyzed in this EA with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects that are near the project area. The geographical boundary for a cumulative impact analysis varies depending on the resource topic. For most resources, the area of cumulative impact was the Moose Headquarters Area and surrounding area. The area of analysis for water resources was the Snake River watershed and the area of analysis for park operations and visitor use and experience was Grand Teton National Park. Given the geographical and temporal scope of this analysis, the following past, present, and reasonably foreseeable future development activities were identified for the purpose of making cumulative effects determinations. Descriptions of these actions are presented in Chapter 1.

- **Moose Entrance Station Replacement**
- **Craig Thomas Discovery and Visitor Center Construction**
- **Multi-Use Pathway Construction**
- **Moose Housing Project**
- **Wastewater Treatment Facilities**
- **Historic Structures Management Plan**
- **Moose Headquarters Rehabilitation Plan**

## Soils

### Affected Environment

Soils within the park were mapped between 1970 and 1974 and the *Soil Survey of Teton County, Wyoming, Grand Teton National Park Area* was published in 1982 (USDA NRCS 1982). Soil names and descriptions are derived from this publication. The flat meadows of the valley floor that comprise the lower elevations within Grand Teton National Park are generally comprised of soils developed from the porous quartzite sand and gravel deposited by glacial melt water. The glaciers underwent several cycles of advance and retreat in the park area, directly or indirectly modifying the valley floor terrain and soils, gouging basins, and depositing undulating moraines during their recession. As the glaciers retreated, melt-water outwash streams further modified the landscape by transporting glacial debris and re-depositing alluvial material. Small basins, or kettles, are left in the moraine deposits from glacial outwash material. These glacial outwash soils are generally very deep and well drained and have less water retention capability than moraine-derived soils. These soils are

generally nutrient-poor and support a sagebrush/ grassland community. The Snake River floodplain consists of more recent alluvial soils, generally from the Tetonville series, which developed when modern streams reworked glacial material. Braided stream channels supporting riparian vegetation (i.e., cottonwood, willows, and sedges) characterize these areas.

There is one main soil complex within the Moose Headquarters Area that is derived from the Tetonville and Wilsonville series. The Tetonville-Wilsonville fine sandy loams are typically found in mountain valleys at elevations of 6000 to 7000 feet. The typical profile of the Tetonville series is 0 to 8 inches: fine sandy loam; 8 to 17 inches: gravelly fine sandy loam; 17 to 60 inches: very gravelly loamy sand. The typical profile of the Wilsonville series is 0 to 7 inches: fine sandy loam; 7 to 29 inches: fine sandy loam; 29 to 54 inches: loamy coarse sand; 54 to 60 inches: very gravelly loamy coarse sand.

Both of these soils are found on nearly level to gently sloping stream bottom lands and terraces with 0 to 3 percent slopes, although the Tetonville series is more likely to be associated with floodplains than is the Wilsonville series. The parent material is alluvium derived from igneous, metamorphic and sedimentary rock. These series consist of somewhat poorly drained soils with slow runoff and moderately rapid permeability. The erosion hazard for these soils is minimal and they are both well suited for mechanical site preparation.

## Environmental Consequences

### Methodology

The baseline information used to assess impacts to soil resources includes park staff knowledge of the resources and site; review of existing literature and park studies; information provided by professionals within the NPS; and professional judgment.

### Impact Threshold Definitions

Impact Category	Definition
Negligible	A change to soil that is not measurable or perceptible.
Minor	A measurable or perceptible, small localized change to the soil resource. The change is of little consequence.
Moderate	A change to soil resources that is measurable and of consequence but is localized.
Major	A measurable change to the soil resource that is large and/ or widespread and could have permanent consequences for the resource.

### Effects of Alternative A: No Action on Soils

*Direct/Indirect Effects:* Soils within the Moose Headquarters Area have been previously impacted by the original construction, and continue to be disturbed through visitor and operations use of the area. These disturbances have been local, adverse, minor and long-term. Because Alternative A proposes no new activity, no additional direct effects to soils are expected. However, under Alternative A, there would be no site rehabilitation and no changes would be made to the stormwater management system. Consequently, this alternative would not provide any long-term, beneficial effects from site rehabilitation, a reduction in the built environment, and stormwater system improvements. Indirect, local, minor, long-term adverse impacts to soils related to poor surface water drainage and river bank erosion would continue under this alternative.

*Cumulative Effects:* Continued use of the Moose Headquarters Area under Alternative A, combined with other activities in the area including construction of the multi-use pathway along the Teton

Park Road, installation of the temporary swing space modular building, construction of the auditorium at the Craig Thomas Discovery and Visitor Center, construction of a new water treatment plant or connection to the Jackson Wastewater Treatment Plant, and the Moose housing project would result in overall adverse negligible to minor, local, long-term cumulative impacts to soils. The incremental contribution of Alternative A to these cumulative soil impacts would be negligible.

*Conclusion:* There would be no direct impacts to soil resources under Alternative A. Indirect, local, minor, long-term adverse impacts to soils would continue related to poor surface water drainage. The relative contribution of Alternative A to cumulative impacts to soils would be negligible; overall cumulative impacts to soils would be local, long-term, adverse, and negligible to minor in intensity. The No Action alternative would not result in any unacceptable impacts on soils (NPS 2006). The effects on soils under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be only minor in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of soils under this alternative (by definition, impairment is worse than unacceptable impacts).

### **Effects of Alternative B: NPS Preferred Alternative on Soils**

*Direct/Indirect Effects:* Implementing Alternative B would have both beneficial and adverse effects on soil resources. Leveling, grading, resurfacing, and landscaping activities associated with the site work would all result in soil disturbance. The majority of the disturbance associated with Alternative B would be within the existing disturbance footprint. During site work, a total of approximately 41,855 square feet (0.96 acre) of previously disturbed soil would be impacted by removal, grading, and recontouring. Of this total amount of disturbance 9,110 square feet (0.21 acre) would be for new pedestrian trails. Some of the currently disturbed areas would be rehabilitated (approximately 2,500 square feet [0.06 acre]) and the area landscaped as part of the revegetation plan. The removal of this hardened surface would permit rain and snowmelt waters to infiltrate the soil. In the long term, soils lost to productivity would be those actually occupied by new parking or road surfaces. These amounts would be negligible. Mitigation measures such as natural vegetation replacement and noxious weed treatments would reduce impacts on disturbed soils not occupied by new surfaces to a negligible level over the long-term. There would be no change in the area of lost soil productivity.

Adding a new interpretive trail that traverses the riverside area would create some new disturbance depending on the final alignment (approximately 5,500 square feet [0.13 acre]), but possible closure and restoration of existing user-created trails could help to offset this disturbance in the long-term. Signage implemented to notify users to stay on the trail would help reduce the potential for new user-created trails in the future. This trail would be extended outside the current disturbance footprint to replace an existing user-created trail to Menor's Ferry. The new trail would be 3 feet wide and 670 feet long resulting in permanent disturbance of 2,010 square feet (0.05 acre). The new trail would be covered with pervious surface materials (3/4" crushed gravel with fines) and would be ADA compliant. This length would connect the new trail to an existing asphalt trail that leads from the Maud Noble Cabin to Menor's Ferry. In the future the existing asphalt trail may be removed and covered with similar pervious materials to match the surface of the new trail; this would create an additional 3,525 square feet (0.08 acre) of disturbance (3 feet wide by 1,175 feet long).

The new multi-use residential trail that is planned to link the Moose employee housing area to the Post Office, the main park multi-use pathway, and Headquarters Road also has the potential to disturb soils depending on the final alignment and could disturb up to 1,600 square feet (0.04 acre). Other small areas of soil disturbance would occur where a new vault toilet would be added

near the north boat landing area and where an existing restroom would be relocated near the concessioner client parking area. Increasing the size of the bus parking area by two spaces would disturb an area of approximately 320 square feet (0.01 acre).

Short-term construction related disturbance can be expected to result in soil loss through erosion and soil compaction for a minimum duration of 3 years. The effect of this disturbance would be mitigated to some degree by implementation of BMPs and actions taken to improve site conditions. Implementation of BMPs during and following site work including standard erosion control measures (e.g., silt fences) would limit impacts to soils resulting from construction activities and vehicular traffic. A SWPPP would be developed that provides engineering methods and techniques specific to the finalized design drawings in order to minimize erosion and degradation of soils in the project area both during construction and operation. Reseeding new disturbances should reduce the potential for future soil erosion. Through implementation of structural engineering designs incorporated into the project and appropriate construction techniques and BMPs, impacts to the soils resource would be minimized. Given that the proposed activities would occur in a previously disturbed location, the overall soil disturbance associated with this alternative would have localized, minor to moderate, short- and long-term, adverse effects.

In the long-term, the nearly complete replacement of existing asphalt and reconfiguration of drainage patterns along with the other revegetation and stormwater management improvements would reduce erosion and help protect existing soils within the project area. New stormwater management, a reduction in the built environment, and reclamation of previously disturbed ground would have a localized, beneficial, minor, long-term effect on soil resources. However, these newly reclaimed areas would not regain function and characteristics similar to nearby undisturbed soil for many decades. Overall, direct and indirect impacts of Alternative B on soils would be adverse, localized, minor to moderate, and short- and long-term and beneficial localized, minor, and long-term.

*Cumulative Effects:* Current and future ground-disturbing activities within the area of analysis include operations and visitor use of the Moose Headquarters Area, ground disturbing activities associated with Alternative B, installation of a temporary swing space modular building, construction of a multi-use pathway along the Teton Park Road, construction of the auditorium at the Craig Thomas Discovery and Visitor Center, the Moose housing project, and construction of a new wastewater treatment plant or potential connection to the Jackson Wastewater Treatment Plant. All of these activities would result in adverse, long-term, minor to moderate, localized impacts through soil erosion and compaction. Rehabilitating the site and improving stormwater drainage under Alternative B would have a localized, beneficial, minor, and long-term effect on soils within the project area. The incremental contribution of Alternative B to these cumulative soil impacts would be negligible.

*Conclusion:* Resultant direct and indirect impacts of Alternative B on soils would be adverse, localized, minor to moderate, and short- and long-term and beneficial localized, minor, and long-term. Cumulative impacts to soils would be adverse, long-term, minor to moderate, and localized; the relative contribution of Alternative B to cumulative impacts to soils would be negligible. Alternative B would not result in any unacceptable impacts on soils (NPS 2006). The effects on soils under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be only minor to moderate in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of soils under this alternative (by definition, impairment is worse than unacceptable impacts).

## Vegetation

### Affected Environment

The Moose Headquarters Area encompasses approximately 10 acres on a flat river terrace adjacent to the Snake River. The majority of the area has previously been disturbed and consists of asphalt or gravel covered roadways and parking areas, buildings and other structures, and some landscaped areas. As a result of these past actions, much of the natural vegetation has been removed and what remains exists as patches or small islands between the developed areas of the Moose Headquarters Area and as a strip along the river (Figure 10).



**Figure 10. Patches of vegetation along roads in the Moose Headquarters Area. The left fork leads to the residential area and the right fork connects to the boat landing area.**

The vegetation types found in the project area are summarized in Table 3. Vegetation is relatively contiguous along the Snake River and occurs in patches across the remainder of the site. The native plant community includes a variety of perennial shrubs, forbs, grasses and trees (Figure 11). Common grass species include slender wheatgrass (*Elymus trachycaulus*), bluebunch wheatgrass (*Pseudoroegneria spicata*), mountain brome (*Bromus carinatus*), prairie junegrass (*Koeleria macrantha*), needle and thread grass (*Hesperostipa comata*), and Idaho fescue (*Festuca idahoensis*). Shrub species include Wood's rose (*Rosa woodsii*), serviceberry (*Amelanchier alnifolia*), russet buffaloberry (*Shepherdia canadensis*), mountain snowberry (*Symphoricarpos oreophilus*) and mountain big sagebrush (*Artemisia tridentata*) on the upland sites, with several willow species present in the riparian zone adjacent to the Snake River. A number of forbs are present including yarrow (*Achillea millefolium*), scarlet gilia (*Ipomopsis aggregata*), woolly sunflower (*Eriophyllum lanatum*) and sulfur buckwheat (*Eriogonum umbellatum*). Near the Snake River the overstory is dominated by cottonwood (*Populus angustifolia* and *Populus balsamifera*) and Colorado blue spruce (*Picea pungens*) while other areas of the site contain quaking aspen (*Populus tremuloides*) and lodgepole pine (*Pinus contorta*) as well. The administrative area has been surveyed for sensitive plants, including Ute lady's tresses (*Spiranthes diluvialis*). There is no evidence of the presence of any sensitive plant species and no state-listed species of management concern have been found on the site.

**Table 3. Description of vegetation types found in the project area (Grand Teton National Park Vegetation Mapping Project Final Report, NPS 2005A).**

Vegetation Type	Description
Aspen	Mature trees and saplings with a diverse understory of shrubs, forbs and grasses.
Riparian Mixed Conifer-Poplar Forest	Pole-sized and mature trees dominated by narrowleaf cottonwood and blue spruce; understory of shrubs, grasses and forbs.
Sagebrush / Grassland	Primarily big sagebrush interspersed with rabbit brush, snowberry and antelope bitterbrush; diverse understory of grasses and forbs.



**Figure 11. Existing vegetation in the location of a user-created trail to Menor's Ferry (left) and within an administrative area (right)**

Non-native species, also referred to as exotic or invasive weeds, are not a natural component of the ecosystem. These species are generally adept at colonizing disturbed sites, often out-competing native vegetation and, in some cases, spreading into undisturbed areas. Ground disturbing activities and construction projects have been demonstrated to increase weedy species 1-2 years post construction, frequently introducing species not previously recorded in the park (McCloskey, pers. comm.).

Executive Order 13122, Invasive Species, states that federal agencies are to prevent the introduction of invasive species, provide for their control, provide for restoration of native species and habitat conditions in ecosystems that have been invaded, and minimize the economic, ecological, and human health impacts that invasive species cause. Within the park noxious weeds primarily occur along roadsides and trails and in developed and other disturbed areas. Roadsides are uniquely vulnerable to invasions by non-native species because of continual disturbance resulting from maintenance activities, vehicular traffic, and runoff, as well as the roadway corridor acting as a vector for the spread of invasive species.

Park personnel inventory, monitor, collect test plot data, and control invasive plants each summer. Invasive plants in the project area include six state-listed noxious weeds: spotted knapweed (*Centaurea maculosa*), houndstongue (*Cynoglossum officinale*), yellow toadflax (*Linaria vulgaris*), Dalmatian toadflax (*Linaria dalmatica*), Canada thistle (*Cirsium arvense*) and musk thistle (*Carduus nutans*). Other exotic species present include cheatgrass (*Bromus tectorum*), smooth brome (*Bromus inermis*), orchardgrass (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratensis*), red-seeded dandelion (*Taraxacum laevigatum*), and common dandelion (*Taraxacum officinale*). Park personnel

control or reduce the spread of invasive species using herbicides and mechanical treatments. Where noxious weeds have become established, eradication and revegetation with native species is the goal.

## Environmental Consequences

### Methodology

Vegetation surveys of the area were conducted in 2001 for exotic species, in 2004 as part of a vegetation mapping project, and again in 2009 to survey for rare and sensitive species as well as invasive plants in the project area. No rare or sensitive plant species were located within the surveyed area. Physical disturbances associated with the alternatives are compared to the existing vegetation as mapped on the park's vegetation map, and as reflected in the vegetation surveys, to determine the impact of the proposed alternatives on park vegetation resources.

### Impact Threshold Definitions

Impact Category	Definition
Negligible	Impact is barely measurable and has no perceptible consequences, either adverse or beneficial to the park's vegetation resources.
Minor	A measureable or perceptible localized change to the vegetation resources. The change is to a small portion of the park-wide vegetation resources and does not include sensitive, rare, threatened, or endangered plant species or communities.
Moderate	A measureable change to local vegetation resources which could have permanent consequences for local vegetative resources, or small portions of sensitive or rare species populations.
Major	A measurable change to the vegetation resources which is large and/ or widespread. This measurable change could have permanent consequences for vegetation resources, species or communities, through a substantial portion of their range.

### Effects of Alternative A: No Action on Vegetation

*Direct/Indirect Effects:* Under the No Action alternative no improvements within the Moose Headquarters Area would occur and therefore no direct impacts to vegetation would occur. Indirect effects would persist as vegetation resources would continue to be impacted by visitor use, including user-created trails resulting in trampling of vegetation, human-induced spread of invasive plant species, and ground disturbance, which enables the establishment of exotic invasive plants. The continued use of the Moose Headquarters Area without site improvements would result in the continuation of these localized, adverse, minor, and long-term impacts.

*Cumulative Effects:* Continued use of the Moose Headquarters Area under Alternative A, combined with other activities in the area (installation of a temporary swing space modular building, construction of the multi-use pathway along the Teton Park Road, construction of the auditorium at the Craig Thomas Discovery and Visitor Center, the addition of a new wastewater plant or connection to the Jackson Wastewater Treatment Plant, and the Moose housing project) would allow disturbances to persist which would result in overall adverse, negligible to minor, localized, long-term cumulative impacts to vegetation. The incremental contribution of Alternative A to these cumulative vegetation impacts would be negligible.

*Conclusion:* There would be no direct impacts to vegetation resources under Alternative A. Indirect minor, localized, long-term, adverse impacts to vegetation would persist from use of user-created trails and erosion related to stormwater runoff. The relative contribution of Alternative A to cumulative impacts to vegetation would be negligible; overall cumulative impacts to vegetation would be long-term, localized, adverse, and negligible to minor in intensity. Alternative A would not result in any unacceptable impacts on vegetation (NPS 2006). The effects on vegetation under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be minor or less in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of vegetation under this alternative (by definition, impairment is worse than unacceptable impacts).

### **Effects of Alternative B: NPS Preferred Alternative on Vegetation**

*Direct/Indirect Effects:* The majority of the disturbance proposed under Alternative B would be within the existing disturbance footprint of the Moose Headquarters. As a result, the amount of vegetation disturbance due to site work activities would be minor.

Construction of the new trails proposed under this alternative has the potential to disturb existing vegetation within the Moose Headquarters Area. Adding a new interpretive trail that traverses the riverside area would create some new disturbance depending on the final alignment (approximately 5,500 square feet [0.13 acre]), but possible closure and restoration of some existing user-created trails could help to mitigate any new disturbance that may occur. It is estimated that up to five cottonwood trees greater than 10 inch diameter at breast height (DBH) and three spruce trees between 5-10 inch DBH would be removed within the alignment of this trail. This trail would be extended outside the current disturbance footprint to replace an existing user-created trail to Menor's Ferry. This trail would be 3 feet wide and 670 feet long resulting in permanent disturbance of 2,010 square feet (0.05 acre) to connect the new trail to an existing asphalt trail that leads from the Maud Noble Cabin to Menor's Ferry. In the future the existing asphalt trail may be removed and covered with similar pervious materials to match the surface of the new trail; this would create an additional 3,525 square feet (0.08 acre) of trail in a previously disturbed area (3 feet wide by 1,175 feet long).

Signage implemented to notify users to stay on the trail would help reduce the potential for new user-created trails in the future. The new multi-use residential trail that is planned to link the Moose employee housing area to the Post Office, the main park multi-use pathway, and Headquarters Road, also has the potential to disturb vegetation (approximately 1,600 square feet [0.04 acre]). Depending on the final alignment of this trail some understory vegetation could be removed (see Figure 10). Once the trail is complete, continued disturbance from snow removal along the trail and adjacent road could adversely affect vegetation by breaking off lower branches of trees and stunting growth of smaller trees buried under the thrown snow. Other small areas of vegetation disturbance would occur where a new restroom facility would be added near the north boat landing area and where an existing restroom would be relocated near the concessioner client parking area. Increasing the size of the bus parking area by two spaces would also disturb approximately 320 square feet (0.01 acre) of existing vegetation; it is estimated that this disturbance would result in removal of one spruce and three cottonwood trees greater than 10 inch DBH and approximately six large willows. Overall the vegetation disturbance associated with these activities would have local, minor, short-term, adverse effects.

The effects described above would be mitigated by rehabilitation activities that would result in revegetation and recontouring of all disturbed areas that are not paved using local native species and preserving existing trees to the extent possible. Approximately 2,500 square feet (0.06 acre) would be rehabilitated as part of activities implemented under this alternative. Prior to the

rehabilitation activities, there would be the potential for short-term, localized, minor, adverse effects due to the potential for invasive species to expand into disturbed areas. These impacts can be mitigated somewhat through the use of certain preventative practices including washing of vehicles before they enter the site and when they leave if they have traveled off road; minimizing ground disturbance, which creates openings for weed infestations; pre-and post- disturbance weed treatments to decrease seed availability and dispersal; and revegetation of disturbed areas to eliminate patches of bare soil. Mitigation measures such as these would limit impacts over the long-term. Consequently, in the long-term, implementation of mitigation measures would result in minor, localized, adverse effects on vegetation in the project area. These impacts would be reduced 5-10 years following completion of the project as native plant species would become established in previously disturbed areas. The combined impacts of Alternative B on vegetation resources would result in adverse, local, minor, short- and long-term effects.

*Cumulative Effects:* Activities proposed under Alternative B combined with other projects in the area (disturbances associated with the proposed Moose Headquarters Rehabilitation Plan including installation of a temporary swing space modular building, construction of the multi-use pathway along the Teton Park Road, construction of the auditorium at the Craig Thomas Discovery and Visitor Center, the addition of a new wastewater plant or connection to the Jackson Wastewater Treatment Plant, and the Moose housing project) would result in vegetation disturbance and an increased potential for exotic species problems. These impacts would be mitigated somewhat through the use of certain preventative practices including washing of vehicles before they enter the site and when they leave, if they have traveled off road; minimizing ground disturbance, which creates openings for weed infestations; pre-and post- disturbance weed treatments to decrease seed availability and dispersal; and revegetation of disturbed areas to eliminate patches of bare soil. Mitigation measures such as these would limit impacts over the long-term. Overall, cumulative effects to vegetation would be negligible to minor, long-term, localized, and adverse. The incremental contribution of Alternative B to these cumulative impacts to vegetation would be negligible.

*Conclusion:* The combined impacts of Alternative B on vegetation resources would result in adverse, local, minor, short- and long-term effects. Cumulative impacts would be negligible to minor, local, adverse and long-term; Alternative B would contribute a negligible amount to cumulative impacts. Alternative B would not result in any unacceptable impacts on vegetation (NPS 2006). The effects on vegetation under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be minor in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of vegetation under this alternative (by definition, impairment is worse than unacceptable impacts).

## **Water Resources (Surface, Groundwater & Floodplains)**

### **Affected Environment**

Jackson Lake, located in the northern half of Grand Teton National Park, is fed primarily by the Snake River as it flows south from Yellowstone National Park. The natural Jackson Lake was enlarged into a reservoir when the Jackson Lake Dam was constructed by the Bureau of Reclamation (BOR) in 1907 and again in 1916. Jackson Lake Reservoir provides storage space for 100- and 500-year floodwaters within the BOR's Minidoka Project (a series of six major reservoirs in the Upper Snake River Basin). Since 2004, collaboration between the BOR and the NPS has resulted in reservoir releases being managed to, when possible, simulate the natural peak and decline demonstrated by undammed rivers in the Rocky Mountain region; these efforts are intended to

benefit native fish, plant, and wildlife habitat along the Snake River downstream from Jackson Lake.

The Snake River reemerges from the southeast end of Jackson Lake at the dam and flows east for approximately 5 miles before turning south and west. For most of its length, the river follows the pattern of a classic braided stream. However, in the area adjacent to Moose, flow is contained within a single channel. Farther south, the river returns to a braided form, but its western boundary is contained by a levee maintained by the U.S. Army Corps of Engineers.

### **Surface and Groundwater**

Water quality in the Snake River adjacent to the Moose area is a function of all upstream influences associated with a very large drainage area, but is characterized as being of high quality. Water quality adjacent to the project area is being influenced by existing conditions within the Moose Headquarters Area that are contributing to erosion of user-created trails, deterioration of riparian vegetation, and degradation of water quality. Drainage patterns are such that runoff from paved areas is entering the river without prior treatment to reduce contaminants such as gasoline, diesel fuel, and road salts. The situation is exacerbated by the increase in impervious surface that has occurred over time within the Moose Headquarters Area, particularly in the boat ramp area.

Groundwater recharge occurs by infiltration of precipitation, streamflow leakage, irrigation water, and inflow from other aquifers. Water level contours indicate that groundwater flows topographically from high areas toward the Snake River and southwest through the valley in the general direction of the river. The data indicate that the water quality of the alluvial valley aquifer is excellent; it supports utilization for drinking water, recreation, and other commercial uses. Much of the aquifer exhibits high permeability and interconnection to the rivers and lakes, making it vulnerable to contamination from the facilities, visitor use, and transportation corridors that exist in the recharge areas.

### **Floodplains**

Executive Order 11988, Floodplain Management, requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. Under NPS *Management Policies 2006* and DO-77-2: Floodplain Management, the NPS will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to DO-77-2, certain construction within a 100-year floodplain requires preparation of a Statement of Findings for Floodplains.

Grand Teton National Park is considered non-high hazard for purposes of floodplain compliance because high flows do not occur unpredictably (except very rarely due to dam failure, human, beaver, or landslide). Flooding typically occurs as temperatures warm in the spring or after considerable rainfall making the chances of sudden flooding very remote.

The Moose Headquarters Area is located in an overbank area adjacent to the Snake River. Floodplain maps produced by the Federal Emergency Management Agency (FEMA, Report # 178) depict a portion of the project area within the 100-year floodplain. However, a recent floodplain analysis of the Moose area conducted by NPS Water Resources Division (WRD) concluded that the 100-year flood should be considered to be almost completely contained by the Snake River channel. The 500-year flood would exceed the channel capacity by roughly one to three feet, vertically (NPS 2001). The NPS WRD floodplain analysis determined that the developed area of the former Visitor Center was located partially within the 500-year floodplain. The existing Administrative Building itself is shown to be located outside the 500-year floodplain. The Moose Maintenance Building is totally within the 500-year floodplain, which would also be the regulatory

floodplain for this structure (emergency services are located there). Additionally, the fuel storage shed and wastewater treatment plant are within the 500-year floodplain boundaries.

This study also examined the effects of two more extreme floods, the probable maximum flood and the dam-break flood. The depths and velocities associated with the 500-year flood are not considered to be great, and relocating critical actions such as the fuel storage facilities, water treatment plant, irreplaceable records, archaeological artifacts, and emergency services, outside or above the flood level could mitigate the effects of such a flood. Furthermore, the river channel itself, in the reach adjacent to the project area, is relatively straight and the valley is very wide which would prevent deep flooding and consequently create a low hazard environment for people. This makes evacuation a viable human flood hazard mitigation strategy. A Statement of Findings for Floodplains is included in Appendix A.

## Environmental Consequences

### Methodology

#### Surface and Groundwater

Consideration of impacts to surface water and groundwater and their disclosure is a function of risk, intensity, duration and extent. Actions were evaluated for potential delivery of pollutants and proximity to water resources.

#### Impact Threshold Definitions

Impact Category	Definition
Negligible	An action with low potential to change water quality because of sufficient separation between the action and conveyance routes to the resource, or because the action does not generate sources of impact to water resources.
Minor	An action that could affect changes in water quality by proximity to surface water, or involvement with non-toxic or nonpoint and minor sources of pollution that do not persist in the environment.
Moderate	An action that could affect changes in water quality that are local in extent by proximity to surface water, or involvement with sources of pollution that are persistent in the environment and may be toxic to aquatic biota.
Major	An action that could affect changes in water that extend beyond the local area due to proximity to surface water or involvement with sources of pollution that are persistent in the environment and may be toxic to aquatic biota.

#### Effects of Alternative A: No Action on Surface and Groundwater

*Direct/Indirect Effects:* Under the No Action alternative the water resources in the project area would remain unchanged. There would be no direct impacts to the land adjacent to the Snake River and no direct effects on water resources. However, because no changes would be made in the Moose Headquarters Area, the adverse indirect impacts to the water quality of the Snake River that are occurring as a result of existing conditions would continue. These effects include erosion of user-created trails adjacent to the river and untreated stormwater runoff containing pollutants that may be toxic to aquatic biota entering the Snake River and subsequent degradation of water quality. These effects would be local, moderate, long-term and adverse.

*Cumulative Effects:* On the basis of the amount of flow in the Snake River, and the extent of the watershed above Moose, any long-term impacts from the existing situation would not detract measurably from existing surface or groundwater quality. Existing water quality in the Snake River at Moose would be regarded as an index to the total cumulative sources of impact in the drainage above that point. The No Action alternative, combined with other activities in the area including installation of a temporary swing space modular building and wash bay, construction of the multi-use pathway along the Teton Park Road, construction of the auditorium at the Craig Thomas Discovery and Visitor Center, construction of a new water treatment plant or connection to the Jackson Wastewater Treatment Plant, and the Moose housing project would result in overall localized, negligible to minor, adverse, long-term and localized, negligible, beneficial, long-term cumulative impacts to water resources. The incremental contribution of Alternative A to these cumulative impacts to water resources would be negligible. Mitigation measures would serve to limit impacts over the long-term. No additional activities are proposed that would measurably affect groundwater in a cumulative context.

*Conclusion:* There would be no direct impacts to water resources under Alternative A. Indirect local, moderate, long-term, adverse impacts to water resources would continue related to existing conditions. Overall cumulative impacts to this resource would be localized, long-term, negligible to minor, and adverse and localized, long-term, negligible, and beneficial; the relative contribution of Alternative A to cumulative impacts to water resources would be negligible. Alternative A would not result in any unacceptable impacts on water resources (NPS 2006). The effects on surface and groundwater under this alternative would not be unacceptable because the potential adverse impacts are anticipated to be moderate or less in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of vegetation under this alternative (by definition, impairment is worse than unacceptable impacts).

### **Effects of Alternative B: NPS Preferred Alternative on Surface and Groundwater**

*Direct/Indirect Effects:* Implementation of Alternative B would impact approximately 41,855 square feet (0.96 acre) of land adjacent to the Snake River creating the potential for indirect impacts to water resources. The river itself would not be disturbed by project implementation because all site work would be located in the uplands above the river. However, potential impacts to water quality could result from upland soil disturbance, equipment fluid leakage, etc., during construction due to the project area's proximity to the Snake River. BMPs for erosion and sediment control (e.g., silt fences, soil stabilization) are included in the project design to minimize erosion and sediment issues that could lead to water quality impacts. Utilization of standard erosion control devices would reduce the potential for runoff and other deleterious material from the site to enter the Snake River.

Alternative B would rehabilitate stormwater drainage to reduce impacts to the Snake River. All elements of the project would be designed to result in an overall reduction in impervious surface within the Moose Headquarters Area. New stormwater management, removal of five temporary buildings, and restoration of user-created trails would help decrease impacts to water quality in the long term. There would be nearly complete replacement of existing asphalt to provide positive drainage along with a reconfiguration of drainage patterns. Concrete drainage features would force the largest possible portion of runoff (based upon onsite gradients) from paved areas through new oil-water separators. Construction of sediment and infiltration basins would allow stormwater to filter into the ground and the addition of multiple bio-swales would treat surface water runoff. A gravel trench would be constructed between the Moose Landing Road and the existing native vegetation to encourage sediment filtration prior to flowing into the river. Removal of old, inefficient structures along the river would result in reclamation of pervious surface and native plant

species in this critical zone. Overall, actions under this alternative would promote positive drainage and reduce the amount of runoff to the adjacent Snake River.

Final site design would take into consideration the stability and resiliency of the soil and water resources that may be impacted. A SWPPP would be developed as part of the construction plans to provide engineering methods and techniques specific to the finalized design drawings that would minimize erosion and degradation of soils in the project area during both construction and use of the area. Through the implementation of proper design and BMPs, impacts to the water resources related to construction would be negligible to minor, adverse, local, and short-term. Long-term impacts related to new stormwater management would be minor to moderate, local, and beneficial.

*Cumulative Effects:* Water quality in the Snake River adjacent to the Moose area is potentially at risk from this alternative. Construction activities under this alternative, combined with other activities in the area including installation of a temporary swing space modular building and wash bay, construction of the multi-use pathway along the Teton Park Road, construction of the auditorium at the Craig Thomas Discovery and Visitor Center, construction of a new wastewater treatment plant or connection to the Jackson Wastewater Treatment Plant, and the Moose housing project would result in localized, long-term, negligible to minor, and adverse and localized, long-term, negligible, and beneficial cumulative effects. Mitigation measures implemented for each project would limit impacts over the long-term. The incremental contribution of Alternative B to these cumulative impacts to surface and groundwater would be negligible. On the basis of the amount of flow in the Snake River, and the extent of the watershed above Moose, any short-term, mitigated impact of construction would not detract measurably from existing water quality.

*Conclusion:* Through the implementation of proper design and BMPs, impacts to water resources related to construction would be negligible to minor, adverse, local, and short-term. Long-term impacts related to new stormwater management would be minor to moderate, local, and beneficial. Cumulative impacts would be localized, long-term, negligible to minor, and adverse and localized, long-term, negligible, and beneficial; the relative contribution of Alternative B to cumulative impacts would be negligible. Alternative B would not result in any unacceptable impacts on water resources (NPS 2006). The effects on surface and groundwater under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be moderate or less in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of surface or groundwater under this alternative (by definition, impairment is worse than unacceptable impacts).

### **Floodplains**

A floodplain analysis was conducted by the NPS WRD, using standard hydrologic and hydraulic methods to determine flood hazard parameters within the Moose area as part of the analysis for the new Craig Thomas Discovery and Visitor Center. Consideration of impacts and their disclosure is a function of risk, intensity, duration and extent. The risk would be relative to effects that might occur as a consequence of the presence of structures within their defined regulatory floodplain as described in DO-77-2: Floodplain Management. In compliance with Executive Order 11988, Floodplain Management, a Statement of Findings for Floodplains has been prepared and incorporated into this analysis (Appendix A).

### Impact Threshold Definitions

Impact Category	Definition
Negligible	An action that is not located within its defined regulatory floodplain.
Minor	An action that is located within its defined regulatory floodplain where design and siting avoid or mitigate all identified risks to human life and property and strive to preserve floodplain values.
Moderate	An action that is located within its defined regulatory floodplain where design and siting avoid or mitigate few risks to human life and property and neglect to preserve floodplain values.
Major	An action that is located within its defined regulatory floodplain, but takes no measures to mitigate risks to human life and property or to preserve floodplain values.

### Effects of Alternative A: No Action on Floodplains

*Direct/Indirect Effects:* The No Action alternative would result in the continuation of existing conditions and trends. No direct impacts would occur but maintaining the existing levels of facilities in their defined regulatory floodplain would result in indirect effects that are adverse, minor, local, and long-term. The NPS WRD floodplain analysis determined that the Moose Maintenance Building and other structures within the Moose Headquarters Area are either completely or partially within the 500-year floodplain. The presence of these facilities within the 500-year floodplain represents an existing impact or a potential for impact on both water resources and on the structures and their contents.

*Cumulative Effects:* Minor, local, long-term, and adverse cumulative effects on floodplains could result from this alternative in combination with impacts of relevant, recent, ongoing and reasonably foreseeable actions that involve disturbance within the floodplain. Installation of a temporary swing space modular building, construction of the auditorium at the Craig Thomas Discovery and Visitor Center, construction of the multi-use pathway, and a new wastewater treatment facility all have the potential to affect floodplains due to placement or expansion of new or existing infrastructure within the Snake River floodplain. The incremental contribution of Alternative A to these cumulative impacts to floodplains would be negligible.

*Conclusion:* Under Alternative A there would be indirect adverse, minor, local, long-term impacts to floodplains. Cumulative impacts to floodplains would be minor, local, long-term, and adverse; the incremental contribution of Alternative A to these cumulative impacts to floodplains would be negligible. Alternative A would not result in any unacceptable impacts on floodplains (NPS 2006). The effects on floodplains under Alternative A would not be unacceptable because the adverse impacts are not anticipated to exceed minor in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of floodplains under this alternative (by definition, impairment is worse than unacceptable impacts).

### Effects of Alternative B: NPS Preferred Alternative on Floodplains

*Direct/Indirect Effects:* Any construction activities that require excavation or ground disturbance have the potential to affect floodplains. Hazards associated with development in the defined regulatory floodplain would be considered in the design and construction specifications would encourage a work window during low flow. This alternative would result in minor, short-term, local, adverse impacts to floodplains from ground disturbance and excavation activities. This

alternative would remove five temporary buildings and thus result in minor, long-term, local, beneficial impacts to the Snake River floodplain.

*Cumulative Effects:* Negligible to minor, local, long-term, adverse and beneficial cumulative effects on floodplains could result under this alternative in combination with impacts of relevant, recent, ongoing and reasonably foreseeable actions as described for Alternative A. Cumulatively, this alternative would contribute a negligible to minor amount of disturbance to floodplains when considered with other past, present, and reasonably foreseeable future actions.

*Conclusion:* Alternative B would have minor, short-term, local, adverse and minor, long-term, local, beneficial effects to floodplains in the project area. There would be negligible to minor, local, long-term, adverse and beneficial cumulative impacts to floodplains; the relative contribution of this alternative to cumulative effects to floodplains would be negligible to minor. Alternative B would not result in any unacceptable impacts on floodplains (NPS 2006). The effects on floodplains under Alternative B would not be unacceptable because potential adverse impacts are not anticipated to exceed minor in intensity and, thus, would not rise to the level where unacceptable impacts could occur. In addition, this alternative provides beneficial effects to floodplains. Because no unacceptable conditions would result, there would be no impairment of floodplains under this alternative (by definition, impairment is worse than unacceptable impacts).

## **Wildlife, including Threatened, Endangered, and Special Concern Species**

### **Affected Environment**

The location of the proposed rehabilitation is in a previously disturbed area that contains minimal vegetation, is generally flat, and is immediately adjacent to the Snake River. The presence of humans, human-related activities, and structures has removed or displaced much of the native wildlife habitat in the project area, which has limited the number and variety of wildlife occurrences in the area. However, a thin strip of typical spruce-cottonwood floodplain forest lies between the river and the project area and serves as an important movement corridor for various wildlife species.

### **Threatened, Endangered, and Candidate Species**

Grand Teton National Park currently contains four species of vertebrates that are listed as threatened, endangered, or candidate species under the ESA. The bald eagle was removed from ESA protection because population levels no longer met federal protection requirements. It still receives a form of state protection and is also protected under the Migratory Bird Treaty Act and the Bald Eagle Protection Act of 1940, as amended (16 U.S.C. 668-668c), and is discussed in the Special Concern Species section below.

#### **Gray Wolf (*Canis lupus*)**

Gray wolves were native to the park but were extirpated from the Rocky Mountain west in the first half of the twentieth century. In 1995 and 1996, wolves were reintroduced into Yellowstone National Park and central Idaho as part of a recovery effort. Reintroduced wolves are classified as “nonessential experimental” according to Section 10(j) of the ESA and managed as threatened in national parks. All provisions of Section 7 of the ESA apply (50 CFR 17.83(b)).

By 1997 dispersers from Yellowstone started exploring Jackson Hole. As of summer 2008, approximately 50 wolves (total) in 6 packs roamed portions of Grand Teton National Park (GTNP, unpublished data). At least two wolf packs had home ranges that overlap the project area; one frequented the Snake River corridor. Confirmed wolf sightings have occurred in southern portions

of the park, and high elk densities during summer there make it likely that wolves would continue to use this area. Despite the presence of wolves throughout the park and surrounding area, the occurrence of wolves in the Moose Campus would be considered incidental and rare due to the amount of human activity there.

#### Canada Lynx (*Lynx canadensis*)

The USFWS listed the Canada lynx as threatened under the ESA in 2000. Lynx are solitary carnivores generally occurring at low densities in boreal forests. In Wyoming, they occur primarily in spruce/ fir and lodgepole pine forests with slopes of 8 to 12 degrees and at elevations from 7,995 to 9,636 feet (Ruediger et al. 2000). Denning habitat consists of late successional spruce/ fir forests on north-facing slopes with relatively high densities of large diameter woody debris. Dispersal corridors, principally continuous conifer forests several miles in width, are critical for lynx travel and dispersal (Tanimoto 1998).

Little information exists on lynx abundance and distribution within Grand Teton National Park. Although sightings are rare, two are listed in the park's historical database as occurring within 5 miles of the project area, one dated 1984, the other 1992 (GTNP, unpublished data). These sightings likely record lynx travelling through riverine cottonwood/ spruce habitat. The Moose Campus is not within a Lynx Analysis Unit, it is not located in potential lynx habitat, and its high level of human activity would continue to discourage even rare use. Therefore, this species is not considered further in this document.

#### Yellow-billed Cuckoo (*Coccyzus americanus*)

Yellow-billed cuckoo is a candidate species for listing as threatened or endangered. The yellow-billed cuckoo is a riparian obligate species that prefers extensive areas of dense thickets and mature deciduous forests near water, and requires low, dense, shrubby vegetation below 7,000 feet for nesting. During migration, they are most commonly observed in woodland and scrub habitat. Yellow-billed cuckoos are very sensitive to disturbance in the form of habitat modification and loss. They are also sensitive to human presence and may abandon nests if disturbed, especially during nest building (Laymon 1998).

Yellow-billed cuckoos may occur in the park but little is known about their status and occupancy. This species was documented in the park in 2000 near Ditch Creek (USFWS and NPS 2007) and in 2001 at the Teton Science School's monitoring avian productivity station near the eastern park boundary (NPS wildlife observation database). The cottonwood-riparian habitat located along the Snake River within the project area is suitable cuckoo habitat, although no birds have been documented there and the amount of human activity makes it unlikely that cuckoos would occur.

#### Grizzly Bear (*Ursus arctos horribilis*)

In 1975, grizzly bears in the lower 48 states were listed as threatened under the ESA. In 1982, a recovery plan for grizzly bear populations in the contiguous United States was completed and implemented (USFWS 1982). Recovery zones and population goals were established in the Grizzly Bear Recovery Plan (USFWS 1982) and revised Grizzly Bear Recovery Plan (USFWS 1993). These plans established six grizzly bear recovery zones in the contiguous United States, one of which encompassed a portion of the GYA including much of Grand Teton National Park. Guidelines for grizzly bear recovery were developed in 1983 by the Interagency Grizzly Bear Committee (IGBC 1986). A revised Grizzly Bear Recovery Plan established measurable population parameters as indicators of population status for the GYA (USFWS 1993).

All grizzly bear population recovery parameters were achieved for the first time in 1994, but mortality limits were exceeded during the next 3 years (1995-97). All population recovery parameters were again achieved from 1998-2001 and habitat-based recovery criteria, a

conservation strategy, and state plans were developed by 2007, when the USFWS removed grizzly bears from threatened species status. In 2008 and 2009, recovery mortality limits were again exceeded, raising concern for future management of human-caused mortalities in the ecosystem. On September 30, 2009 federal protections were reinstated for the GYA population by court order on September 21, 2009.

Grizzly bears currently inhabit much of the GYA. Their occurrence in the park has grown during the past 20 years, likely in response to increases in GYA bear densities (Pyare et al. 2004, Schwartz et al. 2002). They are now relatively common in the southern GYA including the Gros Ventre Range southeast of the park and are regularly seen in the Badger Creek drainage and the Teton Range north of Paintbrush Canyon (NPS 2005). Recently they have been more frequently observed in the south end of the park, including areas within and immediately adjacent to the project area (GTNP, unpublished data). In 2009, two grizzlies were trapped during black bear research less than 1 mile from the project area. Grizzly bears would be expected to occasionally use habitats near the project area for foraging and traveling. They would be expected to enter the Moose Campus infrequently to investigate human food odors.

Management of grizzly bears and grizzly bear habitat in Grand Teton National Park follows the Conservation Strategy (USFWS 2003) and the park's Human-Bear Management Plan (NPS 1989). Management in both the GYA and the park has been highly successful in promoting grizzly bear recovery and reducing bear-human conflicts (e.g., property damage, incidents of bears obtaining human food, and bear-inflicted human injuries) and human-caused bear mortalities. Recreational and administrative facilities, human activities, and human waste (garbage and sewage) in the park are managed in a manner that results in relatively few human-caused grizzly bear mortalities. However, despite these efforts, grizzly bears in the park have been killed because of human activities. Three were hit and killed by vehicles between 1992 and 2008 (GTNP, unpublished data). Two grizzly bears that frequented park developments, and had nuisance histories outside the park prior to the park incidents, eventually were killed by Montana officials.

The number of human-habituated (but not food-conditioned) grizzlies in the park has increased. These bears go about their daily routines in close proximity to humans and their developments, particularly roads, and because they are not afraid to approach developments or forage along park roads, may be more vulnerable to being hit by vehicles. Although the presence of grizzly bears in or near the project area would likely continue to be incidental and rare due to the amount of human activity, it may increase if grizzly bears establish home ranges near the area and/ or travel through habitat near the Moose Campus.

### **Special Concern Species**

In conjunction with species classification systems generated by the WGFD, Wyoming Natural Diversity Database, and USFWS, Grand Teton National Park maintains a sensitive species list for establishing monitoring priorities and evaluating project impacts. The WGFD classifies certain non-game animal species as "species of special concern" and categorizes these species into a range of priority groups according to their need for special management. This classification system evaluates species' distributions, population status and trend, habitat stability, and tolerance to human disturbance. Animals are also considered species of special concern by the Wyoming Natural Diversity Database if they are "vulnerable to extirpation at the global or state level due to inherent rarity, significant loss of habitat, or sensitivity to human-caused mortality or habitat disturbances" (Fertig and Beauvais 1999).

Migratory Bird Species of Management Concern in Wyoming are designated as such by the USFWS (Cerovski et al. 2000). The Wyoming Field Office of the USFWS has developed a list from the Wyoming Bird Conservation Plan compiled by state and federal agencies, non-governmental

organizations, and the public. The Wyoming Bird Conservation Plan identifies “priority species” based on a number of criteria, using the best information available. In many cases, this list reflects identified threats to habitat because no information is available on species population trends. Two priority groups are designated by the USFWS: Level 1 and Level 2. Level 1 species are those that are clearly in need of conservation action. They include species which Wyoming has a high percentage of and responsibility for the breeding population, and the need for additional knowledge through monitoring and research. The focus on Level 2 species is for monitoring rather than conservation action.

Habitat within the project area is very limited due to its disturbed and developed nature. Sagebrush habitat is present north of the Moose Headquarters Area and riparian habitat is located along the banks of the Snake River directly east of the project area. In addition small patches of trees scattered throughout the project area could provide nesting or perch habitat. The mixture of riparian and upland sagebrush habitats surrounding the project area makes it likely that a variety of resident and neotropical migratory bird species would be found there. Species of concern with the potential to occur in the project area are listed in Table 4.

**Table 4. Species of Special Concern with Potential Habitat near the Project Area**

Common Name / Scientific Name	WGFD Status <sup>1</sup>	Potential Habitat near the Project Area
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	NSS2	Riparian / River
Greater Sage-Grouse ( <i>Centrocercus urophasianus</i> )	NSS2	Sagebrush
Trumpeter Swan ( <i>Cygnus buccinator</i> )	NSS2	Riparian / River
American White Pelican ( <i>Pelecanus erythrorhynchos</i> )	NSS3	Riparian / River
Ash-throated Flycatcher ( <i>Myiarchus cinerascens</i> )	NSS3	Riparian
Long-billed Curlew ( <i>Numenius americanus</i> )	NSS3	Sagebrush / Open Fields
Bobolink ( <i>Dolichonyx oryzivorus</i> )	NSS4	Sagebrush
Brewer’s Sparrow ( <i>Spizella breweri</i> )	NSS4	Sagebrush
Great Blue Heron ( <i>Ardea herodias</i> )	NSS4	Riparian / River
Sage Thrasher ( <i>Oreoscoptes montanus</i> )	NSS4	Sagebrush
Northern Goshawk ( <i>Accipiter gentilis</i> )	NSS4	Forests
Swainson’s Hawk ( <i>Buteo swainsoni</i> )	NSS4	Open Fields/Sagebrush
Northern Pygmy-Owl ( <i>Glaucidium gnoma</i> )	NSS4	Forests
Water Vole ( <i>Arvicola terrestris</i> )	NSS3	Riparian
Vagrant Shrew ( <i>Sorex vagrans</i> )	NSS3	Forests / Sagebrush / Riparian
Long-eared Myotis ( <i>Myotis evotis</i> )	NSS2	Forests / Buildings / Caves
Little Brown Myotis ( <i>Myotis lucifugus</i> )	NSS3	Forests / Buildings / Caves
Long-legged Myotis ( <i>Myotis volans</i> )	NSS2	Forests / Buildings / Caves
Big Brown Bat ( <i>Eptesicus fuscus</i> )	NSS3	Forests / Buildings / Caves
Townsend’s Big-eared Bat ( <i>Corynorhinus townsendii</i> )	NSS2	Forests / Buildings / Caves
Western Small-footed Myotis ( <i>Myotis ciliolabrum</i> )	NSS3	Forests / Buildings / Caves
Boreal Western Toad ( <i>Bufo boreas boreas</i> )	NSS2	Riparian
Northern Leopard Frog ( <i>Rana pipiens</i> )	NSS4	Riparian
Northern Sagebrush Lizard ( <i>Sceloporus graciosus graciosus</i> )	NSS4	Sagebrush

<sup>1</sup> WGFD Status: NSS2 = Populations restricted or declining in numbers and/or distribution; extirpation in Wyoming is not imminent AND ongoing significant loss of habitat; NSS3 = Populations restricted or declining in numbers and/or distribution; extirpation in Wyoming is not imminent AND habitat is restricted or vulnerable but no recent or on-going loss; species is sensitive to human disturbance; NSS4 = Species is widely distributed; population status and trends within Wyoming are assumed stable AND Habitat is restricted or vulnerable but no recent or on-going significant loss; species is sensitive to human disturbance.

### Sagebrush Habitat

The sagebrush vegetation community north of the project area may provide suitable habitat for some of the above listed species. Brewer's sparrow and sage thrasher, both sagebrush obligates that depend on sagebrush habitats for breeding and nesting, occur throughout Wyoming including Grand Teton National Park. These and other bird species that use sagebrush habitat could be found within the project area depending on their level of tolerance for human disturbance.

The northern sagebrush lizard is the only lizard species known to occur in the GYA and, specifically, in Grand Teton National Park. Although rarely found above 6,000 feet in the northern Rocky Mountains, it has been documented as high as 8,300 feet in Yellowstone and Grand Teton National Parks in geothermally-influenced areas and as high as 7,000 feet in non-geothermal areas. Occurrence in Grand Teton National Park was not confirmed until 1992 when an individual was observed near Pilgrim Creek (Koch and Peterson 1995). This species likely occurs only in small, localized areas; none have been reported in the project area.

Greater sage-grouse are known to occur in sagebrush habitat, a habitat type which surrounds the project area. Sage-grouse numbers have declined over the past several decades throughout the west, including Wyoming. These declines resulted in petitioning for their listing under the ESA. The USFWS determined that listing the greater sage-grouse as threatened or endangered was unwarranted (70 Federal Register 2244, February 12, 2005); however, in a December 4, 2007 ruling, U.S. District Judge Lynn B. Winmill directed the USFWS to reconsider this decision. The cause of sage-grouse declines has not been conclusively identified but is thought to be related to permanent loss, degradation and fragmentation of key habitat, as well as low nest productivity. State and local working groups initiated conservation planning efforts that focus on providing guidelines for sustaining and/ or perpetuating sage-grouse populations through consistent and up to date management strategies. In Wyoming, the Wyoming Greater Sage-Grouse Conservation Plan (WGFD 2003) outlines these guidelines. In addition, the Upper Snake River Sage-Grouse Working Group developed a conservation plan that outlines recommendations for grouse management and conservation in the Jackson Hole area.

Sage-grouse depend on sagebrush communities for their entire life cycle. They breed on mating grounds called leks, which are generally open areas such as meadows, low sagebrush zones, ridge tops, and old lakebeds surrounded by denser sagebrush cover (Connelly et al. 1981). Soon after breeding, females disperse to nesting areas characterized by relatively dense, tall, mature sagebrush stands (Connelly et al. 2000, Holloran and Anderson 2004). Early brood-rearing habitat is typically close to nest sites and in dense, mature sagebrush stands (Holloran and Anderson 2004). As summer progresses, hens and their young will also use relatively open sagebrush stands that have good grass and forb cover (Lyon 2000). In the winter, sage-grouse use dense, tall stands of mature sagebrush for both food and cover. Low sagebrush stands on open windswept knolls are also used as feeding sites. Currently there are four known active leks in the park as well as several intermittently used and satellite leks. The sagebrush communities surrounding the Moose Headquarters Area contain suitable nesting, brood-rearing and wintering habitat; however, no known leks are located within or near the project area.

### Riparian Habitat

The banks of the Snake River, which flows along the eastern boundary of the project area, support narrow bands of riparian vegetation. This riparian habitat provides suitable nesting and foraging habitat for many bird species including raptors, songbirds, and owls. This habitat also provides foraging habitat for bat species which have the potential to occur within the area.

Amphibian species of special concern, the boreal toad and the northern leopard frog, both inhabit a variety of aquatic habitats, including ponds, wetlands, streamsides, riparian zones, forests, and

meadows. Western boreal toads are present within the park and have been documented in the project area. The southern Rocky Mountain population has been a candidate species for listing under the ESA since 1995. Listing is considered warranted but was precluded due to higher priority species and activities. The northern Rocky Mountain population within the GYA, which includes Jackson Hole and Grand Teton National Park, can be locally abundant. In addition to aquatic habitats, boreal toads may also use mesic areas in foothills, montane and subalpine life zones, willow marshes, and aspen or spruce-fir stands. When in search of food, they may move a considerable distance from permanent water (Baxter and Stone 1980). Northern leopard frogs were historically present in the park but because there have been no verified sightings in the park in nearly 40 years (Koch and Peterson 1995) it is assumed that this species is extremely rare or absent from the area (USFWS and NPS 2007).

Trumpeter swans use riparian areas such as lakes, ponds, rivers and reservoirs for nesting and foraging. They initiate nesting when these areas thaw, typically in late April or early May. Eggs hatch in early June and cygnets usually fledge in September. Swans use open water along rivers and lakes for foraging in the late fall and winter. Breeding territories are monitored by park personnel each year for site occupancy, nest success, and number of cygnets that successfully fledge. Of 12 territories monitored in 2009, six were occupied, four contained pairs that attempted to nest, and one successfully fledged four young (GTNP, unpublished data). No trumpeter swan nest territory is in or adjacent to the project area. The nearest known swan nesting territory is located on the northern end of the National Elk Refuge. Swans can be observed along portions of the Snake River adjacent to the project area especially during winter months.

The bald eagle was federally listed as an endangered species in Wyoming in 1967. After several decades of protection, recovery goals were met and they were de-listed in 2007. They continue to be considered a species of concern in the park and by WGFD and are protected under the 1918 Migratory Bird Treaty Act (16 U.S.C. 703) and the 1940 Bald Eagle Protection Act (16 U.S.C. 668). The park contains 15 known nesting eagle territories and pairs; however, not all nests successfully fledge young each year. Known territories are located along the shorelines of the Snake River, Jackson Lake, and adjacent riparian areas. The park establishes, and enforces a 0.5 mile seasonal area closure from February 15 to August 15 around bald eagle nests to minimize human disturbance, per USFWS recommendations in Wyoming (USFWS and NPS 2007). Many of the bald eagles that nest in the park remain on their nest territories throughout the year, occasionally leaving for short periods during the non-breeding season to exploit abundant or ephemeral food sources elsewhere. Eagles feed primarily on fish, waterfowl, and carrion. No bald eagles nests are within the project area; however, two nesting territories are in the vicinity. Neither nest is located within 0.5 miles of the project area.

#### Bat Habitat within the Developed Areas

Bats have commonly been found to roost and hibernate in buildings and older man-made structures. Due to the age of many of the structures within the project area, they potentially provide habitat for bat species, which include *Myotis*, identified as occurring in the general geographic area. Unless specific measures have been taken to prevent individuals from roosting within or on these structures, it is possible that they are present.

#### Birds, Including Neotropical Migratory Bird Species

Numerous bird species, such as osprey (*Pandion haliaetus*), great blue heron (*Ardea herodias*), trumpeter swan, bald eagle, northern goshawk (*Accipiter gentilis*), owls, neotropical migrants and sage grouse, occur in Grand Teton National Park and may sometimes be seen in the Moose Headquarters Area or in appropriate habitat surrounding the project area.

Neotropical migratory birds include raptors, passerines, and shorebirds that breed in North America, but migrate to Mexico and Central and South America for the winter. Of particular concern to wildlife managers, they have been experiencing severe population declines throughout their North American range (Askins et al. 1990). Habitat fragmentation and loss of winter range are among factors believed responsible (Hutto 1988, Robbins et al. 1989). Bird species of special concern may be vulnerable to extirpation at the global or state level due to inherent rarity, significant loss of habitat, or sensitivity to human-caused mortality or habitat disturbances (Fertig and Beauvais 1999). These factors contribute to reduced reproductive success, increased mortality risks and reduced availability of secure habitat to bird species of special concern.

In Wyoming, 162 bird species are considered neotropical migrants (Cerovski et al. 2001) with peak migration periods in May and September through early October. Nesting is typically initiated from early May to mid-June and most young fledge sometime in June to late-July; these dates vary annually due to snow melt and leaf-out of trees and shrubs.

In addition to species listed in Table 4, many neotropical migratory bird species, residents, and other migrants not designated as sensitive also occur and breed in Grand Teton National Park. These include, but are not limited to: osprey, vesper sparrow (*Pooecetes gramineus*), chipping sparrow (*Spizella passerine*), ruby-crowned kinglet (*Regulus calendula*), northern flicker (*Colaptes auratus*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), yellow warbler (*Dendroica petechia*), yellow-rumped warbler (*Dendroica coronata*), mountain chickadee (*Poecile gambeli*), red-breasted nuthatch (*Sitta canadensis*), mountain bluebird (*Sialia currucoides*), white-crowned sparrow (*Zonotrichia leucophrys*), and western tanager (*Piranga ludoviciana*).

All migratory birds in the park are protected under the Migratory Bird Treaty Act, 16 U.S.C. 703, enacted in 1918. This act prohibits the taking of any migratory birds, their parts, nests, or eggs. Removal of nests or nest trees is prohibited, but may be allowed once young have fledged.

Studies have not been conducted specifically at the Moose Headquarters Area to inventory the occurrence or relative abundance of migratory birds. The closest surveys include a land bird transect at 4 Lazy F, approximately 0.8 mile north of the administrative area, and transportation plan-related surveys between the Moose entrance station and Jenny Lake. Results from these surveys are not yet available. Long-term bird projects conducted in the park indicate that riparian and wetland habitats generally contain the highest density of bird species (NPS 2009). In addition, many bird species of special concern migrate, breed, and nest throughout the park in sagebrush-grassland plant communities. The mixture of riparian and upland sagebrush habitats surrounding the project area makes it likely that a variety of resident and neotropical migratory bird species would be found there.

## **Mammals**

Large mammals known or suspected to use habitat near the project area include elk (*Cervus elaphus*), bison (*Bison bison*), moose (*Alces alces*), mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), grizzly bear, black bear (*Ursus americanus*), mountain lion (*Puma concolor*), and wolf. Small and mid-sized mammals observed in the general vicinity include bobcat (*Lynx rufus*), badger (*Taxidea taxus*), beaver (*Castor canadensis*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), pine marten (*Martes americana*), porcupine (*Erethizon dorsatum*), river otter (*Lontra canadensis*), long-tail weasel (*Mustela frenata*), red squirrel (*Tamiasciurus hudsonicus*), deer mouse (*Peromyscus maniculatus*), pocket gopher (*Thomomys talpoides*), chipmunk (*Eutamias umbrinus*), Uinta ground squirrel (*Spermophilus armatus*), and vole (*Microtus pennsylvanicus*).

Loss of habitat due to existing development and high levels of human activity within the Moose Headquarters Area limit its use by most of these species. Human activity is also high in the surrounding area throughout the year because employee housing is located to the west and the

Craig Thomas Discovery and Visitor Center is located to the south. However, several of these species likely use the strip of existing floodplain habitat adjacent to the Snake River as a travel corridor as well as other habitat adjacent to the Moose Headquarters Area. On occasion large ungulates, such as moose and mule deer, or other mammals are observed within and adjacent to the project area.

### Ungulates

Elk, moose, mule deer, and, potentially, bison and pronghorn may use areas of the park adjacent to the project area. During winter, snow accumulation in the mountains and foothills reduces food availability and forces many ungulates to lower elevations. Most Jackson elk and bison are found on the National Elk Refuge, southeast of the project area, where they are supplementally fed. Mule deer are mainly limited to east- and south-facing slopes and bottomlands at low elevations in the southern portion of Jackson Hole although some deer irregularly winter along the Snake River south of the park. Pronghorn generally migrate to winter range about 100 miles to the south (Sawyer and Lindzey 2000). Moose are the exception in that they are widely distributed in Jackson Hole and can be found within the park at any time of year. The entire Snake River drainage represents either “winter-yearlong” or “crucial moose winter range” (WGFD, unpublished data).

Elk are versatile generalists (Houston 1982) that use a mixture of habitat types. During spring and fall movements between seasonal ranges, a substantial portion of the Jackson elk herd migrates adjacent to the project area through the Mormon Row Hayfields, Antelope Flats, Blacktail Butte, and Moose-Wilson Road areas. Many elk summer adjacent to the project area in the Snake River bottom both north and south of Moose and in Cottonwood Creek to the northwest.

The project area continues to provide habitat for moose in all seasons. Moose are commonly observed in the Snake River corridor north and south of the project area, as well as in adjacent sagebrush and bitterbrush habitats. These browsers have been observed within the Moose Headquarters Area, especially during winter and late spring, and may occasionally calve in or near the project area.

Most of the park and its vicinity are classified as spring-summer-fall mule deer habitat. Although primary summer range is on mountain slopes in southern Jackson Hole, mule deer also summer within the Snake River floodplain. Use of lower elevations (e.g., along the Snake River and on the slopes of buttes and foothills) increases dramatically during spring and fall migrations. Although they do not commonly use specific migration routes in Jackson Hole (Campbell 1990), general movements within the park (e.g., along the Snake River) occur en route to and from crucial winter range.

Generally, bison spring/ summer/ fall range within the park includes the Antelope Flats, Elk Ranch and Potholes areas. Bison primarily use sagebrush-grassland communities in these areas as well as the Snake River bottoms and may calve anywhere in the park. Large numbers are typically present in the Mormon Row-Kelly hayfields and Hunter-Talbot area in September and October. Bison have not occurred in the project area. They have used sagebrush-grassland areas within a few miles to the southeast, northwest, and east.

Pronghorn are seasonal residents of the sagebrush grasslands which surround the project area. The highest pronghorn concentrations occur within the park’s low-lying sagebrush communities on the east and west side of the Snake River floodplain (Seegerstrom 1997), such as Baseline Flats, the Potholes, south Antelope Flats, the Kelly hayfields (Sawyer and Lindzey 2000), and in the Elk Ranch area.

### Carnivores

Carnivore species that may occur in or adjacent to the project area include black and grizzly bears, bobcat, mountain lion, pine marten, weasel, red fox, coyote, striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), and badger. Wolverine (*Gulo gulo*) also may travel through the area while moving between more preferred habitats.

Along the eastern base of the Teton Range, the western base of the Gros Ventre range, and on Blacktail Butte, mixed conifer habitats provide some of the park's best bear habitat, with irregular openings and a diverse shrub understory that includes *Vaccinium* spp. and other fruit-producing plants. Black bears are common in these areas and can be expected to occur regularly in and near the project area. Coyotes, which are habitat generalists, are also very common. These habitats are also important to bobcat, mountain lion, and red fox, which occur at lower densities in the park and probably only pass through the project area occasionally. Pine marten, weasels, raccoons, and skunks are likely year-round residents. Grizzly bears were discussed above in the *Threatened, Endangered and Candidate Species* section.

Black bears may be killed due to human activities in Grand Teton National Park, including those associated with developed areas. Seventeen black bears have been hit and killed by vehicles from 1992 to 2008 in the park (GTNP, unpublished data). An average of about one black bear a year is killed by park officials because of human food conditioning and aggressive behavior that threatens humans. Many of the incidents that result in bears becoming human food conditioned are due to visitors' non-compliance with food storage regulations.

## **Environmental Consequences**

### **Methodology**

Identification of federally listed species, migratory bird species of management concern, and special-concern species was accomplished through discussions with wildlife biologists in Grand Teton National Park and informal consultation during the scoping period with the USFWS in Wyoming. The most recent list of federal threatened, endangered, and special concern species provided by the USFWS was used for this project. Neither the USFWS nor the WGFD identified any concerns related to threatened and endangered species during the scoping period for this project.

In assessing impacts on listed species and other wildlife, their current presence, habitat availability, and use of the area by wildlife species was first determined, followed by a determination of the extent and intensity of habitat loss or disturbance caused by the alternatives.

### **Compliance with Section 7 of the Endangered Species Act**

Section 7(a)(1) of the ESA, requires federal agencies to consult with the USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. In June 2008, the park sent a scoping letter to the USFWS, Wyoming Ecological Services Office, notifying them of the proposed project.

The park will be utilizing this EA as the consultation document pursuant to Section 7 of the ESA. The EA provides an impact determination for each federally listed, proposed, or candidate species under each alternative below. The impact determinations as defined under Section 7 of the ESA include no effect; may affect, not likely to adversely affect; and may affect, is likely to adversely affect. This EA will be sent to the USFWS for their concurrence with these determinations of effect. Once concurrence has been received by the USFWS, consultation under Section 7 will be complete.

## Impact Threshold Definitions

Impact Category	Definition
Negligible	A change to a population or individuals of a species or to the species habitat (including designated critical habitat for ESA-listed species) that is not measurable or perceptible.
Minor	A measurable, small, localized change to a population or individuals of a species or to the species habitat (including designated critical habitat for ESA-listed species).
Moderate	A change to a population or individuals of a species or to the species habitat (including designated critical habitat for ESA-listed species) that is measurable, localized and of consequence.
Major	A measurable, large and/or widespread change to a population or individuals of a species or to the species habitat (including designated critical habitat for ESA-listed species).

### Effects of Alternative A: No Action on Wildlife, Including Threatened and Endangered Species

*Direct/Indirect Effects:* The No Action alternative would maintain the Moose Headquarters Area in its current state with no rehabilitation to improve site conditions. The project area would continue to provide low quality habitat due to the existing development and levels of human use. The present level of human activity in the Moose Headquarters Area also creates a buffer of relatively unused habitat around the developed area, the size of which is based on species and individual levels of tolerance for human activities. With no changes in vegetation and human use levels, wildlife use of the area would generally remain as it is currently. Existing habitat adjacent to the Snake River, which in a pristine state would likely be an important travel corridor for many species, would continue to be used by some species but at a reduced level due to nearby development and human activity.

#### Threatened, Endangered, and Candidate Species

**Gray wolf** – Ongoing activities at the Moose Headquarters Area result in daily disturbance from visitors, concessioners, park employees, and residents from late May through early October and from park employees and residents year-round. The amount of human disturbance has decreased habitat available for ungulates in the project area as well as the quality of habitat in immediately adjacent areas. Ungulates are the primary prey of wolves. Any displacement impacts to ungulates, particularly elk, which result from human use of the Moose Headquarters Area, would also have negligible to minor indirect, long-term impacts on wolves. These impacts would continue under the No Action alternative. The project area is greater than 1 mile from any known wolf den or rendezvous site. Consequently, activities within the Moose Headquarters Area are unlikely to disrupt or affect any denning activities. No additional habitat would be modified and existing human use would remain the same under Alternative A, therefore this alternative would not have any additional effects on wolves nor would it cause population level impacts on wolves, their ungulate prey or other important habitat elements. Therefore, this alternative **“may affect, but is not likely to adversely affect”** gray wolf.

**Yellow-billed cuckoo** – Ongoing activities at the Moose Headquarters Area have reduced the suitability of the area for yellow-billed cuckoo, especially during their breeding and nesting season (May-July) when they are sensitive to disturbance. Human presence and associated activities have also decreased the quality of habitat in areas immediately adjacent to the project area. No additional habitat would be modified and existing human use would remain the same under

Alternative A, therefore this alternative would not have any additional effects on yellow-billed cuckoo. Continued use of the Moose Headquarters Area under existing conditions would have local, long-term, minor adverse effects. Displacement or disturbance to individuals that occurs as a result of human activities would be confined to the project's immediate area and would not have population level impacts on this species. Therefore, this alternative **"may affect, but is not likely to adversely affect"** yellow-billed cuckoo.

**Grizzly bear** – Most grizzly bears are displaced from using habitats within the Moose Headquarters Area under this alternative because of the high levels of human activity that occur there. Human presence and associated activities have also decreased the quality of habitat in areas immediately adjacent to the project area. In addition, the presence of human foods associated with park visitors within the Moose Headquarters Area has the potential to attract bears to the area on occasion, particularly human-habituated grizzly bears. Expanding numbers of grizzly bears in the south end of the park may increase the chance that they would investigate this area more frequently. Ongoing use of the Moose Headquarters Area and associated human foods increases the probability that bears would receive food rewards, become food conditioned, and ultimately be destroyed because of threats to human safety. This adverse impact to grizzly bear populations is negligible and long-term currently but could increase to minor and long-term if grizzly bear density increases in the area. The direct and indirect impacts on this species associated with habitat loss due to the existing use of the area are considered negligible to minor and long-term. Displacement or disturbance to individuals that occurs as a result of activities occurring in the Moose Headquarters Area would be confined to the project's immediate area and limited on a temporal extent and should not have population level impacts on this species. Therefore, this alternative **"may affect, but is not likely to adversely affect"** grizzly bear.

### **Mammals**

Development of the Moose Headquarters Area has resulted in the loss or modification of approximately 10 acres of riparian and adjacent upland habitat. Under the No Action alternative, small mammal species such as ground squirrels, red squirrels, chipmunks, mice, and voles would continue to use unmodified habitat within and adjacent to the project area. Continued human use of the area would not result in additional direct loss of habitats suitable for ungulate browsing and security but it would continue to cause habitat avoidance, particularly during the busy visitor season. Ungulates could use habitat surrounding the Moose Headquarters Area during winter and early spring or at other times of the year when human presence is low. The primary effect of continued use of the Moose Headquarters Area on ungulates would continue to be habitat avoidance due to human disturbance, a long-term, direct and indirect, minor adverse impact.

Ongoing use of the Moose Headquarters Area under the No Action alternative has direct and indirect adverse effects on several species of carnivores. Some habitat remains for raccoons, weasels, badgers, skunks, and pine marten within the developed area's existing footprint. Although these species may be present in the habitats within the developed area, densities are likely reduced when compared to undisturbed habitats. Species such as skunks and raccoons may experience beneficial effects through use of cavities associated with building foundations as wintering and denning areas. Other species, including coyote, bobcat, mountain lion, and black and grizzly bears, are displaced from using habitats within the footprint of the Moose Headquarters Area because of high levels of human activity. This human activity also results in a buffer of unused habitat around the developed area, the size of which depends on the particular species and their individual levels of tolerance for human activities. Habitat loss resulting from the Moose Headquarters Area's existing footprint has resulted in minor and long-term direct and indirect adverse impacts on these carnivores.

The presence of human foods associated with visitor use of the Moose Headquarters Area has the potential to attract bears to the area on occasion. This possibility increases the probability for bears to receive food rewards, become food conditioned, and ultimately be destroyed because of threats to human safety. This adverse impact to bear populations is negligible and long-term currently but could increase to minor and long-term if grizzly bear density increases in the area.

### **Birds — General**

Under the No Action alternative, sparrows, warblers, thrushes, woodpeckers and other birds would continue to use unmodified habitat within and adjacent to the project area. Continued human use of the area would not result in additional direct loss of suitable habitat but it could continue to cause species that are more sensitive to human disturbance to avoid the area, particularly during the busy visitor season. The mixture of riparian and upland sagebrush habitats surrounding the project area makes it likely that a variety of resident and neotropical migratory bird species would be found there.

### **Special Concern Species, Neotropical Migratory Birds, and Amphibians and Reptiles**

The continued operation of the Moose Headquarters Area under the No Action alternative has direct and indirect adverse effects on several special-concern species including bald eagles, sage-grouse, trumpeter swans, neotropical migratory birds, and amphibian and reptiles. Within the developed area's existing footprint, some habitat remains for neotropical migratory birds, amphibians and reptiles, and other special-concern species. These species may use habitats within the developed area for nesting, foraging or shelter but densities are likely reduced when compared to undisturbed habitats. Other species, such as sage-grouse, bald eagle, trumpeter swan, and raptors may be displaced from using habitats within the Moose Headquarters Area's footprint because of high levels of human activity and/or habitat alteration. Human presence and associated activities has also decreased the quality of habitat in areas immediately adjacent to the project area, the size of which depends on the particular species and individual levels of tolerance for human activities.

The existing footprint of the Moose Headquarters Area would remain the same under the No Action alternative. No new areas of disturbance would be created and no trees or other vegetation would be removed. Without a change in vegetation or human activity in the project area, wildlife use would generally remain the same although habitat quality in the immediate area would remain relatively low due to the existing level of development and human presence. Selection of the No Action alternative would not affect special-concern species, neotropical migratory birds, or amphibian and reptiles in the project vicinity, or their habitat, beyond the on-going impacts from visitation and human activity that have been occurring in this area for many years. These ongoing impacts are considered negligible to minor, and long-term.

*Cumulative Impacts:* Continued use of the Moose Headquarters Area under the No Action alternative, combined with other activities in the area (disturbances associated with the proposed Moose Headquarters Rehabilitation Plan including installation of a temporary swing space modular building and the wash bay, and the Moose Housing Project) as well as potential future activities (construction of a multi-use pathway between the south park boundary and Dornan's, and possible use of the 4 Lazy F Ranch) would allow disturbances to persist which would result in overall adverse negligible to minor, long-term cumulative impacts to wildlife. The incremental contribution to existing cumulative impacts from activities associated with the No Action alternative is expected to be negligible.

It should be noted that, from a terrestrial wildlife perspective, the most important issue is the function of the wildlife movement corridor along the Snake River. Cumulatively, existing development in Moose, the Moose Post Office, the Craig Thomas Discovery and Visitor Center,

Menor's Ferry, the Murie Ranch, 4 Lazy F Ranch, and Dornan's on the east side of the river have likely had an effect on the ability of wildlife to move along this important corridor. Due to existing development, habitat use and animal movements are restricted to a narrow bottleneck of native spruce-cottonwood floodplain habitat adjacent to the river.

*Conclusion:* Direct, indirect, and cumulative impacts to the wildlife resource would be adverse, negligible to minor and long-term as a result of implementing the No Action alternative; the contribution to cumulative effects from this alternative would be negligible. It was also determined that Alternative A "may affect, but is not likely to adversely affect" the gray wolf, yellow-billed cuckoo, and grizzly bear. The No Action alternative would not result in any unacceptable impacts on wildlife and their habitats in the area, including special concern, threatened, or endangered species (NPS 2006). The effects on wildlife resources under the No Action alternative would not be unacceptable because the potential adverse impacts are anticipated to be only negligible to minor in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of wildlife under this alternative (by definition, impairment is worse than unacceptable impacts).

### **Effects of Alternative B: NPS Preferred Alternative on Wildlife, Including Threatened and Endangered Species**

*Direct/Indirect Effects:* Alternative B proposes a number of site upgrades and improvements within the Moose Headquarters Area. Project implementation would primarily involve upgrade/replacement of existing surfacing within the previously disturbed footprint, removal of some existing temporary facilities, and restoration of some previously disturbed areas; disturbance in currently undisturbed habitat would be minimal and would not occur immediately adjacent to the Snake River. Construction activities associated with the proposed upgrades would likely be minor, compared to the type of activities that typically occur in the project area and would add to the existing disturbance impacts. Implementation of this alternative is expected to result in a short-term, local increase in disturbance impacts during construction and 41,855 square feet (0.96 acre) of disturbance including permanent loss of approximately 12 trees. Of that total disturbance amount, 2,010 square feet (0.05 acre) represents new disturbance in a previously undisturbed area (along the user-created trail to Menor's Ferry). Once the construction is complete, most potential impacts on wildlife would be similar to Alternative A.

Some long-term, negligible to minor adverse impacts would be expected due to improvements in the project area, particularly those closer to the river where the most important wildlife habitat exists. Although existing development and human activity have already degraded habitat quality and likely the ability of wildlife to freely use this habitat as a movement corridor, improvements such as the new concessioner parking area, the new interpretive pedestrian trail, and signs directing visitors make it likely that the number of people using the area would increase. The degree to which wildlife is discouraged from using the area would also increase.

### **Threatened, Endangered, and Candidate Species**

**Gray wolf** - Generally, project activities occurring more than 1 mile from a den or rendezvous site and outside of the breeding season (April - June) do not disrupt and/or inhibit wolf life history behavior to the point of site abandonment or mortality. The project area is greater than 1 mile from any known wolf den or rendezvous site. While Moose Headquarters and adjacent areas provide some foraging habitat used by wolf prey, such as deer, moose, and elk, project effects would reduce a negligible amount of prey foraging opportunities. Long-term, negligible to minor, direct and indirect, adverse effects due to human activities in the Moose Headquarters Area would continue as described under the No Action alternative under Alternative B. In addition, individual wolves that could use habitat near the project area may leave or avoid the area due to human

presence and construction noise during project implementation. Any displacement or disturbance of individual wolves, or their prey, that occurs as a result of project implementation would be confined to the project's immediate area and limited in timeframe and extent. The addition of negligible short-term and long-term adverse impacts would not have population level impacts on wolves, their ungulate prey or other important habitat elements. Therefore, it is in the opinion of the NPS that this alternative **"may affect, but is not likely to adversely affect"** gray wolf.

**Yellow-billed cuckoo** - Human presence and associated activities in the Moose Headquarters Area has decreased the quality of habitat in the project area as well as in areas immediately adjacent to the project area. Implementation of Alternative B would result in further disturbance during construction activities and a small amount of additional habitat disturbance including removal of one spruce tree and eight cottonwood trees greater than 10 inch DBH, three spruce trees between 5-10 inch DBH, and approximately six large willows. Although there is already considerable human presence along Moose Landing Road, adding a new interpretive pedestrian trail along the road and formalizing the user-created social trail that leads north to the Menor's Ferry Historic District could reduce habitat suitability and increase human presence to some degree. Restoration of some previously disturbed areas would offset some of the vegetation lost; however vegetation structure in the restored areas may not be similar to what is removed. Impacts from the removal of vegetation, mainly cottonwood trees, would have long-term, local, and negligible to minor impacts to yellow-billed cuckoo, although these impacts would occur in areas currently degraded because of high disturbance levels from existing use of the Moose Headquarters Area. Any displacement or disturbance of individual cuckoos that occurs as a result of project implementation would be confined to the project's immediate area and limited in extent and should not have population level or long-term impacts on this species. Therefore, it is in the opinion of the NPS that this alternative **"may affect, but is not likely to adversely affect"** yellow-billed cuckoo.

**Grizzly bear** - The presence of grizzly bears in or immediately adjacent to the project area is likely to be incidental due to the amount of ongoing human activity. Grizzlies have been observed in the immediate area since 2007; two were trapped during black bear research in 2009 less than a mile from the project area. It is possible that dispersed human use could affect the distribution of elk that use adjacent habitat, thereby reducing elk calf predation opportunities for bears; however, the park anticipates the effects would be negligible. Individual grizzlies that may use habitats near the project area for foraging and traveling may avoid the area due to human presence and construction noise during project implementation. Overall, impacts associated with potential food-conditioning of bears would not vary considerably between Alternatives A and B. Any displacement or disturbance of individual grizzly bears, or their prey, that occurs as a result of project implementation would be confined to the project's immediate area and limited in extent and should not have population level or long-term impacts on this species. Therefore, it is in the opinion of the NPS that this alternative **"may affect, but is not likely to adversely affect"** grizzly bear.

### **Mammals**

Human development with attendant high density human use generally results in a decline in the effectiveness of habitat to support ungulates. In addition to the existing impacts associated with continued use of the Moose Headquarters Area, Alternative B would result in a negligible to minor amount of additional habitat loss where new disturbance occurs in undisturbed areas and a reduction in habitat effectiveness due to construction-related disturbance. Because summer range is widely available for all the ungulate species within the Jackson Hole valley and in areas surrounding the project area, the direct loss of a small amount of ungulate foraging habitat is anticipated to have negligible effects.

Existing development and human activity have already degraded habitat quality and likely the ability of wildlife to freely use this habitat as a movement corridor. Improvements in the project area, particularly those adjacent to the river where the most important wildlife habitat exists such as the new concessioner parking area, the interpretive trail, and signs directing visitors make it likely that the number of people using the area, and associated displacement effects, would increase. These indirect impacts would be long-term, negligible to minor, and adverse.

Small mammal species would continue to use unmodified habitat within and adjacent to the project area. Ground disturbance during some construction activities, including construction of pedestrian trails, one linking the Moose housing area to the Post Office and the other formalizing a user-created social trail between the northern end of Moose Landing Road and the Menor's Ferry Historic District, may destroy some burrowing animals such as voles. Once construction is complete, the effects of continued use of the Moose Headquarters Area on mammals would be the similar to those described for the No Action alternative although additional long-term, negligible to minor, adverse impacts would be expected from increased levels of human use near the river and along the interpretive pedestrian trail to Menor's Ferry.

Ongoing use of the Moose Headquarters Area under this alternative would have direct and indirect adverse effects on carnivores currently using the area. Species displaced from using habitats within the footprint of the Moose Headquarters Area because of high levels of human activity would be further affected by construction activities. Habitat loss would increase by a negligible amount under this alternative related to disturbance of currently undeveloped areas. Alternative B would have negligible to minor and long-term direct and indirect impacts on carnivores. Overall, impacts associated with potential food-conditioning of bears would not vary considerably between Alternatives A (the No Action alternative) and B. Once construction is complete, potential impacts on carnivores would be similar to those described for the No Action alternative.

### **Birds — General**

A variety of birds including sparrows, warblers, thrushes, woodpeckers and others would continue to use unmodified habitat within and adjacent to the project area. Ongoing human use of the area would continue to cause species that are more sensitive to human disturbance to avoid the area, particularly during the busy visitor season.

In addition to the existing impacts associated with continued use of the Moose Headquarters Area, Alternative B would result in a negligible to minor amount of additional habitat loss where new disturbance occurs in undisturbed areas and a reduction in habitat effectiveness due to construction-related disturbance. Ground disturbance during some construction activities may destroy the nests of some ground-nesting birds and removal of approximately one spruce tree and eight cottonwood trees greater than 10 inch DBH, three spruce trees between 5-10 inch DBH, and approximately six large willows within the Moose Headquarters Area related to the site work upgrades has the potential to impact birds that use and depend on cottonwood and spruce trees for nesting, foraging, or shelter. Some species of birds may relocate to similar habitat within the surrounding area. For other species, tree removal may result in the permanent, direct loss of habitat, a reduction of habitat security, and increased habitat fragmentation. Although these effects would not have population level impacts on such species, they may cause displacement, competition, higher predation, and lower survival of some individuals.

The construction of a pedestrian trail between the Moose employee housing area and the Post Office would cause ground disturbance, loss of habitat, and potentially destroy the nests of some ground-nesting birds but, after construction was completed, the level of human activity would be similar to levels under the No Action alternative. Adding signage and a formal interpretive trail along Moose Landing Road that continues north to the Menor's Ferry Historic District could also

increase human presence and reduce habitat suitability to some extent in the long term. Although pedestrians already use this area and the interpretive trail would mainly direct pedestrian traffic, more people would likely walk to Menor's Ferry on this formal trail compared to numbers that use the unsigned user-created trail. Placement of this pedestrian trail along the existing social trail alignment would reduce potential habitat loss. Restoration of previously disturbed areas would offset some of the direct habitat loss from new disturbance; however vegetation structure in the restored area may not be similar to what is removed for site improvements.

Impacts from the removal of vegetation, mainly spruce and cottonwood trees, and the potential that human activity would increase along the interpretive pedestrian trail would have long-term, local, negligible to minor, direct and indirect impacts on neotropical migratory birds. Almost all of these impacts would occur in areas currently degraded because of high disturbance levels from existing use of the Moose Headquarters Area.

Once construction is complete, the effects of continued use of the Moose Headquarters Area on birds in general (see below for discussion on impacts to neotropical migratory birds) would be similar to those described for the No Action alternative although additional long-term, negligible to minor, adverse impacts would be expected from increased levels of human use near the river and along the interpretive trail to Menor's Ferry.

### **Special Concern Species, Neotropical Migratory Birds, and Amphibians and Reptiles**

Direct impacts to special-concern species such as bald eagles, sage-grouse, trumpeter swans, neotropical migratory birds, and amphibians and reptiles as a result of implementation of Alternative B would primarily stem from noise disturbance related to construction activity and a small amount of habitat removal related to disturbance in new areas. Noise associated with construction activities has the potential to disturb wildlife in the area, but this disturbance is expected to be of low magnitude and of short-duration since construction noise would cease as soon as the project was complete. A direct loss of some individuals could occur during construction activities whereas other individuals would not be permanently displaced. Wildlife such as some bird, amphibian or reptile species may be temporarily or permanently displaced to similar habitat in the surrounding area.

Adding signage, a new interpretive pedestrian trail along Moose Landing Road, and formalizing the user-created social trail that leads north to the Menor's Ferry Historic District could also reduce habitat suitability and increase human presence to some degree. Although pedestrians already use this area and the interpretive trail would mainly direct pedestrian traffic, more people would likely walk to Menor's Ferry on this pedestrian trail compared to numbers that used the unsigned user-created trail. Placement of the formalized trail along the existing user-created trail alignment reduces potential habitat loss.

Under Alternative B, the permanent loss of a relatively small number of trees (described above under *Birds — General*) has the potential to impact birds that use and depend on cottonwood and spruce trees for nesting, foraging, or shelter, although this loss would occur in an area with existing high human use and low habitat quality. Some species of birds may relocate to similar habitat within the surrounding area. For other species, tree removal may result in the permanent, direct loss of habitat, a reduction of habitat security, and increased habitat fragmentation. Impacts from site work such as increased noise and human activity would be short-term and negligible to breeding, nesting, or migrating birds. Although these effects would not have population level impacts on such species, they may cause displacement, competition, higher predation, and lower survival of some individuals. Impacts from the removal of vegetation, mainly spruce and cottonwood trees, and the potential that human activity would increase along the interpretive pedestrian trail would have long-term, local, and negligible to minor, direct and indirect impacts on

neotropical migratory birds. Almost all of these impacts would occur in areas currently degraded because of high disturbance levels from existing use of the Moose Headquarters Area.

Restoration of certain areas within the Moose Headquarters Area would offset some of the direct habitat loss resulting from new disturbance although vegetation structure in the restored area may not be similar to what is removed for site improvements. Impacts from the removal of vegetation, mainly cottonwood and spruce trees, would have long-term, local, and minor impacts to wildlife special-concern species and amphibians and reptiles although these impacts would occur in areas currently degraded because of high disturbance levels from existing use of the Moose Headquarters Area. Other potential impacts on special concern species would be similar to impacts under the No Action alternative.

*Cumulative Impacts:* Cumulative impacts associated with Alternative B would be similar to the No Action alternative except that Alternative B would contribute to additional habitat loss, fragmentation, and degradation related to the removal of approximately of one spruce tree and eight cottonwood trees greater than 10 inch DBH, three spruce trees between 5-10 inch DBH, and approximately six large willows. Improvements such as the new interpretive pedestrian trail and signage would increase human presence and reduce habitat suitability to some extent in the long term, increasing disturbance effects in an important movement corridor for terrestrial wildlife (see *Cumulative Impacts* under Alternative A). Pedestrians already use this area and the interpretive trail would mainly direct pedestrian traffic. Overall, cumulative impacts to wildlife would be adverse, negligible to minor, and long-term. The incremental contribution to existing cumulative impacts from activities associated with Alternative B is expected to be negligible.

*Conclusion:* Direct, indirect, and cumulative impacts to wildlife resources would be long-term, adverse, and negligible to minor as a result of implementing Alternative B. Cumulative impacts to wildlife would be adverse, negligible to minor, and long-term; the incremental contribution to cumulative impacts from activities associated with Alternative B is expected to be negligible. It was determined that Alternative B **"may affect, but is not likely to adversely affect"** the gray wolf, yellow-billed cuckoo, and grizzly bear. Alternative B would not result in any unacceptable impacts on wildlife and their habitats in the area, including special concern, threatened, or endangered species (NPS 2006). The effects on wildlife resources under Alternative B would not be unacceptable because the potential adverse impacts are anticipated to be only negligible to minor in intensity and, thus, would not rise to the level where unacceptable impacts could occur. Because no unacceptable conditions would result, there would be no impairment of wildlife under this alternative (by definition, impairment is worse than unacceptable impacts).

## Visitor Use and Experience

### Affected Environment

Over the past decade, the total number of recreational visits to Grand Teton National Park has ranged from 2.5 to 2.8 million people per year. Approximately 80 percent of all visits to the park occur between June 1 and September 30, with July and August as the peak months for visitation. Visits during these months in recent years have averaged around 24 and 21 percent of the annual total, respectively.

In summer 2002, a survey found that approximately 40 percent of non-local and 55 percent of local visitors to the park participate in boating on lakes and rivers in the park (Loomis and Caughlan 2004). The boat landing area of the Moose Headquarters Area receives heavy use during the summer months from both visitors and concessioners and their clients. This use often results in congested traffic and a spillover effect to the administration area resulting in safety hazards and a negative experience for those who use the area. Approximately 65,000 park visitors are guided on

Snake River float and fishing trips annually, predominantly late-May through September, along with approximately another 20,000 self-guided recreational users. The following float or fishing companies use the Moose Landing to land boats: Barker-Ewing Scenic Tours; Boy Scouts of America; Snake River Angler; Grand Teton Lodge Company; Heart 6 Float Trips; Jack Dennis Fishing Trips; Lost Creek Ranch; National Park Float Trips; OARS, Inc.; R Lazy S Ranch; Signal Mountain Lodge; Solitude Float Trips; and Triangle X Float Trips.

Moose Landing, with its two boat ramps and three associated parking areas, does not have sufficient capacity to accommodate the number and type of boat trailers and shuttle vehicles that currently use this area, as permitted under the Snake River Management Plan (1997) and concession contracts. The crowded situation results in boat trailers and passengers lining up in the landing areas amidst boat trailers being used to land river rafts, boat trailers being loaded or unloaded, large and small moving vehicles, and intermingled pedestrian traffic.

In its current configuration, there is effectively a circular route surrounding the Moose Headquarters Area that provides access/departure for concessioners and private boaters on the Headquarters and Moose Landing Roads. During the peak boating season, the traffic can be heavy at times between the concessioner parking and staging area and the boat landing drop off island and public float trip parking area. The concessioner parking area to the north, with space for an estimated 28 vehicles, is used for picking up boats coming off the river, for rigging, and as a waiting area for operators. The public float trip parking area is located to the south on the Moose Landing Road adjacent to the boat landing drop off island and bus parking area.

In addition to typical passenger vehicles, there are numerous large vehicles that need to be accommodated in this area. Concessioner vehicles that use the area typically consist of a 15 passenger van and boat trailer and public vehicles consist of a variety of vehicles that can haul a trailer and a boat. These vehicles must have sufficient space to navigate 180° turns and 3 point turns for boat landing, parking, etc. Tour buses also use the Moose Landing Road for both pick up and drop off of tour participants of the river float trips. Bus parking is provided adjacent to the rigging area and the river. There are three bus parking spots currently available on site.

There are no formal trails for boaters leaving the river along the Moose Landing Road; however, a network of user-created trails has been created throughout. Pedestrian traffic on the road is currently uncontrolled and confusing creating safety concerns and the potential for conflict. The lack of a clear walkway contributes to an unsafe overlap of pedestrians and river access vehicles as visitors linger in areas used for parking, boat rigging, customer pickup, and the road trying to find their way. There are several picnic tables near the river and one vault toilet in the boat landing drop off island. There are no restrooms located at the north end of the road where the majority of the people get off boats. Often, when they get to shore, they do not know where the nearest restroom facility is and, as a result, visitors have been observed relieving themselves in the woods.

The park has constructed a multi-use/biking pathway that runs along the north side of the Teton Park Road. This multi-use pathway accesses the new Craig Thomas Discovery and Visitor Center to the south, but does not tie into the Moose Landing Road to link to river operations. A user-created trail exists north of the concessioner parking area that connects to the Menor's Ferry Historic District. There is a small trail in the Moose Headquarters Area that provides access to the Post Office but it is not connected to any other pathway or trail. Residents accessing the Post Office walk on the road until they get to the back side of the Post Office where the short trail is located.

## Environmental Consequences

### Methodology

The baseline information used to assess impacts to visitor experience is as described in the methodology section at the beginning of this chapter and includes park staff knowledge of the resources and site; occupancy rate and pattern data collected by the NPS and its concessioner; visitor surveys; review of existing literature and park studies; information provided by NPS professionals; and professional judgment.

### Impact Threshold Definitions

Impact Category	Definition
Negligible	The impact is barely detectable and/or would affect few visitors.
Minor	The impact is slight but detectable and/or would affect some visitors.
Moderate	The impact is readily apparent and/or would affect many visitors.
Major	The impact is severely adverse or exceptionally beneficial and/or would affect the majority of visitors.

### Effects of Alternative A: No Action on Visitor Use and Experience

*Direct/Indirect Effects:* Under the No Action alternative, the current confusion and safety issues caused by poor traffic circulation and conflicting and mixed uses would persist. The congested conditions that result in boat trailers and passengers lining up in the ramp areas, amidst boat trailers being loaded or unloaded, large and small moving vehicles, and intermingled pedestrian traffic would continue. In addition, the crowded commercial vehicle parking area used by shuttle vehicles with boat trailers is surrounded by the NPS maintenance area, resulting in potential conflicts between commercial operators, NPS heavy equipment, construction activities, and public and administrative pedestrian traffic. Because there is no designated route for visitors traversing the riverside area, they walk along the road in the traffic lanes without a designated crossing point to return to the vehicle parking area. The lack of a clear walkway contributes to an unsafe overlap of pedestrians and river access vehicles as visitors linger in the asphalt areas used for parking, boat rigging, customer pickup, and through traffic because there is no clear trail or signage indicating where they should go. In combination, these existing conditions are creating safety hazards and a negative experience for those who use the area. This alternative would have long-term, moderate, local, and adverse effects on visitor use and experience because the area around the Moose Headquarters Area would remain unchanged.

*Cumulative Effects:* Continued use of the Moose Headquarters Area under Alternative A with its existing poor traffic circulation and conflicting and mixed uses has the potential to affect visitor use and experience in combination with other activities in the area (mainly construction of the multi-use pathway along the Teton Park Road, construction of the auditorium at the Craig Thomas Discovery and Visitor Center, and disturbances associated with the proposed Moose Headquarters Rehabilitation Plan including rehabilitation of the Moose Maintenance Building and Former Visitor Center / Administration Building). Effects of park-wide transportation-related projects and the addition of the auditorium would have short-term, local, negligible to minor, adverse effects due to construction and long-term, moderate, local, beneficial cumulative impacts on visitor use and experience. Actions associated with the Moose Headquarters Rehabilitation Plan would have similar short-term effects related to construction activities. The relative contribution of Alternative A on visitor use and experience would be adverse, minor to moderate, local, and long-term; however, overall cumulative impacts would be beneficial, minor, local, and long-term due to the multi-use pathway and the addition of the new auditorium.

*Conclusion:* The No Action alternative would result in moderate, local, long-term, adverse effects to visitor use and experience because conditions in the Moose Headquarters Area would remain unchanged. Cumulative impacts would be short-term, local, negligible to minor, and adverse and long-term, moderate, local, and beneficial; the relative contribution of Alternative A on visitor use and experience would be minor to moderate. Alternative A would not result in any unacceptable impacts on visitor use (NPS 2006). The effects on visitor use and experience under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be moderate or less in intensity and, thus, would not rise to the level where unacceptable impacts could occur.

### **Effects of Alternative B: NPS Preferred Alternative on Visitor Use and Experience**

*Direct/Indirect Effects:* This alternative would reconfigure the Moose Headquarters Area parking and vehicular traffic flow, including outfitter/ passenger parking and staging areas, to mitigate existing safety hazards and provide an improved visitor experience. The comprehensive rehabilitation of the site would provide safer landing conditions for motor vehicles and boat trailer traffic; better accommodate future increases in public use; and reduce current conflicts between administrative, commercial, and public uses in the Moose maintenance, headquarters and boat ramp area. Alternative B would result in long-term, local, minor to moderate, beneficial effects to visitor use and experience.

Site work implemented under this alternative would afford safe landing conditions by providing more effective control and separation of pedestrians, vehicles, and Snake River boat landing operations. Pedestrian control would be accomplished by constructing a new, designated parking area for guided river raft trip customers, complete with an associated picnic/ waiting area and restroom facilities. This would reduce visitor lingering in the asphalt areas currently used for an unsafe and inefficient mix of parking, boat rigging, customer pickup, and through traffic. The installation of a new pedestrian trail would provide a safe route for visitors traversing the riverside area, outside of traffic lanes, with a designated crossing point. The esthetics and visitor safety would be improved along this new visitor trail through the existing administrative area, resulting in an improved experience for visitors to the historic properties that surround the Moose Headquarters Area. Visual impacts due to development visible from the river would remain essentially the same or slightly improve due to the removal of buildings and the consolidation of pedestrian traffic in designated routes. Vehicular traffic flow would be improved by installing raised concrete intersections, crosswalks, and/or asphalt speed dips to control speed, and implementing an extensive signage program to reduce confusion for first time visitors. These improvements would lessen mixed use confusion and provide better cohesion, resulting in a long-term, local, minor to moderate, beneficial effect on visitor use and experience.

Although there would still be a potential conflict with concessioner and visitor traffic traveling through the Moose Headquarters Area on Headquarters Road, other changes proposed under this alternative such as the addition of new signage and speed control features in combination with improved parking and access and addition of the new pedestrian trail in this area would help mitigate adverse effects.

During construction, visitor access to portions of the area would be limited. Noise and dust from construction activities could also adversely affect visitor use and experience; however all construction-related impacts would be temporary and cease following construction activities. Minor, short-term, local, adverse impacts to visitor use and experience would result from rehabilitation activities.

Resultant direct and indirect impacts of Alternative B on visitor use and experience, including health and safety, would be adverse, minor, and localized in the short-term related to construction activities and localized, moderate, and beneficial in the long-term.

*Cumulative Effects:* As described under Alternative A, construction activities related to other projects in combination with this project have the potential to affect visitor use and experience related to construction noise, dust, and restricted use. Ultimately, however, the resulting changes would have a beneficial effect on visitor use and experience, particularly the construction of the multi-use pathway and auditorium and improvements to the functionality of the Moose Headquarters Area. Overall, cumulative impacts on visitor use and experience are expected to be localized, minor to moderate, and adverse in the short-term and localized, moderate, and beneficial in the long-term; the relative contribution of Alternative B on visitor use and experience would be moderate.

*Conclusion:* Effects of Alternative B would be short-term, local, minor, and adverse and long-term, local, moderate, and beneficial. Cumulative impacts would be localized, minor to moderate, and adverse in the short-term and localized, moderate, and beneficial in the long-term; the relative contribution of Alternative B on visitor use and experience would be moderate. Alternative B would not result in any unacceptable impacts on visitor use and experience (NPS 2006). The effects on visitor use and experience under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be moderate or less in intensity and, thus, would not rise to the level where unacceptable impacts could occur.

## Park Operations

### Affected Environment

Park operations refer to the adequacy of staffing levels and the quality and effectiveness of the park infrastructure in protecting and preserving vital resources and providing for an effective visitor experience. Infrastructure facilities include the roads that are used to provide access to and within the park (both administrative and visitor use), housing for staff required to work and live in the park, visitor orientation facilities (visitor centers, developed and interpreted sites, and other interpretative features), administrative buildings (office and workspace for park staff), management support facilities (garages, shops, storage buildings, and yards used to house and store maintenance equipment, tools, and materials), and utilities such as phones, sewer, water and electric. Location of roads, administrative buildings, and other facilities within the Moose Headquarters Area are shown on Figures 2 and 7.

During the peak summer season, there are up to 200 office workers in the administrative buildings within the Moose area. Park staff is responsible for routine maintenance of the infrastructure, facilities, and site conditions. In general, implementation of a new project can affect the operations of a park such as the number of employees needed; the type of duties that need to be conducted; when/who would conduct these duties; how activities should be conducted; and administrative procedures.

Several conditions exist in the Moose Headquarters Area that are not optimal for park employees and operations as described in the *Background* section in Chapter 1. Since 2005, the park has been working on resolving numerous health/ safety issues related to the park's headquarters and maintenance area. These actions are described in the *Cumulative Actions Scenario* in Chapter 1.

## Environmental Consequences

### Methodology

Park staff knowledge was used to evaluate the impacts of each alternative on current park operations presented.

### Impact Threshold Definitions

Impact Category	Definition
Negligible	A change in operations that is not measurable or perceptible.
Minor	Change in an operation that is slight and localized with few measurable consequences.
Moderate	Readily apparent changes to park operations with measurable consequences.
Major	A severely adverse or exceptionally beneficial change in park operations.

### Effects of Alternative A: No Action on Park Operations

*Direct/Indirect Effects:* Under the No Action alternative, there would be no site work upgrades, and no modification to segregate residential, operations/ administration, and public/ visitor use areas within the Moose Headquarters Area. Concessioners would continue to travel the circular route along the Headquarters Road through the administrative area to access the boat landing area. No action would be taken to address the potential conflict between this traffic and NPS employees (pedestrians, vehicles, and equipment) accessing the park operations (Moose Maintenance Building, Administrative Building, temporary buildings, fuel pump, works yard, and the shipping and receiving, maintenance, and emergency vehicle bay). No improvements would be made to address parking and traffic congestion along the Moose Landing Road.

The numerous deficiencies associated with the current stormwater management system would not be addressed under this alternative. Stormwater would continue to pool and create safety issues during icy conditions. Sheet flow of runoff water also occurs and causes problems when it flows toward the river, adjacent vegetated areas, and river areas. Park operations would have to continue to address these conditions, particularly in the winter when they create unsafe conditions for employees walking and driving in the Moose Headquarters Area.

Effects of this alternative on park operations at Grand Teton National Park would be localized, moderate, long-term, and adverse.

*Cumulative Effects:* Any project that occurs in the park has an effect on park operations; therefore, most of the actions listed in the cumulative effects scenario in Chapter 1 would have some degree of effect on employees and park operations. The Moose Headquarters Rehabilitation Plan would have the greatest potential for cumulative effects to park operations. Project components include: the rehabilitation of all three floors of the Moose Maintenance Building; reuse and rehabilitation of the former Visitor Center / Administration Building for administrative use and warehouse space; and consolidation of uses from the temporary buildings into the renovated Moose Maintenance Building. Addressing structural deficiencies in the Moose Maintenance Building and the former Visitor Center / Administration Building as part of the rehabilitation would reduce the amount of time and expertise needed for maintenance crews to repair deficiencies. These actions would improve park operations by providing a safe, healthy, and functional and efficient working environment for park employees. Effects on the health and safety of employees and the efficiency of park operations would be local, long-term, moderate, and beneficial.

Actions associated with the Moose Headquarters Rehabilitation Plan would change the uses occurring in some of the buildings such that park employees would occupy new office spaces in the renovated Moose Maintenance Building; vehicle and pedestrian traffic to access the buildings would change accordingly. However, under the No Action alternative parking for visitors, concessioners, and employees would remain the same and no site rehabilitation would take place to accommodate the changed function of the buildings. As a result, potential conflicts affecting park operations could continue.

The mobile/temporary structures and pre-engineered buildings located to the east of the Moose Maintenance Building would remain on site although they would no longer be occupied as offices or used for storage. These buildings are inefficient and expensive to maintain. Leaving them on site would place a continued demand on the park maintenance staff for upkeep and a continued expense on the park's operating budget, particularly for the structures that are leased.

Installation of a temporary swing space modular building as part of the rehabilitation would ensure that several employees would have temporary office space to move into while the former Visitor Center / Administrative Building is being converted into warehouse and office space. Construction of a modern, waterproof telecommunication vault and single radio tower would ensure continuity of communications throughout construction and would replace an out-dated telecommunications vault. Construction of a wash bay would provide a temporary facility (swing space) for emergency response vehicles to allow continuity of critical park functions during construction. Once all the phases are completed this facility would provide a wash bay for NPS vehicles and equipment. Implementation of these three projects would provide local, short-term, minor, beneficial effects to park operations by ensuring continuity during implementation of the rehabilitation plan.

Other changes related to the Moose Headquarters Rehabilitation Plan would provide for an improved working environment for park employees. The employee offices currently located in the former Visitor Center and temporary buildings would be relocated to the renovated Moose Maintenance Building, which would consolidate all employees into one location. These effects would have a minor to moderate benefit on employee communication, cohesion, and efficiency. Therefore, there would be a local, minor to moderate, beneficial, long-term effect on park operations when considered with other past, present, and reasonably foreseeable future actions. The relative contribution of Alternative A on park operations would be negligible to minor.

*Conclusion:* Under Alternative A, resultant direct and indirect impacts to park operations would be local, adverse, minor to moderate, and long-term. Relevant recent, ongoing and reasonably foreseeable projects in the park are expected to have adverse, local, minor to moderate, long-term cumulative impacts on park operations and local, moderate, long-term, beneficial effects on the efficiency of park operations and the health and safety of employees. The relative contribution of Alternative A on park operations would be negligible to minor. Alternative A would not result in any unacceptable impacts on park operations (NPS 2006). The effects on park operations under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be moderate or less in intensity and, thus, would not rise to the level where unacceptable impacts could occur.

### **Effects of Alternative B: NPS Preferred Alternative on Park Operations**

*Direct/Indirect Effects:* The site improvements proposed under Alternative B would provide a working environment for park employees that meets current health and safety standards. Rehabilitation of the site in the Moose Headquarters Area would reduce operations and maintenance efforts by improving stormwater drainage and improving the quality and efficiency of overall park operations. These actions and others being taken to segregate incompatible uses within the Moose Headquarters Area would improve safety. Effects on the health and safety of

employees and the efficiency of park operations would be long-term, local, moderate, and beneficial.

Segregation of operations/ administration and visitor use areas including parking facilities within the administrative areas would improve function and safety for park employees. Employee and public parking areas would remain near the south end of the Moose Maintenance Building and would be reorganized and segregated from the maintenance and emergency operations north of the building, making them safer and more functional. The overall size of the works yard would remain the same and the efficiency of the space would be enhanced so no adverse effects to park operations are expected from this action. Reconfiguration of the parking areas and changes in access would segregate visitors and concessioners from administrative functions and traffic in the administration area of the Moose Headquarters Area. Improved segregation would improve traffic flow and provide safer movement of pedestrians in the area. Operations associated with the current and future use of the boat ramp area would be improved to a moderate degree, which would have a minor, local, long-term, beneficial impact to park operations. The rehabilitation of site conditions in the Moose Headquarters Area would provide safer and easier access to the facilities in the project area. These effects would have a local, minor to moderate, long-term benefit on employee communication, cohesion, and efficiency.

A revegetation plan would be implemented to incorporate screening of the works yard as well as the warehouse and other structures and parking areas. These areas would have to be maintained as part of park operations but the work load would be similar to existing conditions. The revegetation plan would also reduce the introduction and presence of exotic vegetation in the long-term, thereby reducing the costs of exotic plant management in the Moose Headquarters Area. Maintenance of the new interpretive trail and multi-use residential trail would increase the work load beyond existing conditions but the change in operations would be minor. Removal of the temporary buildings would eliminate the structural deficiencies associated with these buildings and decrease the workload for maintenance personnel. New paving and landscaping would require maintenance but the workload is expected to be similar to current conditions.

The improvements to stormwater management associated with Alternative B would improve site drainage and water quality. This would have an indirect effect on employee/ park operations safety by reducing slipping hazards during the winter season resulting in a long-term, localized, minor, beneficial effect on employee safety. The wash bay would benefit park operations by providing a single vehicle washing facility with an oil/ water separator in the Moose Headquarters Area.

Indirect adverse impacts to park operations associated with the implementation of Alternative B include the disruption of normal plans and use of facilities during construction activities. These impacts are anticipated to be moderate, local, adverse, and short-term lasting only for the duration of the construction activities. Mitigation measures would be implemented to minimize impacts, allowing employees to carry out their responsibilities to the fullest extent possible.

The potential conflict between concessioners and visitors and park vehicles and equipment would be mitigated under this alternative. New signage to communicate pedestrian and vehicle traffic patterns and segregate use areas for all user groups along with raised crosswalks and intersections and speed dips to control vehicle speed would reduce potential safety risks. Effects would be local, moderate, and adverse in the short-term and local, moderate, and beneficial in the long-term.

*Cumulative Effects:* As described under Alternative A, any project that occurs in the park has an effect on park operations; therefore, most of the actions listed in the cumulative effects scenario in Chapter 1 would have some degree of effect on employees and park operations. As described for the No Action alternative, relevant recent, ongoing, and reasonably foreseeable projects in the park

are expected to have both beneficial and adverse, local, minor to moderate, and short- and long-term cumulative impacts on park operations.

Rehabilitation of the Moose Headquarters Area would have a moderate benefit on employees at the park because the improvements would provide a safer and healthier work environment, as well as provide for all employees to be consolidated into one building. The consolidation would rectify the structural deficiencies of the existing headquarters building. Addressing structural deficiencies of the former Visitor Center / Headquarters Building would reduce the amount of time and expertise needed for maintenance crew to repair deficiencies and would remove conditions that are potentially dangerous to park employees. Improvements in the working environment for park employees resulting from consolidation of all employees into one location would be further enhanced by site work implemented under this alternative. These effects would have a local, minor to moderate, long-term benefit on employee communication, cohesion, and efficiency. The new building designs include high energy efficiency measures which would result in beneficial cumulative effects in combination with removal of the energy inefficient temporary buildings. Moderate, local, short-term, adverse effects to park operations would occur during construction. Cumulatively, the improvements associated with this alternative would have a local, moderate, long-term, beneficial effect on park operations when considered with other past, present, and reasonably foreseeable future actions. The relative contribution of Alternative B on park operations would be beneficial, moderate, and long-term.

*Conclusion:* Under Alternative B, there would be direct and indirect local, moderate, adverse impacts to park operations in the short-term and local, moderate, beneficial impacts in the long-term. Cumulative effects to park operations are expected to be local, moderate, short-term, and adverse and local, moderate, long-term, and beneficial. Alternative B would not result in any unacceptable impacts on park operations (NPS 2006). The effects on park operations under this alternative would not be unacceptable because the potential beneficial and adverse impacts are anticipated to be moderate or less in intensity and, thus, would not rise to the level where unacceptable impacts could occur.

## Unacceptable Impacts and Impairment Analysis

As described in Chapter 1, the NPS must prevent any activities that would impair park resources and values. NPS *Management Policies 2006* require analysis of potential effects to determine whether or not actions would impair park resources (NPS 2006). The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. However, the laws do give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values.

Although Congress has given the NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values. An impact to any park resource or value may constitute an impairment, but an impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

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

- Key to the natural or cultural integrity of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. A determination on impairment is made in the *Conclusion* section for each of the impact topics analyzed in this chapter.

The impact threshold at which impairment occurs is not always readily apparent. Therefore, the NPS applies a standard that offers greater assurance that impairment would not occur. This involves avoiding impacts that the NPS determines to be unacceptable; that is, they fall short of impairment, but are still not acceptable within a particular park's environment. Because park managers cannot allow uses that would cause unacceptable impacts, they must evaluate existing or proposed uses and determine whether the associated impacts on park resources and values are acceptable.

Virtually every form of human activity that takes place within a park has some degree of effect on park resources or values, but that does not mean the impact is unacceptable or that a particular use must be disallowed. Therefore, for the purposes of these policies, unacceptable impacts are impacts that, individually or cumulatively, would:

- Be inconsistent with a park's purposes or values; or
- Impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process; or
- Create an unsafe or unhealthful environment for visitors or employees; or
- Diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values; or
- Unreasonably interfere with:
  - Park programs or activities; or
  - An appropriate use; or
  - The atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park; or
  - NPS concessioner or contractor operations or services (NPS 2006).

In accordance with NPS *Management Policies 2006* (NPS 2006), park managers must not allow uses that would cause unacceptable impacts to park resources. To determine if unacceptable impact could occur to the resources and values of Grand Teton National Park, the impacts of proposed actions in this EA were evaluated based on the above criteria. A determination on unacceptable impacts, and thus impairment, is made in the *Conclusion* section for each of the resource topics carried forward in this chapter. By preventing unacceptable impacts, park managers ensure that the proposed use of park resources would not conflict with the conservation of those resources. In this manner, park managers ensure compliance with the Organic Act's separate mandate to conserve park resources and values and prohibit impairment.

The alternatives evaluated in this document would not result in unacceptable impacts (and thus would not result in impairment of park resources and values) for the following reasons:

- The alternatives are not inconsistent with the park's purposes and values.
- The alternatives would not impede the attainment of the park's desired future conditions for natural and cultural resources.
- The analysis indicated that the alternatives would not adversely affect the health and safety of park visitors or employees.

- Visitors would continue to have opportunities to enjoy, learn about, or be inspired by park resources and values.

As described above, the NPS threshold for considering whether there could be impairment of “the scenery and the natural and historic objects and the wild life therein” for Grand Teton National Park is based on whether “major” (that is, significant) effects would occur. The impact analysis identifies less than major impacts for all resource topics. For the reasons described in the impact analysis for each topic, none of the alternatives would result in impairment of park resources.

## **CHAPTER 4 - CONSULTATION AND COORDINATION**

### **Internal Scoping**

Internal scoping was conducted by an interdisciplinary team of professionals from Grand Teton National Park. Interdisciplinary team members met to discuss the purpose and need for the project; various alternatives; potential environmental impacts; past, present, and reasonably foreseeable projects that may have cumulative effects; and possible mitigation measures. Over the course of the project, team members have conducted individual site visits to view and evaluate the proposed rehabilitation site. Refinements to the proposed action alternative were made over the course of several months to address conflicts and issues identified as part of this process.

### **External Scoping (Agencies/ Tribes/ Organizations/ Individuals Contacted)**

External (public) scoping was conducted to inform various agencies and the public about the proposal to rehabilitate the Moose Administration Administrative Area and to generate input on the preparation of this EA. The scoping letter was mailed in June 2008 to more than 800 individuals, organizations, federal and state agencies, affiliated Native American tribes, local governments, and local news organizations. During the 30-day scoping period one agency and four public responses were received. The agency response is included in Appendix B. The initial proposal in the scoping notice identified additional components (i.e., the Moose wastewater system, employee housing at the Moose Campus, and a dedicated space for park museum collections within the Craig Thomas Discovery and Visitor Center) that are no longer being proposed as part of this project. If these other actions were to take place in the future, additional NEPA compliance would be completed. A list of agencies, tribes, organizations and individuals contacted during the preparation of this document is available through the Grand Teton National Park Planning Office in Moose, Wyoming.

### **Environmental Assessment Review and List of Recipients**

The EA will be released for public review in January 2010. To inform the public of the availability of the EA, the NPS will publish and distribute a letter or press release to various agencies, tribes, and members of the public on the park's mailing list, as well as place an ad in the local newspaper. Copies of the EA will be provided to interested individuals, upon request. Copies of the document will also be available for review at the Craig Thomas Discovery and Visitor Center and on the internet at <http://parkplanning.nps.gov/grte>.

The EA is subject to a 30-day public comment period which is scheduled for January 6 to February 5, 2010. During this time, the public is encouraged to submit their written comments to the NPS address provided at the beginning of this document. Following the close of the comment period, all public comments will be reviewed and analyzed, prior to the release of a decision document. The NPS will issue responses to substantive comments received during the public comment period, and will make appropriate changes to the EA, as needed.

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The following NPS specialists from Grand Teton National Park participated during the preparation of this EA.

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# APPENDIX A – STATEMENT OF FINDINGS FOR FLOODPLAINS

## Moose Headquarters Rehabilitation – Site Work Environmental Assessment Statement of Findings for Floodplains

### Introduction

Executive Order 11988, Floodplain Management, requires the National Park Service (NPS) and other federal agencies to evaluate the likely impacts of actions in floodplains. The objective of Executive Order 11988 is to avoid, to the extent possible, the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. NPS DO-77-2: Floodplain Management and Procedural Manual 77-2 provide NPS policies and procedures for complying with Executive Order 11988. This Statement of Findings (SOF) documents compliance with these NPS floodplain management procedures.

The purpose of this Floodplain SOF is to review the Moose Headquarter Rehabilitation-Site Work in sufficient detail to:

- Provide an accurate and complete description of the flood hazard assumed by implementation of the Selected Alternative (without mitigation).
- Provide an analysis of the comparative flood risk among alternative sites.
- Describe the effects on floodplain values associated with the Selected Alternative.
- Provide a thorough description and evaluation of mitigation measures developed to achieve compliance with Executive Order 11988 (Floodplain Management) and the NPS Floodplain Management Guideline 1993.

### Proposed Action

The NPS is preparing the Moose Headquarters Rehabilitation – Site Work Environmental Assessment (EA). The Headquarters Rehabilitation Plan includes: rehabilitation of the Moose Maintenance Building and the former Visitor Center/Headquarters Building interiors; removal of several temporary buildings; the complete reconfiguration of vehicle and pedestrian traffic within the administrative complex and the Moose boat landing area; and site restoration work targeted to improve stormwater management. This EA analyzes the site work associated with the Moose Headquarters Rehabilitation Plan.

Under the proposed action, all elements of the project would be designed to result in an overall reduction in impervious surface within the area and improve stormwater management. Nearly all the existing asphalt would be replaced to provide positive drainage and direct run-off from paved areas through new oil-water separators. Several sediment and infiltration basins and bio-swales would be constructed to treat surface water runoff. Both gravel and asphalt may be used for resurfacing. A new, designated parking area for concessioner clients would be added at the entrance of the Moose Launch Road. Within this area a picnic/waiting area and restroom facilities would be added. New pedestrian trails would be added to provide connectivity between the Craig Thomas Discovery Visitor Center and Menor's Ferry, as well as from the Moose housing area to the

Moose Post Office. Four temporary buildings would be removed resulting in an 8,000 gross square foot reduction in overall building space in the Moose Headquarters Area.

### **Site Description**

The Moose Headquarters Area includes park headquarters, visitor use areas, administrative and maintenance facilities, and United States Post Office. The administrative area is bordered to the west by employee housing, to the north and east by the Snake River and associated river access, and to the south by the Teton Park Road and the Craig Thomas Discovery and Visitor Center.

“Critical actions” within the administrative area, include the Teton Interagency Dispatch Center, which is located on the first floor of the Moose Maintenance Building, and the communications vault, which includes radio and IT equipment, fuel storage, and archive storage.

### **Floodplain Extent**

The best available data were used to determine the extent of existing floodplain boundaries and water surface characteristics of the Snake River. Floodplain maps produced by the Federal Emergency Management Agency (FEMA) (Report # 178) depict a portion of the former Visitor Center and maintenance area within the 100-year floodplain. However, a subsequent floodplain analysis of the Moose area conducted by NPS Water Resources Division (WRD), concluded the 100-year floodplain should be considered to be almost completely contained by the Snake River channel. The 500-year floodplain would exceed the channel capacity by roughly one to three feet, vertically.

### **Justification for Use of the Floodplain**

The majority of the buildings and facilities in the Moose Headquarters Complex were constructed in the 1960s. Existing facilities include the former Visitor Center / Administration Building, Moose Maintenance Building, temporary administration buildings, and a wastewater treatment plant and lab. The Moose Maintenance Building includes offices, the park dispatch center, fire management office and cache, vehicle repair bays, a meeting room, workout room, and storage. A sand shed, work yard area, and two boat ramps are also located within the complex. There is currently space for visitor parking and access to the Moose Boat Landing, as well as parking and access for maintenance or administrative use. Park staff consists of approximately 160 permanent employees and approximately 250 seasonal employees. There are several divisions that comprise the park staff: ranger activities; interpretation; science and resource management; facility management; business resources; and administration. All of these divisions have the majority of their operations in the Moose area. Relocation of any of the buildings and facilities, including the Teton Interagency Dispatch Center, would impose considerable cost and resource impacts.

### **Description of Site-Specific Flood Risk**

The NPS WRD floodplain analysis determined the former Visitor Center developed area to be located partially within the 500-year floodplain. The former Visitor Center / Administrative Building itself is shown to be located outside the 500-year floodplain. The maintenance facility and associated buildings, is totally within the 500-year floodplain, which would also be the regulatory floodplain for this structure (emergency services are located there). For the basis of this analysis, the entire project area would be considered to be within the 500-year floodplain.

### **Flood Frequency and Hydraulic Analyses**

High magnitude floods in the area of Moose may occur due to tributary floods, large releases from the dam, and a combination of both, or, in the worst-case scenario, a sudden dam failure. Flood frequency in the Moose area is difficult to predict, as the gages which measure tributary input as

well as dam release, have not been in place very long. The U.S. Army Corps of Engineers developed four models and concluded (WRD, 2001):

I. The 100-year flood upstream of the Gros Ventre River confluence would be affected by dam operations and would likely be in the range of 22,900 cfs. It is estimated that the flood would be mostly contained in the river channel.

II. The 500-year flood would not likely be affected by the dam operation and, therefore, would be substantially greater estimated to be at 35,470 cfs. Modeling predicts it would subject the maintenance area to flood depths of one foot or less.

III. The probable maximum flood is estimated to discharge at 39,500 cfs. Modeling predicts probable maximum flood would subject the maintenance area to flood depths of two feet. It also predicts overtopping the Teton Park Road west as far as the entrance station and a portion of the Moose-Wilson Road. It could also threaten the Snake River Bridge.

IV. It is estimated a dam break would result in 87,000 cfs and would take approximately 5 hours to reach Moose. This would come in a flood wave that would inundate the entire Moose area with 3-6 feet of water and with 3-4 feet per second velocities. It is predicted to overtop the Snake River Bridge, isolating everything on the inside road.

### **Flood Conditions**

Peak discharges are usually produced by snowmelt in the spring with possible summer pulses resulting from thunderstorms. Flash flooding is unlikely; however, a springtime rain on snow event could produce a large and rapid rise in the river, as it did on June 11, 1997. Moderate flood conditions in the Moose area occurred due to spring snowmelt within the tributaries. The Jackson Lake Dam was still storing most of the incoming runoff from the upper watershed at that time. Flood conditions would have been much worse if the release at from the dam were necessary at the same time. The 1997 peak flow (25,300 cfs, with a stage of 15.25 feet) resulted in bank full conditions in the upstream reach of the Moose area and slight over bank flooding in the area of the boat launches. There was substantial bank loss on the west bank upstream from the bridge. The river stayed almost all contained within the channel and did not result in any hazardous or costly flooding in the Moose area. The bank loss in on the west side was the largest risk (WRD 2001).

In 2005, the park installed stone barbs north of the bridge to redirect flow from the bank during large flow events. The barbs have been successful in trapping finer sediments during flow events and in stabilizing the bank.

### **Floodplain Mitigation**

With the depths and velocities associated with the 500-year flood plain, relocating “Critical Actions” outside or above the flood level could mitigate most adverse affects. The park would be doing the following in the preferred alternative:

- The Dispatch Center would be relocated to the second floor of the Moose Maintenance Building.
- Irreplaceable artifacts would be stored in waterproof containers and/or on upper floors.
- The park is replacing the telecomm vault to protect all the radio and IT components within a modern, water-tight structure.
- Decreasing development, including a reduction in 8,000 square feet of building space, reduction in impervious surface, and substantially improved stormwater management, all provide beneficial impacts to the floodplain.

- The park would place berming or some other barrier adjacent to the fuel station area.
- The water treatment facility could be flood-proofed or made resistant to the 500-year flood stage.
- Building a small levee around the complex may be considered.

Based on NPS guidelines, no mitigation is required for extreme or dam-break flood events. However, preparation for such disasters should be considered due to the risk of human life. To guard against these potential floods, an agreement of prompt notification should be established between the Bureau of Reclamation and the park. An evacuation plan for Moose was developed.

### **Conclusion**

The Preferred Alternative would substantially reduce potentially hazardous conditions associated with flooding by reducing the amount or relocating/waterproofing critical infrastructure within the 500-year floodplain in Moose. Decreasing development, including a reduction in 8,000 square feet of building space, reduction in impervious surface, and substantially improved stormwater management, all provide important beneficial impacts to the floodplain.

The NPS concludes that the Preferred Alternative would reduce the impacts of potentially hazardous conditions associated with flooding in Moose. Mitigation and compliance with regulations and policies to prevent impacts to water quality, floodplain values, and loss of property or human life would be strictly adhered to during and after the construction. Individual permits with other federal and cooperating state and local agencies would be obtained prior to construction activities. No long-term adverse impacts would occur from the alternatives analyzed.

Therefore, the NPS finds the Preferred Alternative to be acceptable under Executive Order 11988 for the protection of floodplains.

Ref: L54 (2380) GRTE/ General, Floodplain Analysis for the Snake River in the area of Moose, conducted by NPS Water Resources Division, Michael Martin, Hydrologist, April 5,2001

Executive Order 11988, Floodplain Management, May 24, 1977

24 CFR Subtitle A § 55.20 Subpart C – Procedures for Making Determinations on Floodplain Management

## **APPENDIX B – AGENCY CORRESPONDENCE**



### WYOMING GAME AND FISH DEPARTMENT

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June 25, 2008

WER 11796  
Grand Teton National Park  
Scoping Notice  
Moose Complex Improvements EA  
Teton County

**RECEIVED**  
JUN 30 2008

BY: *BAK*

*John*  
*NEPA adm*  
*file mg*  
*6/30/08*

Mary Gibson Scott  
Superintendent  
Grand Teton National Park  
P.O. Drawer 170  
Moose, WY 83012

Dear Ms. Scott:

The staff of the Wyoming Game and Fish Department has reviewed the scoping notice for the Moose Complex Improvements EA within Grand Teton National Park. We have no terrestrial wildlife or aquatic concerns pertaining to these projects.

Thank you for the opportunity to comment.

Sincerely,

*JE* JOHN EMMERICH  
DEPUTY DIRECTOR

JE:VS:gfb

cc: USFWS