

**National Park Service
U.S. Department of the Interior**



**Grand Teton National Park
Wyoming**

Teton Science School Rehabilitation and Improvement of Infrastructure

Environmental Assessment

June 2004



Environmental Assessment

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Grand Teton National Park

Moose, Wyoming

SUMMARY

The National Park Service (NPS), in conjunction with the Teton Science School (TSS), is proposing to rehabilitate and improve the infrastructure at the Kelly Campus of Teton Science School, located within Grand Teton National Park (GTNP). These actions would provide necessary housing for TSS employees and students, storage and office space for administrative support, a handicap accessible trail, as well as upgrading of the water system for drinking water and water storage for structural firefighting.

The TSS, a nonprofit organization in partnership with GTNP, has been in operation since 1967 helping the Park carry out its mission of providing environmental education within the Greater Yellowstone Ecosystem to people of all ages. In all seasons, participants and park visitors are involved in hands-on studies, learning basic concepts in ecology, geology, botany, zoology, astronomy and the unique natural history of the Greater Yellowstone Ecosystem. The TSS provides and encourages experiential education in natural science and ecology while fostering an appreciation for conservation ethics and practices. The Greater Yellowstone region serves as our outdoor classroom and model for year-round programs that offer academic, professional and personal benefits to students of all ages. With the high cost of living in the Jackson Hole area, the NPS and its partners have had a difficult time hiring and retaining personnel without providing housing. The NPS believes that the rehabilitation and improvement of infrastructure at the Kelly Campus is a cost-effective way to gain additional housing, office space and storage while improving the water system and handicap accessibility.

The environmental assessment (EA), prepared in compliance with the National Environmental Policy Act (NEPA), examines four alternatives: Alternative 1 – No Action; Alternative 2 – Water System Improvements Only; Alternative 3 – Relocation of the Hunter Hereford Barn; and Alternative 4 – TSS Builds a Facility on the Kelly Campus. The only difference between Alternative 3 and 4 is the method of achieving or acquiring additional square footage to meet the purpose and need at the TSS Kelly Campus. Alternative 3 would create additional housing, office space and storage by relocating the Hunter Hereford Barn to the Kelly Campus and adaptively using it. In Alternative 4, the TSS would gain additional space by building a facility for these purposes on the Kelly Campus. The NPS is not identifying a preferred alternative for the project. In doing so, the NPS expects to receive additional input from the public on the attributes of all four alternatives. The NPS will reach a decision on this project following review and incorporation of public comments on the various alternatives for rehabilitating and improving infrastructure at the TSS. Resource topics addressed because impacts have the potential to be greater than negligible include archaeological resources; historic structures and cultural landscape; vegetation; visual quality; water quality; wildlife, including threatened and endangered species; park operations; and visitor use and experience.

PUBLIC COMMENT

If you wish to comment on the EA, you may mail comments to the name and address below. This document will be on public review for 30 days. Please note that names and addresses of people who comment become part of the public record. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

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PROJECT BACKGROUND

Early discussions among the park's interdisciplinary team for this project led to the identification of a number of issues in the east Antelope Flats area. Park staff initially identified several project actions within the area to include the Hunter Hereford Ranch Historic District, Teton Science School, McCollister Residential Complex, Reimer/Hultman Residence, Gros Ventre Campground, Aspen Ridge Ranch, and Kelly Warm Springs. Following additional internal scoping meetings, park management reviewed all the proposed actions for a Development Concept Plan (DCP) and decided to narrow the focus of the project and change the title from *East Antelope Flats Development Concept Plan* to *East Antelope Flats Adaptive Reuse of Historic Structures Environmental Assessment/Assessment of Effect*. In order to focus on the most important issues at hand, less imminent actions were removed from the project and will be focused on in the future. This left the focus of the project on the Hunter Hereford Ranch Historic District, the Teton Science School Kelly Campus, and the McCollister Residential Complex (Map 1).

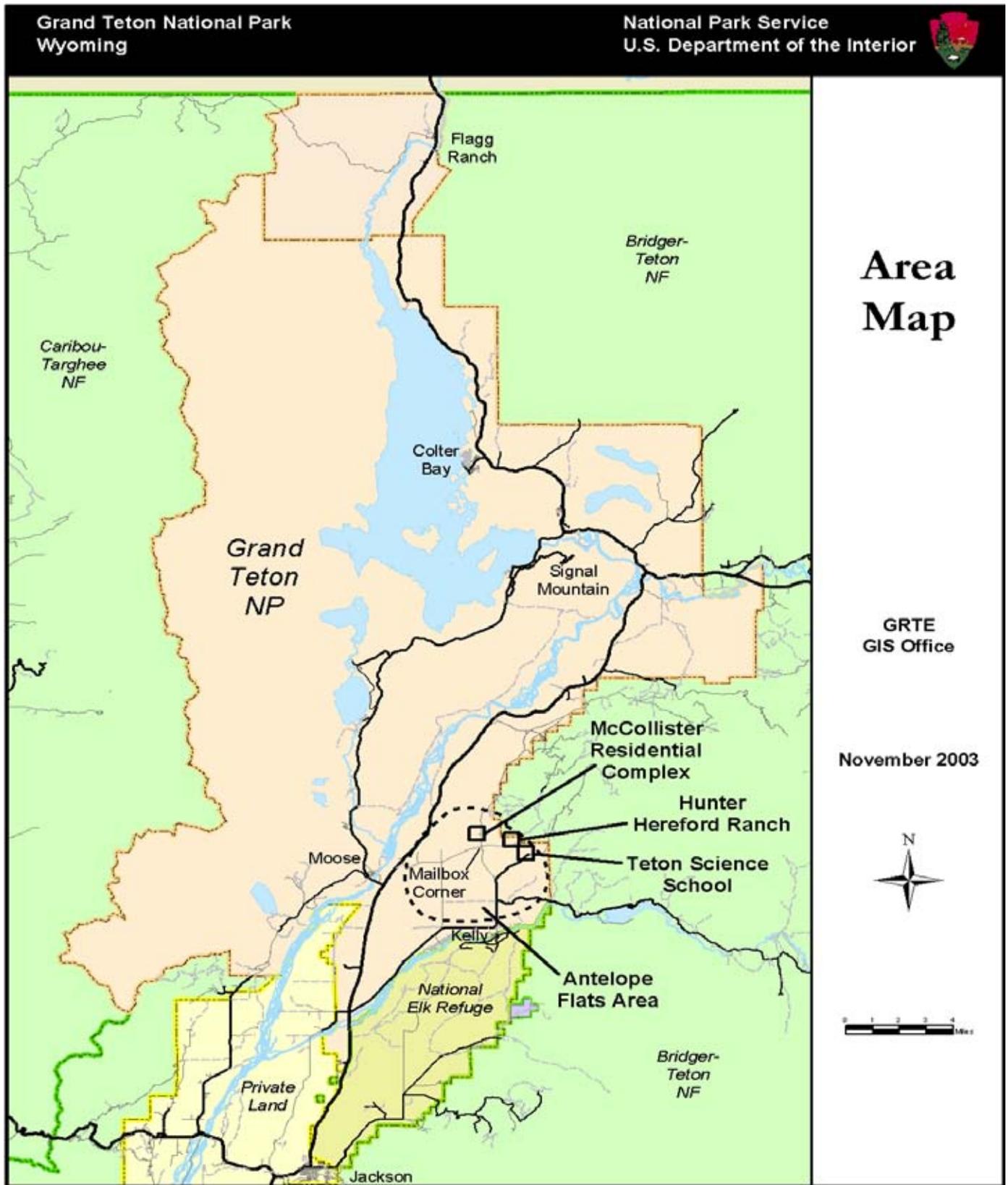
In April 2003, the NPS conducted public scoping proposing adaptive use of historic structures located in the east Antelope Flats area of the park. As part of this proposal, the McCollister Residential Complex would be used as seasonal housing for approximately 20 park employees. In addition, the Hunter Hereford Barn would be moved from its current historic location to the TSS Kelly Campus to provide meeting/office space, storage and housing for seasonal staff and graduate students. The EA examined two alternatives: Alternative 1 - No Relocation or Adaptive Reuse of Historic Structures (No Action Alternative) and Alternative 2 – Relocation and Adaptive Reuse of Historic Structures (Proposed Action). Three other alternatives were considered, but rejected because they did not meet the project purpose and need.

Scoping comments from local and state agencies and the general public expressed concern about the adverse effect of relocating the Hunter Hereford Barn. Park management decided more time was needed for further consultation with the Wyoming State Historic Preservation Office (SHPO) to adequately address comments and potential adverse effects of this move. Because the NPS did not wish to delay a decision on the adaptive use of the McCollister Residential Complex, the NPS divided the East Antelope Flats project into two separate EAs in November 2003. The NPS released the EA on the adaptive use of the McCollister Residential Complex to the public in December 2003 and reached a decision on the project in January 2004.

The subject matter of this EA focuses on the rehabilitation and improvement of infrastructure at the TSS Kelly Campus, including the cumulative effects of all past, present and reasonably foreseeable future actions in the east Antelope Flats area. The division of these projects allowed the NPS to adequately address public concern regarding the adverse effect of possibly relocating the Hunter Hereford Barn without delaying a decision on the adaptive reuse of the McCollister Residential Complex.

In the spring of 2004, the NPS prepared to release the TSS EA to the public. Following review of internal and external (public) scoping comments and consultation with the SHPO over the potential adverse effects of moving the Hunter Hereford Barn, the NPS decided against making the proposed action of moving the Hunter Hereford Barn the "preferred alternative" for the project. Normally when a range of alternatives is developed, one of them becomes preferred at the conclusion of the analysis process. This preferred alternative is then identified in the EA before it is released to the public for review and comment. However, due to the cultural resource impacts associated with relocation of the Hunter Hereford Barn and scoping comments that the park received expressing objection to this action, the NPS is releasing the TSS EA without a preferred alternative. In doing so, the NPS expects to receive input on the attributes of all four alternatives from the public to provide additional insight as to the best alternative regarding natural, cultural and socioeconomic resources. After public input is considered on all four alternatives, the NPS will select a preferred alternative and release a decision document outlining the rationale for the decision.

Map 1: REGIONAL SETTING OF THE TETON SCIENCE SCHOOL



PURPOSE AND NEED

PURPOSE

Grand Teton National Park was established by Public Law 81-787 on September 14, 1950 and encompasses 310,521 acres. The Teton Science School (TSS) is a nonprofit organization created in 1967 as a partner to Grand Teton National Park (GTNP), to provide the valuable service of environmental education within the Greater Yellowstone ecosystem to people of all ages. The past few years, TSS has experienced problems implementing its programs due to the lack of housing and administrative space. Additionally, the water system at the Kelly Campus is inadequate and inefficient, both environmentally and from the health and safety standpoint.

The primary purposes of the proposed action are to meet the demand for employee and student housing and administrative space for Grand Teton National Park's partner, the Teton Science School; to rehabilitate and upgrade the existing water system on the Kelly Campus of Teton Science School; and to improve handicap accessibility of trails.

A series of objectives were established by the NPS to guide the development of the proposed action. The objectives include the following:

- Upgrade Existing Water System
- Provide Student and Employee Housing
- Provide Adequate Meeting, Office and Storage Space for Teton Science School
- Strengthen NPS Partnerships

The project objectives are consistent with the goals and objectives outlined in: 1) *National Park Service Mission Statement*, 2) *Strategic Plan for Grand Teton National Park and John D. Rockefeller Jr. Memorial Parkway October 1, 2001—September 30, 2005*, 3) *1976 Master Plan for Grand Teton National Park* and 4) *Management Plan for Buildings listed on the National Register of Historic Places, Grand Teton National Park, (2000)*.



Kelly Campus of the Teton Science School

NEED

Redevelopment of the water system at the TSS Kelly Campus is required to provide a more sustainable utility system that conserves water and to provide more water storage for fire suppression capability. The current water supply and delivery system does not provide sufficient water to operate fire sprinkler systems and fire hydrants due to lack of storage and space. In addition, the current chlorine treatment of the drinking supply is a very high maintenance system, with possible unsafe contact time of the water with chlorine. The storage tanks are too small to allow the water sufficient contact time for the chlorine to be fully effective to treat the surface water. Upgrading the system is necessary for improved drinking water safety.

The TSS lacks adequate housing and office/administrative space for both staff and students and does not have any handicap accessible trails, which limits the field experience for some staff and students. Grand Teton National Park and its partners have found that the high cost of living in Jackson Hole makes it difficult to hire personnel when affordable housing is not available for staff and students. The current condition of Kelly Campus infrastructure and

lack of necessary affordable housing impedes the Teton Science School's ability to carry out their mission of environmental education and other valuable services they provide to the National Park Service and their visiting public.

PUBLIC SCOPING

The scoping process identifies issues and concerns relating to a proposed action and provides a basis for defining environmental impacts and developing alternatives. In March of 2003, the park began the scoping process with a meeting of park interdisciplinary specialists and a TSS representative. Disciplines represented included interpretation, planning, law enforcement, natural resource management, cultural resource management, professional services (engineering and landscape architecture), buildings and utilities, and management. The meeting's purpose was to define the purpose and need of the project and draft preliminary alternatives. Participants also discussed management plans and policies that applied to the project and described issues. The undertakings described in this document are subject to §106 of the National Historic Preservation Act, as amended in 1992 (16 USC §470 et seq.). Consultations with the Wyoming State Historic Preservation Office (SHPO) have been ongoing throughout the project and will continue as necessary.

The NPS conducted public scoping from April 24 through May 27, 2003, seeking comments on issues, alternatives, concerns, and other considerations regarding the proposal. A press release, as well as a scoping notice was sent to approximately 150 parties describing the proposed action. Certified letters of the proposed action on May 1, 2003 notified the American Indian tribes traditionally associated with the lands of Grand Teton National Park. See Appendix B for a copy of the tribal letter.

Nineteen comments were received. All but one comment letter were from Wyoming residents. Eleven of the comments contained information about the TSS and the Hunter Hereford Barn. Two comment letters had no specific information on the project, but stated they had total support for the project as written. The comment letters are summarized below by topic:

Water Quality

The Wyoming Department of Environmental Quality (WDEQ) identified three Water Quality Division permits that may apply to the project: Permit to Construct, Temporary Discharge Permit, and Storm Water Associated with Construction Activities. They also identified the need for a Section 404 permit from the US Army Corps of Engineers if work occurs within waters of the United States.

Wildlife

The Ecological Services Division of the US Fish and Wildlife Service in Wyoming prepared a summary of listed and proposed species that may be present in the project area, along with an outline of consultation procedures. The US Fish and Wildlife Service addressed species of special interest, in particular the greater sage grouse and indicated that activities that result in loss of sagebrush, or degrade important greater sage grouse habitat, should be closely evaluated for their impacts. Additionally, the US Fish and Wildlife Service sent a list titled *Migratory Bird Species of Management Concern in Wyoming* and requested that surveys be conducted for these species if suitable habitat exists for any of them. The Service further recommended that measures be taken to avoid any wetland losses in accordance with the Clean Water Act and executive orders for floodplain and wetland management.

The Jackson Conservation Hole Alliance addressed the issue of impacts of increased housing and development on wildlife at the TSS. They inquired about the impacts of allowing more people and their associated increase in traffic, noise and pets, on wildlife.

A concern was raised over the proposed location of the Hunter Hereford Barn and its potential impacts to wildlife movement and behavior patterns. Locating the barn at the south end of the TSS adjacent to the large gravel parking area was proposed. The accessible trail and bridge over Ditch Creek at the TSS raised a concern that the bridge

over Ditch Creek would provide easy access to the Hunter Hereford Ranch and would increase human disturbance to grazing areas used by ungulates, with the potential of increasing wildlife/human conflicts.

Historic Status

The Teton County Historic Preservation Board, as well as several of the responding public, opposed the relocation of the Hunter Hereford Barn to the Kelly Campus of TSS for a variety of reasons, primarily because the action would adversely affect the listing of the barn in the National Register. The Teton County Historic Preservation Board presented four other alternatives: 1) use of the barn by Grand Teton for its original purpose, for livestock, 2) adaptive use of the space by TSS *in situ*, connected to the Kelly Campus of TSS by a footpath, 3) stabilization and rehabilitation of the barn and development of an interpretive/educational site, and 4) other non-destructive uses that do not require the relocation of the barn.

The Wyoming State Historic Preservation Office (SHPO) commented that the renovation and relocation of the Hunter Hereford Barn away from its historical context would require extensive alterations to the barn. These renovations and the barn's relocation away from its historic context would adversely affect the listing of the barn and would require discussion of ways to reduce or eliminate the adverse effect.

Several comments expressed support for the project, including the relocation and adaptive use of the Hunter Hereford Barn.

Non-Government Housing

Concern for the NPS proposing an action that would provide housing and office space to a non-profit organization, when other organizations have similar needs, was expressed. Some people suggested that TSS house their employees by purchasing private property.

Natural and Social Resource Impacts

Concerns were expressed over the capacity of the Kelly Campus of TSS and its future growth regarding measures in place to ensure the site does not suffer the degradation of overuse. Other concerns were over the spread of existing invasive species on the TSS campus and the surrounding area.

RELATIONSHIP OF PROPOSED ACTION TO PREVIOUS PLANNING EFFORTS

The proposed rehabilitation and improvement of infrastructure at the Teton Science School Kelly Campus is consistent with the plans and documents listed below:

National Park Service, Strategic Plan FY2001-2005. In 2001, the National Park Service released a strategic plan that embraces the following NPS mission statement:

The National Park Service preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout the country.

To achieve this mission, one of the National Park Service's Guiding Principles is providing for:

Productive Partnerships: Collaborating with federal, state, tribal, and local governments, private organizations, and businesses to work toward common goals.

Management Plan for Buildings Listed on the National Register of Historic Places, Grand Teton National Park, (2000). This document presents an overview of management objectives for buildings listed in or eligible for listing in the National Register of Historic Places that are located within Grand Teton National Park.

1976 Master Plan for Grand Teton National Park: The master plan employs a land classification system, which categorizes land within the national park in six ways.

Class I: High-Density Recreation (Colter Bay and Jackson Lake Lodge)

Class II: General Outdoor Recreation (roads, campgrounds, low-density lodging, and residential and operation sites)

Class III: Natural Environment (valley lands committed to special uses as defined by legislation such as grazing, stock driveways, and life estates). These lands serve as a buffer or transition zone, with low-density use and collectively, they provide the setting for park's Class IV lands.

Class IV: Outstanding Natural (sections of the Teton Range and the Potholes)

Class V: Primitive (undeveloped lands with no roads that preserve the backcountry experience)

Class VI: Historical (remains of prehistoric settlement and historic utilization, which are significant parts of the park interpretive story). Mormon Row Historic District is an example of a Class VI land classification.

The TSS is part of the Class III Natural Environment.

Statement for Management, Grand Teton National Park (1995): This document contains the results of a park assessment that identified management objectives and goals, and methods to achieve them. Subjects pertinent to this EA are partnerships, employee housing, and historic buildings.

ISSUES AND CONCERNS

Early planning discussions among the park's interdisciplinary team for this project led to the identification of a number of resource issues to consider in the EA. Park staff used an Environmental Screening Form (ESF) to identify the following potential resource issues and concerns specific to the TSS EA:

- archaeological resources
- cultural landscapes
- historic structures
- light and sound pollution
- park operations and maintenance (sustainability)
- vegetation loss and erosion (invasive species)
- visitor use and experience
- visual quality
- water quality
- wetlands & floodplains
- wildlife and habitat (threatened & endangered species)

IMPACT TOPICS

Impact topics focus the analysis of impacts on resources and the potential consequences of the proposed action in relation to the no action alternative. These impact topics are based on legislative requirements, topics specified in *Director's Order #12 and Handbook*; environmental statutes, regulations, executive orders and NPS Management Policies 2001; park specific resource information; and concerns raised during internal and external (public) scoping.

Table 1: Impact Topics Retained or Dismissed from Further Analysis

Impact Topic	Retain or Dismiss	Relevant Regulations or Policies
Cultural Resources		
Archaeological Resources	Retain	National Park Service Organic Act; National Historic Preservation Act of 1966, as amended; Executive Order 11593 (1971); Archaeological and Historic Preservation Act of 1974, as amended; Archaeological Resources Protection Act of 1979, as amended; the Secretary of the Interior’s Standards and Guidelines for Archaeology and Historic Preservation; Programmatic Memorandum of Agreement (MOA) Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); Protection of Archaeological Resources, 43 CFR 7; Protection of Historic Properties, 36 CFR 800; NPS Management Policies (2001); Cultural Resources Management Guidelines, DO-28 (1998)
Ethnographic Resources	Dismiss	The Secretary of the Interior’s Standards and Guidelines for Archaeology and Historic Preservation; NPS Management Policies (2001); Protection of Historic Properties, 36 CFR 800; Cultural Resources Management Guidelines, DO-28 (1998)
Museum Collections	Dismiss	National Historic Preservation Act of 1966, as amended; National Environmental Policy Act of 1969, as amended; Museum Properties Management Act of 1955; NPS Management Policies (2001); Protection of Historic Properties, 36 CFR 800; Cultural Resources Management Guidelines, DO-28 (1998)
Historic Structures and Cultural Landscapes	Retain	National Park Service Organic Act; National Historic Preservation Act of 1966, as amended; Executive Order 11593: Protection and Enhancement of the Cultural Environment (1971); Archaeological and Historic Preservation Act of 1974, as amended; the Secretary of the Interior’s Standards for the Treatment of Historic Properties; Programmatic MOA among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies (2001); Protection of Historic Properties, 36 CFR 800; the Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes (1996); Cultural Resources Management Guidelines, DO-28 (1998)
Natural Resources		
Air Quality	Dismiss	Organic Act, Clean Air Act, NPS Management Policies (2001)
Floodplains	Dismiss	Executive Order 11988, Clean Water Act, NPS Management Policies (2001)
Natural Lightscapes	Dismiss	NPS Management Policies (2001)
Natural Soundscape/Noise	Dismiss	Organic Act, NPS Policy Soundscape Management 4.9
Prime & Unique Farmlands	Dismiss	Council on Environmental Quality 1980 Memorandum on Prime and Unique Farmlands
Vegetation	Retain	Organic Act, NPS Management Policies (2001), DO -77 for Natural Resource Protection, Executive Order 13112: Invasive Species
Visual Quality (viewshed)	Retain	Enabling Legislation for Grand Teton National Park, Grand Teton National Park Master Plan 1976, NPS Management Policies (2001)
Water Quality	Retain	Clean Water Act, Executive Order 12088, NPS Management Policies (2001)
Wetlands	Dismiss	Executive Order 11990, Clean Water Act, NPS Management Policies (2001)
Wild & Scenic Rivers	Dismiss	Wild and Scenic Rivers Act
Wilderness	Dismiss	Director’s Order 41, NPS Management Policies (2001)
Wildlife, including Threatened, Endangered and Species of Special Management Concern	Retain	Endangered Species Act; NPS Management Policies (2001), National Environmental Policy Act, Migratory Bird Treaty Act. For GTNP - Bald Eagle, Canada Lynx, Grizzly Bear, Gray Wolf, Sage Grouse.

Impact Topic	Retain or Dismiss	Relevant Regulations or Policies
Social Resources		
Environmental Justice	Dismiss	Executive Order 12898: General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
Indian Trust Resources	Dismiss	DOI Order No. 3206, Secretarial Order No. 3175
Park Operations	Retain	NPS Management Policies 2001
Socioeconomic Environment	Dismiss	National Environmental Policy Act
Visitor Use and Experience	Retain	Organic Act, NPS Management Policies 2001

TOPICS DISMISSED FROM FURTHER CONSIDERATION

Many of the impact topics presented in Table 1 were dismissed from further study after site visits; discussions with resource specialists and professional consultants; input from federal and state agencies; and after internal and public scoping were completed. Impact topics that had no measurable or negligible impacts were dismissed. Impact topics included for further analysis were those whose impacts could not be immediately determined. The rationale for dismissing specific topics from further consideration follows:

Ethnographic Resources

Ethnographic resources are defined by the NPS 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” (Director’s Order #28, Cultural Resource Management Guideline, 191). While locations of specific ethnographic resources are not known within the project area, it is known that American Indian people utilized the Grand Teton area over thousands of years for hunting and gathering subsistence and occupation. GTNP holds many resources important to these tribes including, but not limited to, wildlife, plants, and water. These resources do not always have a defined boundary and many may occur within the project area. Because many of these resources have not been identified, the NPS will continue to consult with the Crow, Northern Arapaho, Northern Cheyenne, Eastern Shoshone, and Shoshone-Bannock tribes. If these tribes subsequently identify the presence of ethnographic resources, appropriate mitigation measures will be undertaken in consultation with the tribes, as well as the SHPO. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the NAGPRA (25 USC 3001) of 1990 will be followed. Because the tribes have not identified any known ethnographic resources in the project area or its immediate vicinity, this topic was dismissed from further analysis.

Museum Collections

The National Historic Preservation Act, as amended in 1992 (16 USC 470 et seq.), the National Environmental Policy Act of 1969 (42 USC 4321 et seq.), National Park Service’s Management Policies, 2001 (2000) and Director’s Order #28, and Cultural Resource Management Guidelines (1997) require the consideration of impacts on museum collections (archeology, ethnology, history, biology, paleontology, geology and archives). There are no museum objects or archival collection items relating to the families or others currently stored or exhibited in the Hunter Hereford Ranch Historic District. If the barn is moved, any historic fabric or other project-related documentation found would be accessioned and cataloged into the GTNP museum collection as generated.

The TSS displays and stores extensive museum collections in the Murie Museum, primarily from the work and art of Olaus Murie. Smaller amounts of the collection are on display in the Dining Lodge, and the Main Lodge. The collections in storage and on exhibit at the TSS are the property of the TSS. As such, NPS guidelines, regulations, policies, and recommended procedures are not applicable and museum collections are dismissed from further analysis as an impact topic. However, as a professional courtesy, the GTNP cultural resource staff would offer to visit with TSS staff prior to renovations of the Dining Lodge and the Main Lodge and would provide information on recommended procedures and guidance from the NPS Museum Handbook for care of museum collections.

Air Quality

The NPS has a responsibility under the Clean Air Act to protect its natural resources from the adverse effects of air pollution (42 USC 7401 et seq., Section 165). This act also established a national visibility protection goal to eliminate existing and prevent future visibility impairment in Class I areas. Grand Teton National Park is a mandatory Class I area. The National Park Service Management Policies (2001) state that the NPS, “will seek to perpetuate the best possible air quality in parks because of its critical importance to visitor enjoyment, human health, scenic vistas, and the preservation of natural systems and cultural resources.” Air quality and visibility in the project area are excellent, although occasional periods of smoke or haze from local and interstate wildland fires, agricultural activities, and windstorms occur throughout the year. Typical mitigation measures will be applied during construction activities for dust suppression. The proposed action is not anticipated to have a measurable increase in air quality emissions in the area, whether from vehicle traffic, residential use, or visitor use. Therefore, emissions attributable to the proposed action would have no detectable effect. Air quality is therefore dismissed from further analysis.

Floodplains

Natural floodplain values are attributes that contribute to ecosystem quality such as soils, vegetation, wildlife habitat, sedimentation processes, and ground water recharge. It is NPS policy to recognize and manage for the preservation of natural floodplain values; to minimize potentially hazardous conditions associated with flooding; and to comply with the NPS Organic Act and all other federal laws and Executive orders related to the management of activities in flood-prone areas. Executive Order 11988 and NPS Procedural Manual #77-2 (Floodplain Management) direct the NPS to avoid, if possible, development and other activities in the 100-year base floodplain. The alternatives have been reviewed, and it has been determined that project actions proposed at the TSS would not affect the 100-year or 500-year (regulatory) floodplains. Although portions of the proposed accessible trail are within the 100-year floodplain, these activities are defined as “excepted actions” and are permitted within the regulatory floodplain without further compliance steps. The trail would be designed in such a way to avoid impacts to the floodplain. Therefore, floodplains are dismissed from further analysis.

Natural Lightscape

The NPS will preserve, to the greatest extent possible, the natural darkness of the park (NPS 2001). The adaptive use of historic structures and changes in infrastructure would not introduce and/or increase artificial light sources into the environment beyond the current or historic level, thus preserving the ability to see the stars, planets, and earth’s moon and other natural features that are visible during clear nights around east Antelope Flats. The park and TSS will employ lighting techniques, such as using reflective shields on outdoor lights that minimize the amount of light directed up at the sky and/or using building lights activated by motion sensors, which help preserve the natural lightscape and save energy. Since the proposed action would not have a measurable effect on natural lightscapes, this topic was dismissed from further analysis.

Natural Soundscape

An important part of the NPS mission is to preserve and/or restore the natural resources of the parks, including the natural soundscapes associated with units of the national park system. Natural sounds are intrinsic elements of the environment that are often associated with parks and park purposes. In order to allow for visitor enjoyment and operation of national parks it is expected that higher levels of human caused sound will occur in some areas. To accommodate visitor access and enjoyment, NPS Management Policies 2001 - Soundscape Management 4.9 offers the following guidance to park managers: *“Using appropriate management planning, superintendents will identify what levels of human-caused sound can be accepted within the management purposes of the parks. The frequencies, magnitudes, and duration of human-caused sound considered acceptable will vary throughout the park, being generally greater in developed areas and lesser in undeveloped areas.”*

Sounds associated with rehabilitation and construction activities at the TSS would slightly change the levels of human-caused noise on a short-term basis and would not alter the overall current condition of soundscape in east Antelope Flats. Because the proposed action is expected to result in negligible impacts to the natural soundscape, it was dismissed from further analysis.

Prime and Unique Farmlands

In August 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. 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 NRCS, none of the soils in the project area are classified as prime and unique farmlands. Therefore, the topic of prime and unique farmlands was dismissed as an impact topic.

Wetlands

Wetlands are transitional lands between terrestrial and aquatic systems. They generally include swamps, marshes, bogs, and similar areas, such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds. Executive Order 11990: Protection of Wetlands, NPS Management Policies (2001), Director's Order #77-1: Wetland Protection and Procedural Manual #77-1: Wetland Protection established NPS policies, standards, and procedures for protecting and managing wetlands. These regulations and policies require federal agencies to avoid, where possible, adversely impacting wetlands. Wetlands have been identified and mapped for the project under the National Wetland Inventory program.

Wetland Inventory - One wetland was identified within the project area for the redevelopment of the water system at the TSS, adjacent to the well house for the water system. The well house at the TSS is situated on a natural spring or seep protected by a four-foot diameter metal culvert, buried 15 feet deep. The frame well house sits on a concrete slab above the spring. The spring has supplied water for the site since the late 1950s or early 1960s, when Katie Starratt operated the new Elbo Ranch under a concession permit with the NPS. The wetland site has all three wetland characteristics: hydrophytic vegetation, wetland hydrology, and hydric soils. Dominant plants are willows, sedges, and rushes. Surface water begins at the surface and extends to greater than 12 inches in depth. Soils are composed of the Youga-Tineman complex and show prominent mottling. In May 2003, a US Forest Service hydrologist prepared a watershed evaluation for the project. In August 2003, an NPS hydrologist and a contract botanist delineated the wetland at the TSS and two NPS wetland scientists visited the site to help examine the effects of the proposed actions on the wetland and identify opportunities to avoid wetland impacts. As a result of these visits and delineation of the wetlands, several mitigation measures were proposed to the park.

Mitigation - Redevelopment of the TSS water system is included in all of the alternatives except the No-Action, and is necessary in order to comply with regulatory requirements. To avoid wetland impacts, the new water pipes between the well house and the underground water storage tanks will take an alternative route around the wetlands. This will eliminate the need for a Statement of Findings, which is a separately identifiable document that states the rationale for identifying a preferred alternative that has adverse impacts on wetlands and otherwise documents compliance with Director's Order #77-1 for Wetland Protection. As part of the rerouting of water pipes around the wetland, it will be necessary for engineers to determine how best to avoid affecting a propane tank, a generator building, and a mature Colorado blue spruce tree. Every attempt would be made to avoid all three. The redevelopment of the water system would result in negligible impacts to wetlands, due to rerouting of water pipes around rather than through the wetland. Therefore, wetlands are dismissed from further analysis.

Wild and Scenic Rivers

The project area is not within or adjacent to the identified corridor for any existing or proposed eligible wild, scenic or recreation river corridor. Therefore, this was dismissed.

Wilderness

The project is not within or adjacent to any lands in existing or recommended wilderness. Therefore, it was dismissed.

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. The proposed action would not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). Therefore, environmental justice was dismissed as an impact topic.

Indian Trust Resources

Indian trust assets are owned by Native Americans but held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial Order No. 3206, "American Indian Tribal Rites, Federal – Tribal Trust Responsibilities, and the Endangered Species Act," and Secretarial Order No. 3175, "Departmental Responsibilities for Indian Trust Resources." Indian trust assets do not occur in GTNP.

Socioeconomic Environment

The proposed action would neither change local and regional land use nor measurably affect local businesses or other agencies, therefore the socioeconomic environment will not be addressed as an impact topic.

ALTERNATIVES CONSIDERED

This Environmental Assessment examines four alternatives:

- **Alternative 1 - No Action**
- **Alternative 2 - Water System Improvements Only**
- **Alternative 3 - Relocation of the Hunter Hereford Barn**
- **Alternative 4 - TSS Builds Facility on the Kelly Campus**

In addition to these four alternatives, adaptive use of the Hunter Hereford Barn at its current location by the TSS was considered. This option was rejected, however, in view of the fact that it is not operationally practical and would not meet the purpose and need for the project. In addition, the distance between the barn and the Kelly Campus would result in additional human use of the corridor between them, with natural resource impacts such as the development of social trails, habitat fragmentation, vegetation damage, etc.

Actions Common to Alternatives 2, 3, and 4: The redevelopment of the existing water system at the Kelly Campus would take place in Alternatives 2, 3, and 4 in order to comply with regulatory requirements. The upgraded system would provide a more sustainable utility that conserves water and provides more water storage for better fire suppression capability.

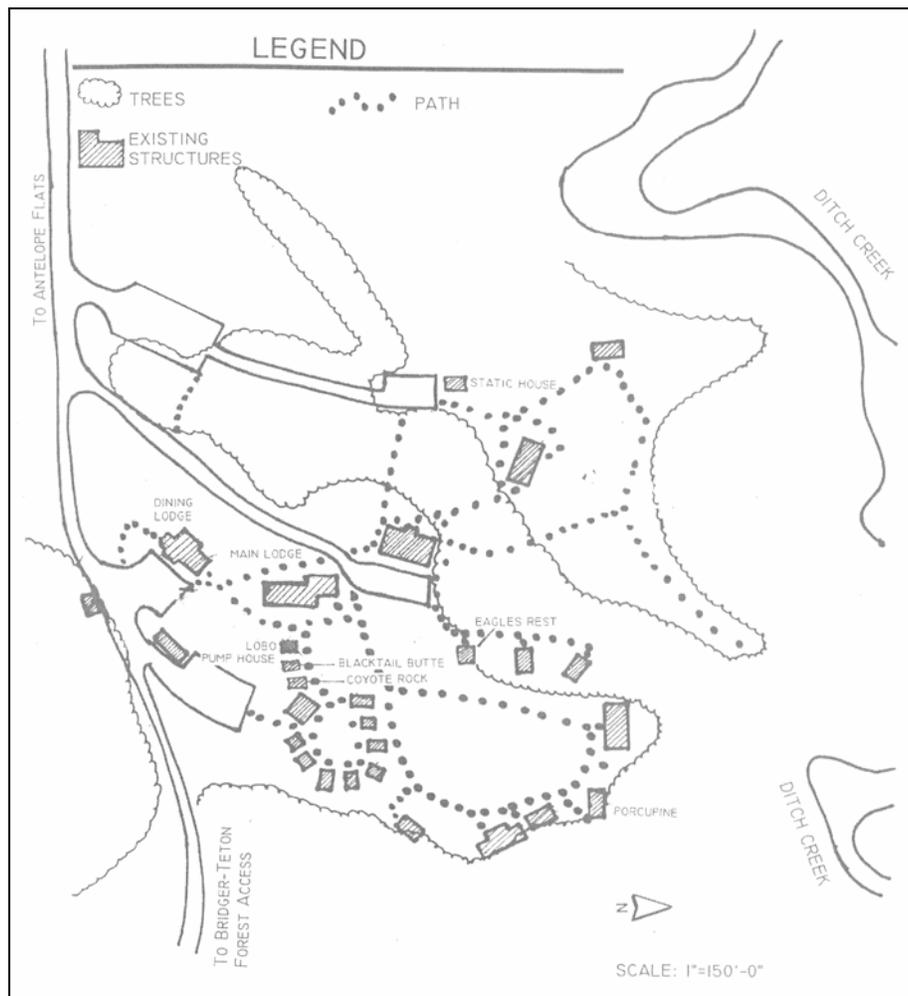
Actions Common to Alternatives 3 and 4: Preserve or rehabilitate the interiors of the Dining Lodge and the historic Main Lodge at the TSS. The Main Lodge is the only building at TSS that is listed in the National Register of Historic Places. At this time, the proposed preservation and rehabilitation projects have not been outlined in enough detail for the park to consult with the SHPO. Consultation with SHPO would occur prior to the proposed project commencing. Build an addition on the second floor of the two student dormitories (Porcupine and Eagles Rest) to create housing for 6 full-time residents. Replace the "Static House" with a new duplex unit. Relocate Blacktail Butte and Coyote Rock cabins and place on foundations. Design an accessible trail system. Rehabilitate all disturbed ground and return to natural conditions.

ALTERNATIVE 1 – NO ACTION

The no action alternative describes the action of continuing the present management operation and condition. The no action alternative provides a basis for comparing the management direction and environmental consequences of the proposed actions of all alternatives. Implementing the no action alternative would result in the continuation of existing conditions and trends at the TSS. The redevelopment of the water system, which is necessary for health and safety concerns of the TSS, would not occur. TSS would not acquire additional housing and this would result in the continuation of crowded and deficient housing conditions for residents, as well as a lack of office space, storage and equipment space, and indoor space to hold special functions and community events at the TSS.

Modifications to the interiors of the Dining Lodge and the Main Lodge would not proceed. The Static House would not be removed and replaced with a new duplex unit, additions would not be built on the two student dormitories, and the two cabins by the water systems would remain in their current locations. This would result in the continuation of existing, crowded and deficient housing conditions for residents. The TSS would have no handicap accessible trails. Although the NPS must prepare the no action alternative in order to provide a basis on which to compare the other alternatives, selection of the No-Action alternative would result in the park failing to comply with Wyoming DEQ standards.

Map of Alternative 1 – NO ACTION (TETON SCIENCE SCHOOL)



ALTERNATIVE 2 – WATER SYSTEM IMPROVEMENTS ONLY

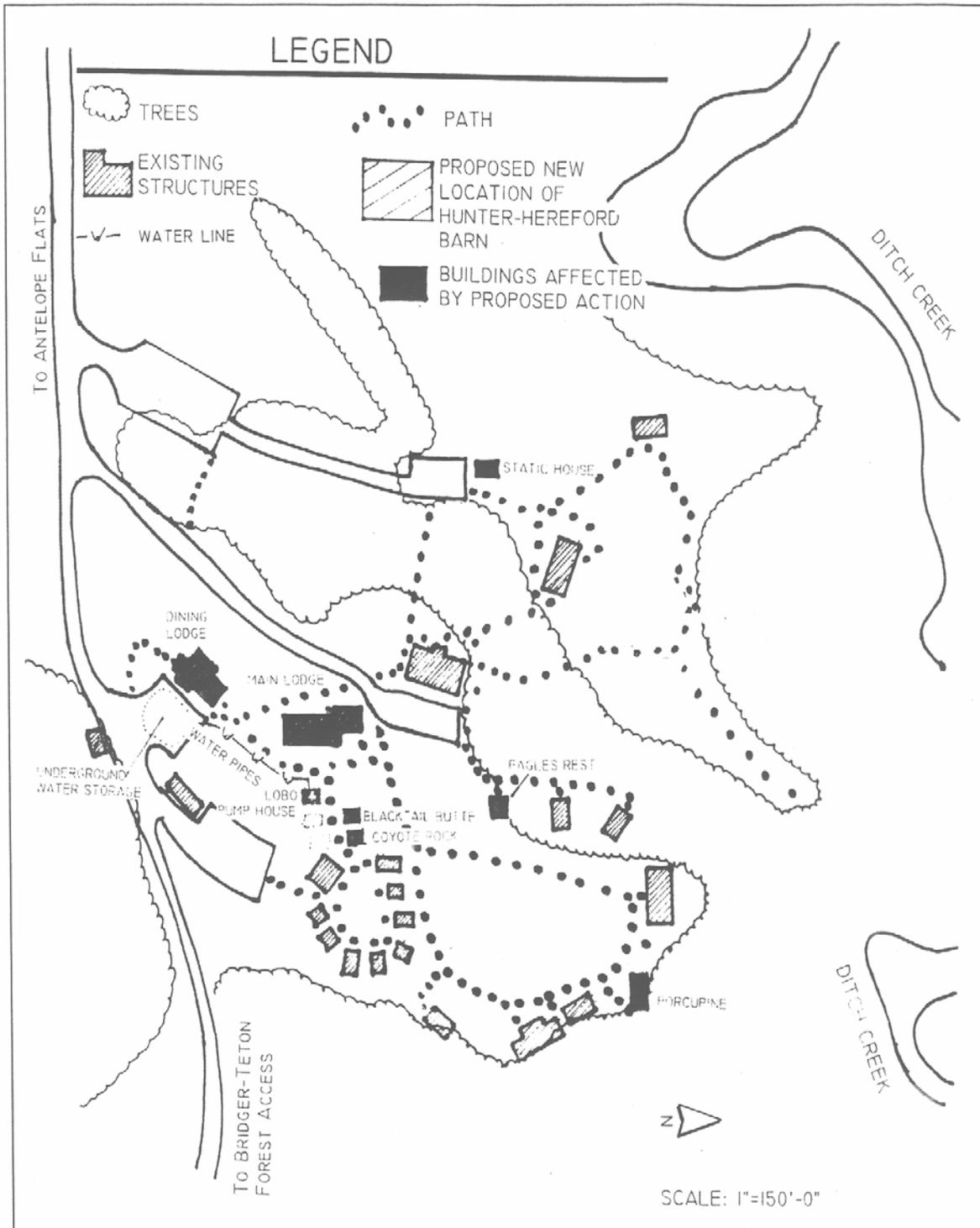
Upgrade of the Public Water System: Under this alternative, the NPS would rehabilitate the existing water system to provide a more sustainable and compliant water supply for human use and structural fire protection. The updated system would meet all federal and state drinking water standards. Rehabilitation of the water system would include the testing of the existing well for adequacy in meeting newer fire suppression demands. In addition, a 25,000-gallon underground water storage tank and fire pump (and pumphouse) would be installed to provide additional fire protection by providing water to hydrants and indoor sprinklers. New pipes would be laid so that they would not affect the wetland and in a location that is as close as possible to the pumphouse that would prevent freezing.

Mitigation measures required as part of this alternative: In addition to standard mitigation measures for construction activities that address pollution prevention using best management practices and technology, the following specific mitigation measures would be required:

- ❑ Construction and rehabilitation zones would be identified and fenced with construction tape, snow fencing, or similar material prior to any activity. The fencing would define the activity zone and confine activity to the minimum area required. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the activity zone. Contractors would coordinate with park staff to reduce disruption in normal park activities. Construction workers and supervisors would be informed about the special sensitivity of park values, regulations, and appropriate housekeeping and wildlife management practices.
- ❑ In many areas, soils and vegetation are already impacted to a degree by various human and natural activities. Construction would take advantage of these previously disturbed areas whenever possible. Vegetation impacts and potential compaction and erosion of bare soils would be minimized by conserving topsoil in windrows. The use of conserved topsoil would help preserve micro-organisms and seeds of native plants. The topsoil would be re-spread in as near to original location as possible and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area. This would reduce construction scars and erosion.
- ❑ As part of the rerouting of water pipes around the wetland, it would be necessary for engineers to determine how best to avoid affecting the propane tank, a generator building, and a mature Colorado blue spruce tree.
- ❑ Should construction unearth previously undiscovered archaeological resources, work would be stopped in the area and the park would consult with the SHPO/Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation, as necessary, according to §36 CFR 800.13, Post Review Discoveries. In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) 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.
- ❑ The construction contract would include mitigation for the potential delivery of pollutants to surface waters, not only during the construction phase, but also for the life of the system.
- ❑ To reduce the potential for bear-human conflicts, all construction workers would receive training in appropriate precautions and safety measures to use around grizzlies and other bears. No pets would be allowed at the site. 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).
- ❑ Weed control, as well as re-vegetation with native species will take place on all disturbed sites. Re-

vegetation efforts will focus on reconstructing the natural spacing, abundance, and diversity of native plant species, preferably from genetic stocks originating in the park. All disturbed areas will be restored as nearly as possible to pre-construction conditions and/or documented historic conditions shortly after construction activities are completed. TSS staff and students will accomplish revegetation with plans approved by park specialists. Park staff will supervise weed control with assistance from TSS staff and students.

Map of Alternative 2 –TSS Water System Improvements Only

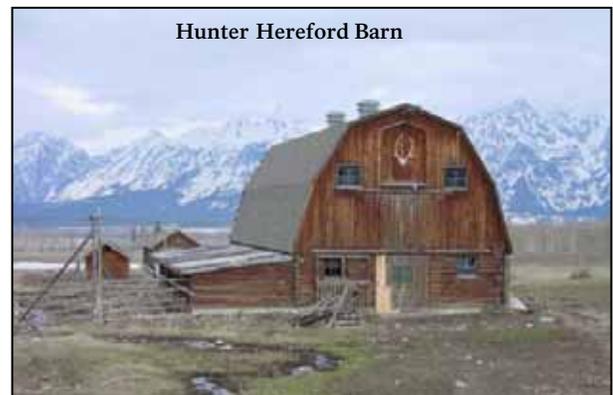


ALTERNATIVE 3 - RELOCATION OF THE HUNTER HEREFORD BARN

The relocation and adaptive use of the Hunter Hereford Barn addresses the need for housing and other programmatic space for the TSS by adaptively using a historic building. This alternative involves the relocation of the Hunter Hereford Barn to the TSS, the rehabilitation of seven existing buildings at the TSS, the development of a handicap accessible trail system, and the rehabilitation of the TSS water system. If Alternative 3 is selected for implementation, §106 compliance to include stabilizing the remaining structures at the Hunter Hereford Ranch will be addressed separately from this environmental assessment through further consultation with the SHPO. This may include entering into a Memorandum of Agreement (MOA) with the SHPO as a means of mitigating the adverse effect to the National Register listed Hunter Hereford Barn. Alternative 3 also includes the following:

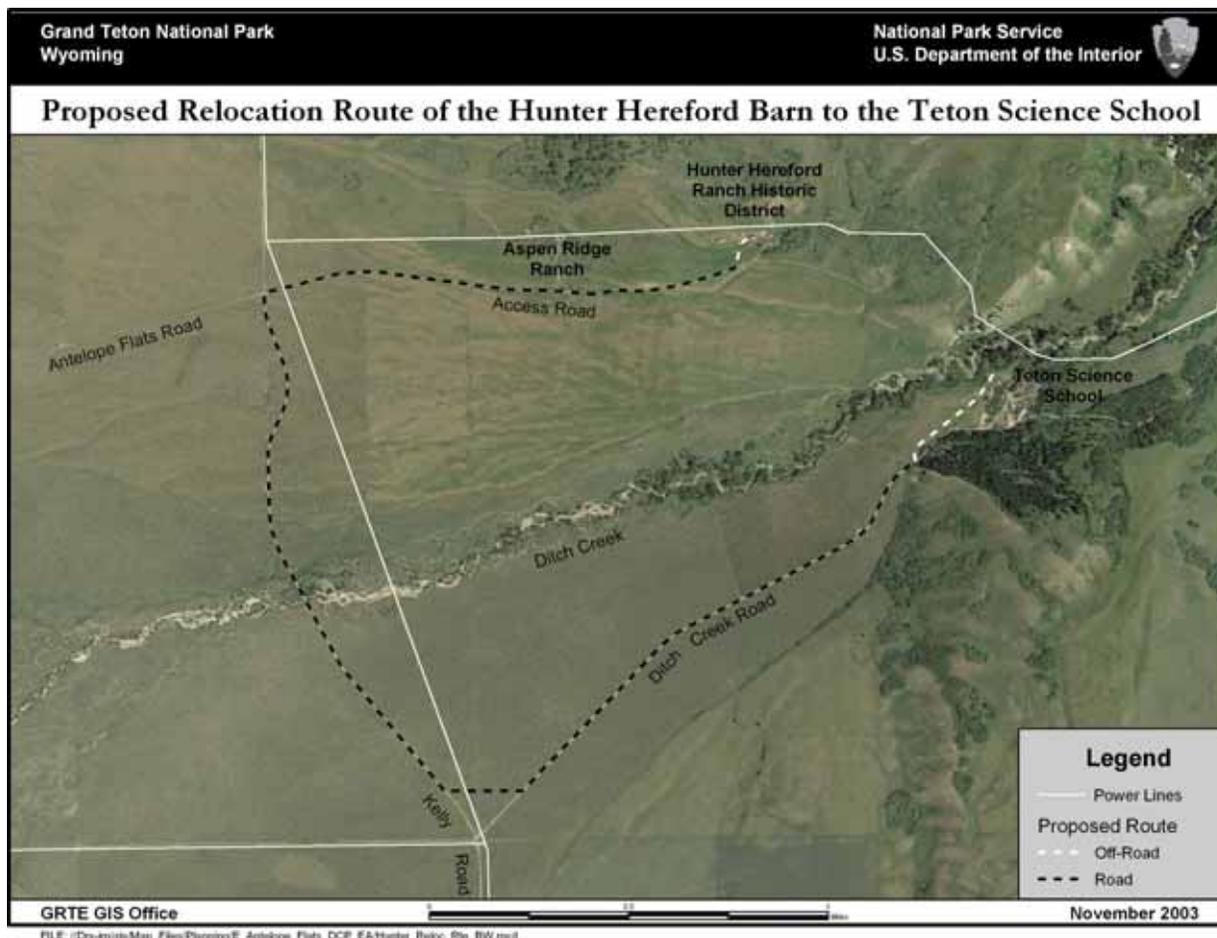
- Upgrade the TSS existing trail system to provide handicap access
- Relocate the Blacktail Butte and Coyote Cabins to nearby higher ground
- Provide utilities (water, septic, electric) to the barn, Blacktail Butte, and Coyote Cabins
- Rehabilitate all disturbed ground to help return land to previous conditions
- Provide routine and preventive maintenance of the barn and other structures at the TSS
- Preserve or rehabilitate the interiors of the Dining Lodge and the Main Lodge
- Replace the Static House with a new duplex unit
- Construct a second floor on Eagles Rest and Porcupine (student cabins)
- Continue water and septic system management
- Incorporate landscaping required to maintain viewshed and weed control

Adaptive use of the Hunter Hereford Barn: The Hunter Hereford Barn would be relocated adjacent to the Two Oceans building, which is south of Ditch Creek and adaptively used for an outfitting center, equipment storage, office and special event space, and housing for five full-time residents and five seasonal residents. A concrete basement would be added to the barn in its new location. The basement would be used for housing, laundry, and equipment storage. The ground floor would be used for housing and office and lab space for the research department. The top floor would be used for meetings and special events. The barn would provide approximately 8,750 square feet of interior space, of which 3,250 square feet is the basement. Designs for the adaptive use of the barn would be sent to the SHPO for review and comment prior to any work commencing. The approximate cost for relocation, design and rehabilitation of the barn is \$1.6 million.



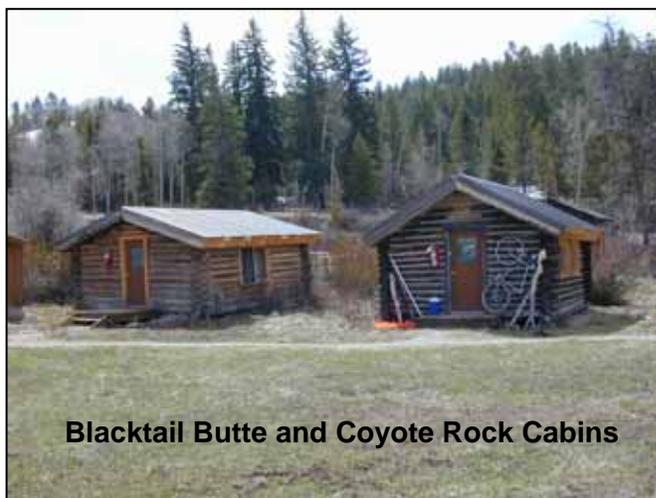
Relocation Route of the Hunter Hereford Barn: The Hunter Hereford Barn would be moved by professional building movers using a truck and trailer. The barn would travel approximately five miles on established travel routes (see figure below). In two locations the truck and trailer would leave established travel routes: first, at the intersection of the Kelly Road with the Ditch Creek Road, where the tightness of the corner prevents the trailer from staying on the road; and second, when leaving the Ditch Creek Road at the TSS to reach the proposed location for the Hunter Hereford Barn. It would be placed between the Two Oceans building and Ditch Creek. It is expected that the move would be accomplished in one day. The relocation route intersects with a Lower Valley Energy main power line in two locations. The trailer and its load would be too high to pass underneath the power line. Lower Valley Energy would need to raise the power line with a “hot stick” during the transportation process, thereby eliminating the need to lower the lines and turn off power to consumers in the affected area; or power would be temporarily turned off to users in the area for several hours while the barn is relocated.

Map 2: RELOCATION ROUTE



Modification of Seven TSS Buildings: The interiors of the Dining Lodge and the Main Lodge at the TSS would be preserved or rehabilitated. A second floor addition would be built on Eagles Rest and Porcupine, the two student dormitories. The Static House would be replaced with a new duplex unit. Blacktail Butte and Coyote Rock cabins, which are located in a depression that is occasionally wet, would be relocated on foundations on nearby higher ground. Specific plans for these actions would be subject first to approval by the NPS, and then would not proceed until consultation with the SHPO was completed.

Modifications to the seven TSS buildings would increase the overnight capacity by six beds. Overall, this alternative provides the ability to house eleven additional full-time staff and five seasonal residents.



Development of an Accessible Trail System: Portions of the existing trail would be upgraded to make it an accessible trail system. No new trail construction is required for this project, but portions of the existing trails require widening and filling to create the proper width and grade for accessibility. The original trail concept, which was presented to the public, included the placement of a bridge over Ditch Creek to facilitate water sampling

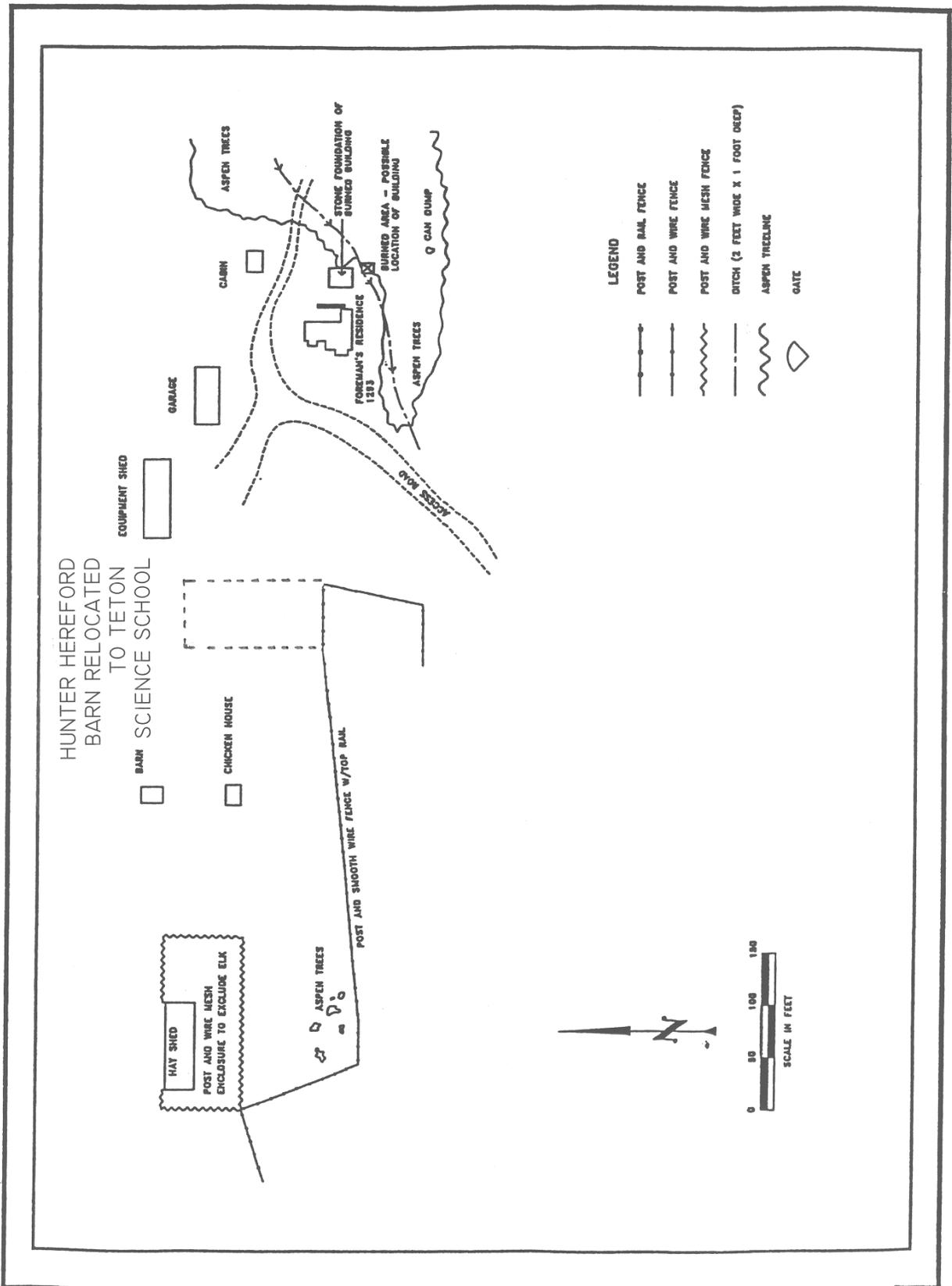
procedures for persons with mobility impairments; however, due to adverse natural resource impacts associated with the bridge encouraging additional human access to this relatively undisturbed area, it was removed from this alternative.

Redevelopment of the Public Water System: As described in Alternative 2, the NPS would rehabilitate the existing water system to provide a more sustainable and compliant water supply for human use and structural fire protection.

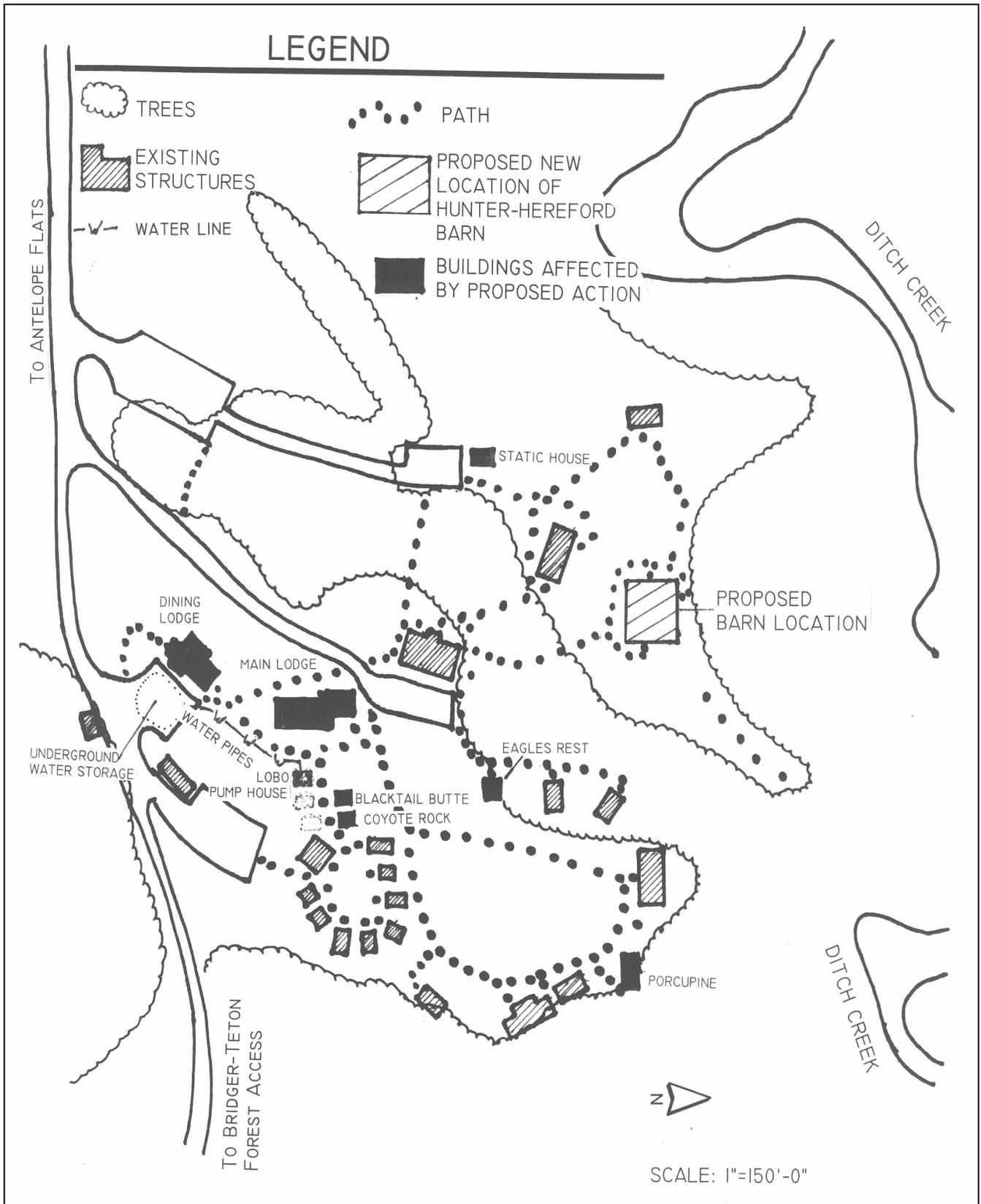
Mitigation measures required as part of this alternative: The Park employs a myriad of standard mitigation measures for construction activities that address pollution prevention using best management practices and technology. In addition, other specific mitigation measures that would be required as part of this alternative are:

- All mitigation measures and stipulations listed in Alternative 2 would be required in Alternative 3.
- Relocation of the Hunter Hereford Barn would constitute an adverse effect according to §106 of the National Historic Preservation Act. For the purposes of NEPA and this environmental assessment, the adverse effect would be considered a major impact. If appropriate mitigation measures were implemented under the terms and conditions of a Memorandum of Agreement (MOA) with the SHPO, the impact would be considered moderate rather than major. Prior to relocating the barn, the NPS would seek to enter into an MOA with the SHPO. If the NPS and SHPO were unable to reach agreement on an MOA, the preparation of a full Environmental Impact Statement (EIS) would be required prior to making any decision regarding relocation of the barn.
- TSS staff would limit the effects of dispersed human use from hiking and wandering on the Ditch Creek corridor associated with use of the Hunter Hereford Barn through education of visitors and residents and the use of established pathways. These efforts are designed to prevent social trail development along Ditch Creek, which could put stress on wildlife and displace them from preferred habitat.

Map of Alternative 3 - Hunter Hereford Ranch Historic District



Map of Alternative 3 – TSS Rehabilitation and Improvements with Hunter Hereford Barn Relocated on the TSS Campus



ALTERNATIVE 4 – TSS BUILDS A FACILITY ON THE KELLY CAMPUS

Under Alternative 4, the TSS would build a facility on the Kelly Campus for an outfitting center, equipment storage, office and special event space, and housing for five full-time and five seasonal residents. The new facility would be located on the same footprint identified for the Hunter Hereford Barn in Alternative 3. The building footprint would disturb approximately 3,250 square feet, the same approximate footprint as the barn.

The new facility would provide approximately 5,500 square feet of usable above-ground space, plus a basement of approximately 3,250 square feet. The total, approximately 8,750 square feet, is about the same that would be provided by the barn under Alternative 4. The new building would be constructed of materials consistent with existing surrounding structures and would not exceed two stories in height. This action would require consultation with the SHPO to discuss any viewshed issues from the National Register listed Main Lodge, as well as any ground disturbance activities. The approximate cost to build a new facility is estimated to be between \$1.9 and \$2.4 million, depending on the building materials for a log or frame building.

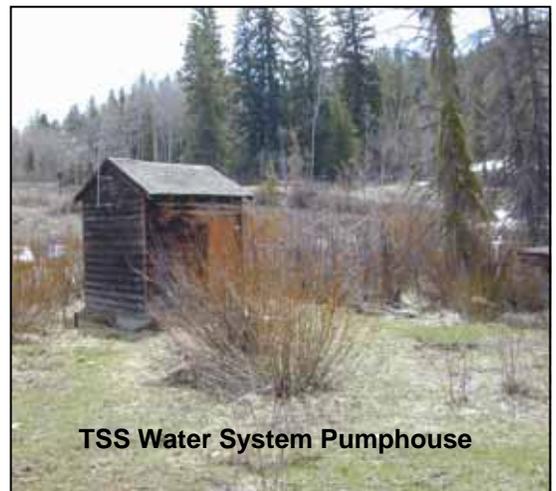
Modification of Seven TSS Buildings: The same rehabilitation work, additions, and replacements would occur as described in Alternative 3, providing an increase of housing for eleven full-time and five seasonal residents.

Development of an Accessible Trail System: The same trail system improvements would occur as described in Alternative 3.

Redevelopment of the Public Water System: As described in Alternatives 2 and 3, the NPS would rehabilitate the existing water system to provide a more sustainable and compliant water supply for human use and structural fire protection.

Mitigation measures required in this alternative:

All the mitigation measures and stipulations listed as part of the Alternatives 2 and 3 would be required as part of Alternative 4, with the exception of entering into a MOA with the SHPO since the barn would not be relocated.



TSS Water System Pumphouse

Map of Alternative 4 - TSS Builds a New Facility on Kelly Campus

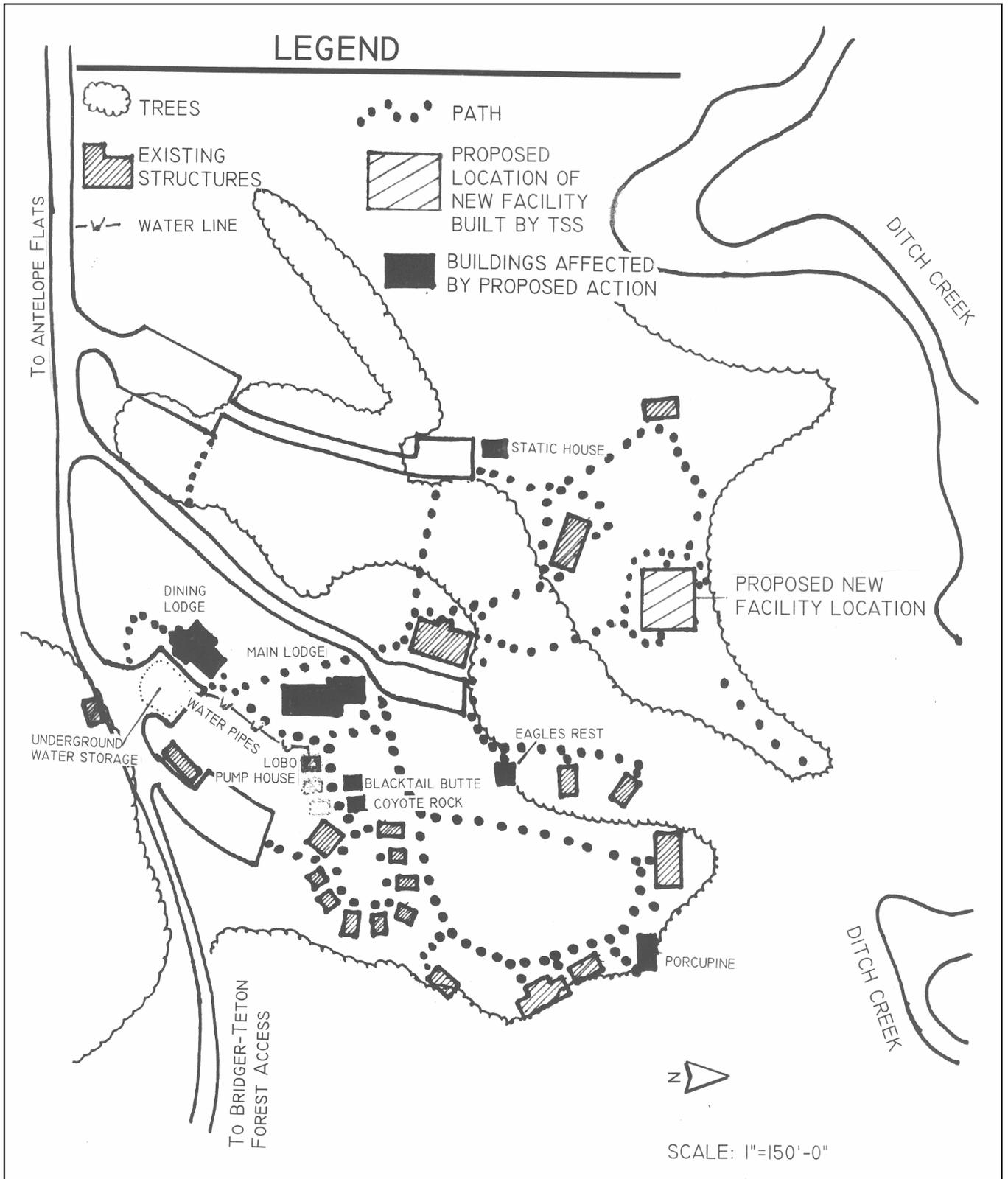


Table 2. Degree to Which Each Alternative Meets Project Objectives

Objective	Alternative 1: No Action Alternative	Alternative 2: Water System Improvements Only	Alternative 3: Relocation of Hunter Hereford Barn	Alternative 4: TSS Builds New Facility at the Kelly Campus
1. Upgrade Existing Water System	Alternative 1 does not meet this objective because it does not upgrade the water system to provide a safe drinking water system and improve structural fire protection capabilities at the TSS.	Alternatives 2, 3, and 4 meet this objective fully and to the same degree.	Alternatives 2, 3, and 4 meet this objective fully and to the same degree.	Alternatives 2, 3, and 4 meet this objective fully and to the same degree.
2. Provide Student and Employee Housing	Alternative 1 does not meet this objective because it would not provide additional housing, resulting in continuation of the housing shortage for the TSS.	Alternative 2 does not meet this objective because it would not provide additional housing, resulting in continuation of the housing shortage for the TSS.	Alternative 3 fully meets this objective because it would provide additional housing for approximately eleven full-time and five seasonal TSS residents.	Alternative 4 meets this objective the same as Alternative 3.
3. Provide Adequate Meeting, Office, and Storage Space for TSS	Alternative 1 does not meet this objective because it does not increase administrative space and perpetuates current shortages of meeting, office, and storage space.	Alternative 2 does not meet this objective because it does not increase administrative space and perpetuates current shortages of meeting, office, and storage space.	Alternative 3 fully meets the objective by the adaptive use of the Hunter Hereford Barn at TSS. It would provide adequate meeting, office, and storage space in a convenient location.	Alternative 4 meets this objective the same as Alternative 3.
4. Strengthen NPS Partnerships	<p><u>TSS:</u> Alternative 1 does not meet this objective because it would not provide a safe drinking water system and improve structural fire protection capabilities at the TSS, NPS’s partner. Furthermore, it would not provide a framework that would facilitate a partnership to help meet the need to house employees and students.</p> <p><u>Others:</u> Alternative 1 would eventually result in an adverse effect to cultural resources. Community partners would not benefit from use of the new facility for functions and special events. Partnerships with those who opposed relocation of the Hunter Hereford Barn or the construction of the new facility would not be adversely affected, but this Alternative would adversely affect community members interested in the preservation of cultural resources.</p>	<p><u>TSS:</u> Alternative 2 only partially meets this objective because it would only partially meet the needs of the TSS outlined in this project. Although Alternative 2 would provide water system infrastructure improvements, the NPS would not be assisting the TSS with the housing and administrative space shortage. Alternative 2 is not as effective at meeting this objective as Alternatives 3 and 4.</p> <p><u>Others:</u> Alternative 2 would not result in an adverse effect to cultural resources. Community partners would not benefit from use of the new facility for functions and special events. Partnerships with those who opposed relocation of the Hunter Hereford Barn or the construction of the new facility would not be adversely affected.</p>	<p><u>TSS:</u> Alternative 3 meets this objective better than Alternatives 1, 2, and 4 because it would not only provide infrastructure improvements, but would help a formal park partner meet a need to house employees and students in a more cost-effective manner.</p> <p><u>Others:</u> The NPS is required to consult with the SHPO on actions that may or would affect cultural resources that are listed in or are eligible for listing in the National Register of Historic Places. The SHPO is against the relocation of the Hunter Hereford Barn because the historic district would lose its integrity and eligibility for listing in the National Register. Partnerships with members of the Jackson Hole community could benefit from use of the Hunter Hereford Barn for functions and special events. Community relationships would not be strengthened with those partners who oppose relocation of the Hunter Hereford Barn.</p>	<p><u>TSS:</u> Alternative 4 would meet this objective better than Alternative 1 and 2 because it addresses employee-housing needs. It would not meet the objective as well as Alternative 3 because it would require the construction of a new facility, ultimately at a greater expense to visitor and participant education and services.</p> <p><u>Others:</u> Alternative 4 would not result in an adverse effect to cultural resources. Community partners may benefit from use of the new facility for functions and special events. Partnerships with those who opposed relocation of the Hunter Hereford Barn would not be adversely affected, unless such members also opposed construction of the new facility.</p>

ALTERNATIVES CONSIDERED BUT DISMISSED

The NPS initially considered five alternatives but dismissed one of them. The five alternatives arose from issues raised during the internal and external public scoping period in the spring of 2003:

1. NPS stabilizes the Hunter Hereford Barn and TSS does not build their own facility.
2. NPS moves the Hunter Hereford Barn to the TSS for adaptive use.
3. TSS builds a facility on the Kelly Campus and NPS stabilizes the Hunter Hereford Barn.
4. Adaptive use of Hunter Hereford Barn *in situ* by the NPS
5. Adaptive use of Hunter Hereford Barn *in situ* by the TSS

In the last alternative, the TSS would adaptively use the Hunter Hereford Barn on location in the Hunter Hereford Ranch Historic District for housing, office space, equipment storage, and special functions. A footpath approximately 1.5 miles long would cross Ditch Creek and the Kelly hayfields to connect the Kelly Campus with the historic district. Alternative road access is approximately five miles.

Use of the barn in its current location by TSS was not considered operationally feasible due to the distance of the barn from the main campus. The distance involved would have necessitated numerous daily trips that are not practical. In addition, natural resource and human safety considerations were identified that also contributed to the dismissal of this alternative. A footpath between the TSS and the Hunter Hereford Ranch Historic District would cross the riparian corridor of Ditch Creek and the open meadows of the Kelly hayfields. These are important wildlife areas with large bison herds living there year-round. People walking through may disturb bison during calving and could displace animals causing them to move to less preferable habitat. This may also pertain to pronghorn and elk. Increased human presence in these areas could increase the risk of human-wildlife confrontations. This alternative would also increase the amount of traffic on the Kelly Road due to multiple, daily trips made by the TSS employees for equipment rental by students, office and residential use, and special functions.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

As required by Council on Environmental Quality (CEQ) regulations found at 40CFR1502.2(d), National Environmental Policy Act (NEPA) documents must include a section stating how each alternative analyzed in detail would or would not achieve the requirements of sections 101 and 102(1) of NEPA. The NPS meets this requirement by identifying how each of the alternatives meets the criteria set forth in section 101(b) of NEPA, and identifies the environmentally preferred alternative as the alternative that will promote the national environmental policy as expressed in NEPA. Section 101(b) sets forth the following six criteria:

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.”

Alternative 1, No-Action, is the least effective in meeting the six §101 criteria. By maintaining the status quo, it fails to adequately address needed health and safety improvements at the TSS. In addition, it does not address the Teton Science School's need for adequate student and employee affordable housing or meeting or office space. By ignoring these needs, the NPS would not fulfill its role as a Partner nor would this action strengthen this partnership.

Alternative 2 addresses the six criteria better than Alternative 1, but not as well as Alternatives 3 and 4, because it does not rehabilitate and improve infrastructure for housing, office space, and storage. By upgrading the existing water system at the TSS, Alternative 2 only addresses criteria 1, 2, and 6 through improvements to water quality safety and storage.

Alternative 3 would relocate the Hunter Hereford Barn to the TSS, upgrade the water system, and make other infrastructure improvements to buildings and trails at the TSS. Although relocation of the barn would help ensure its preservation over the long-term through adaptive use, it would also result in the historic district losing its integrity and eligibility for listing on the National Register, and would thus be considered an adverse effect on a cultural resource. By addressing the infrastructure needs at the TSS and adaptively using the barn, Alternative 3 meets criteria 1, 2, 5, and 6. Although it meets criteria 6 better than all the other alternatives due to its maximum attainable recycling of depletable resources, it does not meet goals 3 and 4 because it has an unintended consequence of delisting a historic district from the National Register of Historic Places and precludes future, adaptive use of the barn in its historic setting.

Alternative 4 meets all of the six §101 goals and it best meets criteria 3, 4 and 5, therefore it is the environmentally preferred alternative. Alternative 4 rehabilitates and improves the infrastructure at the Kelly Campus of the TSS, while preserving the option of a future adaptive use for the Hunter Hereford Barn at its historic location; hence, it attains the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

Table 3: Summary Comparison of Impacts To Teton Science School Kelly Campus

Impact Topic	Alternative 1 – No Action Alternative	Alternative 2 – Water System Improvements Only	Alternative 3: Relocation of Hunter Hereford Barn	Alternative 4: TSS Builds Facility on the Kelly Campus
Archaeological Resources	Negligible effect to archaeological resources or “No Adverse Effect”.	Negligible effect to archaeological resources or “No Adverse Effect”.	Long-term, adverse, negligible-to-minor effect to archaeological resources or “No Adverse Effect”.	Negligible effect to archaeological resources or “No Adverse Effect”.
Historic Structures and Cultural Landscape	Long-term, minor adverse impacts or “No Adverse Effect” to the Main Lodge at the TSS, since it would not be rehabilitated under Alternatives 1 and 2.	Long-term, minor adverse impacts or “No Adverse Effect” to the Main Lodge at the TSS, since it would not be rehabilitated under Alternatives 1 and 2.	<p>Long-term, moderate-to-major, adverse impact, or “Adverse Effect,” to the Hunter Hereford Ranch Historic District because it will lose integrity and eligibility for listing in the National Register due to removal of the barn, and depending on NPS and SHPO entering into an MOA.</p> <p>Short- and long-term, moderate beneficial impact, or “No Adverse Effect,” to the barn when adaptively used following the Secretary’s standards at the TSS. Long-term, moderate beneficial impact, or “No Adverse Effect,” to Main Lodge due to rehabilitation. Negligible impact, or “No Adverse Effect,” to the view shed from the Main Lodge with the addition of the barn at the TSS Kelly Campus.</p>	Long-term, moderate beneficial impacts, or “No Adverse Effect,” to the Main Lodge due to rehabilitation. Negligible impact, or “No Adverse Effect,” to the view shed from the Main Lodge with the addition of a new building at the TSS Kelly Campus.
Vegetation	No new vegetation impacts would occur. Without treatment, non-native species would persist but there would be very little spreading. Impacts would long-term, adverse and negligible.	Short term, minor adverse impacts due to vegetation disturbance from the water system work and short-term, minor beneficial impacts due to natives salvaging and treatment of non-natives.	Short-term, minor adverse impacts on a site-specific level to vegetation through temporary disturbance of plants during relocation of the barn. Short term, minor adverse impacts due to vegetation disturbance from the water system work and short-term, minor beneficial impacts due to natives salvaging and treatment of non-natives.	Short term, minor adverse impacts due to vegetation disturbance from the water system work and short-term, minor beneficial impacts due to natives salvaging and treatment of non-natives.
Visual Quality	Short-term, negligible adverse impacts. Long-term, negligible-to-minor adverse impacts to the viewshed at the TSS due to building deterioration.	Short-term, minor, adverse, but long-term negligible impacts due to minimal construction activity.	<p>Short-term, minor adverse effects from construction at TSS; but long-term, minor beneficial effects from building improvements.</p> <p>Long-term, minor-to-moderate effects of both a beneficial and adverse nature from adaptive use of the Hunter Hereford Barn at the TSS, depending on individual perspectives.</p> <p>Long-term, moderate adverse effect on the visual quality of the Hunter Hereford Ranch Historic District.</p>	Impacts at the TSS are the same as Alternative 3 with the exception of the effects on visual quality from TSS building a new facility, rather than adaptively reusing the Hunter Hereford Barn. This action would have a long-term, minor-to-moderate, beneficial or adverse effect on some visitors, depending on their perception of the building. The effects to the Hunter Hereford Ranch Historic District would be the same as in Alternatives 1 and 2.

Impact Topic	Alternative 1 – No Action Alternative	Alternative 2 – Water System Improvements Only	Alternative 3: Relocation of Hunter Hereford Barn	Alternative 4: TSS Builds Facility on the Kelly Campus
Water Quality	Negligible impacts to ground water and surface water.	Short-term, negligible-to-minor and adverse impacts to surface water and ground water during construction activities. Long-term, minor beneficial impacts to ground water and negligible impacts to surface water.	Short-term, negligible-to-minor and adverse impacts to surface water and ground water during construction activities. Long-term, minor beneficial impacts to ground water and negligible impacts to surface water. (Same as Alternatives 2 and 4)	Short-term, negligible-to-minor and adverse impacts to surface water and ground water during construction activities. Long-term, minor beneficial impacts to ground water and negligible impacts to surface water.
Wildlife & Habitat, T&E Species	Negligible effects or “No Effect” to wildlife, T&E species, migratory birds, and habitat.	Negligible effects or “No Effect” to wildlife, T&E species, migratory birds, and habitat.	Alternative 3 would have “no effect” on the federally listed bald eagle and Canada lynx and “may affect, but is not likely to adversely affect,” the grizzly bear and gray wolf. Impacts to migratory birds would be short-term, negligible and adverse due to construction activities. Wildlife would experience short- and long-term, minor adverse impacts on a site-specific level due to the effects of dispersed human use on wildlife, causing displacement, which can lead to animals spending more time in less preferable habitat.	Alternative 4 would have similar impacts to Alternative 3.
Park Operations	Long-term, minor adverse impacts from continuous maintenance and repairs to the old water system and continual waste of water due to leaks.	Short-term, minor adverse impacts due to construction activities. Long-term, minor beneficial impacts from water system improvements.	Short-term, minor adverse impacts due to barn and other building relocations and construction activities. Long-term, minor beneficial impacts from water system improvements and adaptive use of the Hunter Hereford Barn.	Short-term, minor adverse impacts due to initial construction activities. Long-term, minor beneficial impacts from water system improvements.
Visitor Use and Experience	Long-term, minor adverse effect due to the inability to provide adequate lodging and services on the campus.	Short-term, minor adverse impacts due to construction activities. Long-term, minor beneficial effect due to water system upgrade, but minor-to-moderate adverse effect due to lack of housing and space at the TSS in the long-term.	Long-term, negligible-to-minor adverse effect on the Hunter Hereford Ranch due to removing the barn from this location. Short-term, minor adverse impacts due to construction activities at the TSS. Long-term, minor-to-moderate beneficial effect due to proposed improvements at the TSS.	Short-term, minor adverse impacts due to construction activities at the TSS. Long-term, minor-to-moderate beneficial effect due to proposed improvements of infrastructure at the TSS. No effect to the Hunter Hereford Ranch Historic District.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Overview

This section describes the existing setting or baseline conditions for all affected resources within the project area. This information was used to analyze the impacts of each alternative against the current conditions of the project area. Best professional judgment is applied, based on personal knowledge of the resource and experience in the field to define the issues and provide a clear basis of choice. Each impact topic will outline the affected environment, methodology, regulations and policies, and associated impacts as they relate to each alternative.

Methodology

For each alternative, the analysis discloses direct, indirect, and cumulative environmental effects for each resource impact topic, including effects on the human environment. The analysis includes a description of whether effects are beneficial or adverse and short- or long-term. The magnitude of the effect also is described in terms ranging from negligible to major. The definition of the level or magnitude of the impact may vary between impact topics so individual definitions are provided for each. Refer to Table 3 on pages 25-26 for a summary comparison of impacts of the alternatives. East Antelope Flats, outlined on Map 1 on page 2, was used as the cumulative effects area since the TSS is located within this area and other complexes and landscape share similar characteristics in this area.

The National Park Service has established guidance in the form of sample methodologies and impact threshold definitions. This guidance serves to provide general definitions for a range of impacts as they relate to various resource topics. Individual park units are encouraged to use this guidance, but to tailor it the guidelines so that they are applicable to the specific characteristics of the unit's resources and environment. In most cases, the impact threshold definitions used in this analysis were derived from this guidance and modified slightly by park professionals with field expertise in each of the resource topic fields. Park personnel applied best professional judgment based on personal knowledge of the resource and experience in the field.

National Park Service guidance directs that if a "major" finding is determined for any impact topic, then preparation of an Environmental Impact Statement (EIS) should be considered. In the event that one of the proposed alternatives results in a "major" finding, the NPS will decide whether to select another alternative or initiate analysis to prepare an EIS in order to proceed with the proposed action.

Cumulative Impact Scenario

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (42 USC 4321 et seq.), require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results 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 were determined by combining the impacts of the each alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects that may affect the east Antelope Flats area. Ongoing projects within GTNP with the potential to affect the east Antelope Flats area include the Fire Management Plan/EA, the Elk and Bison Management Plan/EIS, use of the McCollister site for employee residential use, and the draft Memorandum of Agreement with the Teton Science School.

Impairment of Park Resources and Values

National Park Service policy requires analysis of potential effects to determine whether or not actions would impair park resources. NPS managers must always seek ways to avoid, or to minimize to the

greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the NPS 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. A prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be more likely to constitute impairment to the extent it affects 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 to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

ARCHAEOLOGICAL RESOURCES

Affected Environment

A Class III Cultural Resource Inventory was conducted in August of 2003. Areas were surveyed along the potential relocation route of the Hunter Hereford Barn. One prehistoric lithic scatter and a number of isolated artifacts were identified along the relocation route. These sites are not recommended to be eligible for the National Register of Historic Places; however, mitigation measures would be taken to avoid the areas if the barn is to be moved. Without such mitigation, this action could result in additional adverse impacts to cultural resources.

The proposed route for relocation of the Hunter Hereford Barn traverses an off-road area adjacent to the TSS (see Relocation Route Map, page 16). This area was inventoried in 2000 (*Grand Teton National Park; Teton Science School Prescribed Burn, Class III Cultural Resource Inventory*). The inventory identified one prehistoric site that was recommended to be eligible for the National Register of Historic Places. Mitigation measures would be taken to avoid adverse impacts to this site if the Hunter Hereford Barn is relocated to the TSS.

The TSS developed area was inventoried in 1991 (*An Archaeological Block Inventory of Teton Science School*). The lithic material identified was determined to be associated with flint knapping classes held at the school. No additional sites were recorded in this inventory.

Methodology

Archaeological resources have the potential to answer in whole or in part, important research questions about natural history. In order for an archaeological resource to be eligible for the National Register of Historic Places, it must meet one or more of the following criteria of significance: A) associated with events that have made a significant contribution to the broad patterns of our history; B) associated with the lives of persons significant in our past; C) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; D) have yielded, or may be likely to yield, information important in prehistory or history. In addition, the archaeological resource must possess integrity of location, design, setting, materials, workmanship, feeling, association (National Register Bulletin, Guidelines for Evaluating and Registering Archaeological Properties). For purposes of analyzing impacts to archaeological resources either listed in or eligible to be listed in the National Register, the thresholds of change for intensity of an impact are defined in the following table.

Impact Threshold	Archaeological Resources Definition of Impact
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be no adverse effect.
Minor	Adverse impact - disturbance of a site(s) results in little, if any, loss of integrity. The determination of effect for §106 would be no adverse effect. Beneficial impact - maintenance and preservation of a site(s). The determination of effect for §106 would be no adverse effect.
Moderate	Adverse impact - disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be adverse effect. A memorandum of agreement is executed between the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate. Beneficial impact - stabilization of a site(s). The determination of effect for §106 would be no adverse effect.
Major	Adverse impact - disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be adverse effect. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b). Beneficial impact - active intervention to preserve a site(s). The determination of effect for §106 would be no adverse effect.
Duration	Short-term - Recovers in less than 3 years; Long-term - Takes more than 3 years to recover.

Regulations and Policies

Current laws and policies require that the following conditions be achieved in the park:

Archaeological Resources Desired Condition	Source
Archaeological sites are identified and inventoried, and their significance is determined and documented. Archaeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. In those cases where disturbance or deterioration is unavoidable, the site is professionally documented and salvaged.	National Historic Preservation Act; Executive Order 11593; Archaeological and Historic Preservation Act; Archaeological Resources Protection Act; the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies (2001)

Impacts of Alternative 1 - No Action –The only archaeological site identified within the scope of this project was on the relocation route of the Hunter Hereford Barn. Because the barn is not being transported in this alternative, it would have a negligible impact or “No Adverse Effect” to archaeological resources.

Impacts of Alternative 2 – Water System Improvements Only - A survey has been completed and no archaeological resources were identified within the TSS campus area. The only archaeological site identified within the scope of this project was on the relocation route of the Hunter Hereford Barn. Because the barn is not being transported in this alternative, it would have a negligible impact or “No Adverse Effect” to archaeological resources for the same reasons described in Alternative 1.

Impacts of Alternative 3- Relocation of the Hunter Hereford Barn -Relocating the Hunter Hereford Barn could potentially disturb archaeological resources, resulting in the loss of site integrity and cultural information. Preventive mitigation measures would be taken to protect the identified prehistoric sites from damage while the barn is being transported. The park archeologist will be on site during transport to ensure that the transportation of the barn occurs in the areas she has already surveyed and cleared. Based on the unlikelihood that unknown archaeological resources occur in the project area, as well as the significance of any affected resource, this alternative would result in a local, long-term, negligible-to-minor adverse impact to archaeological resources or “No Adverse Effect”.

If either significant archaeological resources (i.e. those that are eligible to be listed in the National Register of Historic Places) or human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, all items would be left *in situ* to avoid further disturbance. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed. Archaeological resources determined ineligible for listing in the National Register would be recovered, documented and recorded before construction would proceed.

Impacts of Alternative 4 - TSS Builds Facility on the Kelly Campus – A survey has been completed and no archaeological resources were identified within the TSS campus area, therefore the proposed footprint for the new facility would not have an impact on archaeological resources. As in Alternatives 1 and 2, the Hunter Hereford Barn would not be transported; consequently, this alternative would have a negligible impact or “No Adverse Effect” to archaeological resources.

Cumulative Effects

Archaeological resources at GTNP are subject to damage from vandalism, visitor access, and natural processes. Past development in the park has resulted in the disturbance and loss of some archaeological resources during excavation and construction activities. The only actions in the past at, or near the project area have been road rehabilitation work on a “patch” or as-needed basis. Impacts to archaeological resources from these activities are negligible and not measurable. No new roadwork outside the road prism is anticipated in the future, nor are any actions in or near the surveyed project area.

Conclusion

After applying the Advisory Council on Historic Preservation’s criteria of adverse effects (36 CFR §800.5, Assessment of Adverse Effects), the NPS concludes that the construction of utilities and transport of the barn to the TSS or the construction of the building at the TSS would have “No Adverse Effect” on archaeological resources. None of the alternatives pose any significant, adverse, direct or indirect impacts to archaeological resources. Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of GTNP; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park’s general management plan or other relevant NPS planning documents, there would be no impairment of the park’s archaeological resources.

HISTORIC STRUCTURES AND CULTURAL LANDSCAPE

Affected Environment

Historic Structures

The TSS Kelly Campus consists of the historic Ramshorn Dude Ranch Lodge (48TE1165), over fifteen non-historic residences and small cabins (the majority of them moved to the site), an ice house, the Ramshorn barn, and the relocated Hunter Hereford residence. The Wyoming State Historic Preservation Office concurred in 1989 that the property retained insufficient integrity in setting and association for listing in the National Register as a historic district yet requested reevaluation of the Ramshorn Dude Ranch lodge and barn. Upon reevaluation, the park determined that only the lodge was eligible for listing in the National Register since the barn had been significantly altered on the exterior, diminishing its integrity. The Ramshorn Dude Ranch Lodge retains remarkable integrity of design, workmanship, and materials, contributes to our understanding of the characteristics of dude ranch rustic architecture, and is eligible to the National Register under Criterion C. The Ramshorn Dude Ranch Lodge was listed in the National Register in August 1998. *See Appendix A for the history of what is now the TSS Kelly Campus.*

The Hunter Hereford Ranch Historic District (48TE1629-1636) was listed in the National Register of Historic Places in August 1998, and consists of eight contributing buildings and one contributing site, most prominent of which is the barn. The historic district is eligible under National Register Criterion A for its association with the growth of hobby ranches, a locally significant historic theme, and under Criterion C for its association with vernacular architecture and with architect-designed rustic architecture. The property is associated with the settlement historic context outlined in the Grand Teton National Park Multiple Property Nomination of August 1998. *See Appendix A for the history of the Hunter Hereford Ranch.*

Cultural Landscapes

Regulations and policies, as outlined in Table 1, require the consideration of impacts on cultural landscapes listed in or determined eligible for listing in the National Register of Historic Places. Cultural landscapes are evaluated separately from archaeological sites, historic structures, ethnographic resources, and museum objects. According to the National Park Service's Cultural Resource Management Guideline (Director's Order #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."

The National Park Service defined four overlapping types of cultural landscapes:

Historic Designed Landscape--a landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, or horticulturist according to design principles, or an amateur gardener working in a recognized style or tradition. The landscape may be associated with a significant person(s), trend, or event in landscape architecture; or illustrate an important development in the theory and practice of landscape architecture. Aesthetic values play a significant role in designed landscapes. Examples include parks, campuses, and estates.

Historic Vernacular Landscape--a landscape that evolved through use by the people whose activities or occupancy shaped that landscape. Through social or cultural attitudes of an individual, family or a community, the landscape reflects the physical, biological, and cultural character of those everyday lives. Function plays a significant role in vernacular landscapes. They can be a single property such as a farm or a collection of properties such as a district of historic farms along a river valley. Examples include rural villages, industrial complexes, and agricultural landscapes.

Historic Site--a landscape significant for its association with a historic event, activity, or person. Examples include battlefields and president's house properties.

Ethnographic Landscape--a landscape containing a variety of natural and cultural resources that associated people define as heritage resources. Examples are contemporary settlements, religious sacred sites and massive geological structures. Small plant communities, animals, subsistence and ceremonial grounds are often components.

In FY1999, the NPS Intermountain Regional Office conducted a Level 0 Cultural Landscape Inventory (CLI) for GTNP. A Level 0 assessment is a general overview of the whole park involving preliminary identification of landscapes, component landscapes within the park, and identification of immediate threats to cultural landscape resources that helps determine CLI priorities.

During the 1999 GTNP Level 0 Cultural Landscape Inventory, the NPS determined that the setting, association, and feeling of the historic Ramshorn Dude Ranch (now the TSS Kelly campus) was lost due to modifications made at the site, including the addition of several modern buildings, the change in circulation on the property, and the adaptive use of the site as the TSS, a major change from dude

ranching. The remaining Ramshorn landscape will be formally evaluated for listing in the National Register under the dude ranching context in consultation with SHPO. However, the park believes the landscape will be ineligible for listing because the integrity of the Ramshorn property has been lost. The TSS Kelly Campus cultural landscape will be evaluated once the property meets the fifty-year rule of the National Register. The Teton Science School moved to the property in 1974.

The Hunter Hereford Ranch Historic District was assessed and considered ineligible during the 1999 Region-wide Level 0 Cultural Landscape Inventory by the NPS, but the SHPO was not consulted on this determination. Further, the original Hunter Hereford Ranch National Register nomination, written in 1998, did not include evaluated landscape components, except for the Limestone Ditch. The Limestone Ditch, which historically irrigated the Hunter’s cultivated fields, was determined ineligible for listing because the structure retained no integrity of workmanship, design, association, or feeling. The ditch has been plowed over and infilled, and is now only a slight, grass-filled depression virtually indiscernible as it cuts across the once cultivated fields. Additionally, the other significant landscape features that once characterize the land use as a hobby ranch are no longer extant. Therefore, the park believes the Hunter Hereford Ranch cultural landscape retains no integrity of workmanship, design, association, or feeling because of the removal of a majority of the landscape features that would have contributed to the understanding of hobby ranches.

By 1956, the Hunter Hereford Ranch infrastructure included 5.375 miles of buck fence; 1.25 mile wire fence; 4 cattle guards and gates; corral fences and gates; head works and fencing at springs; 1.5 miles of 3-inch water line; .5 mile 2-inch water line, and a log entryway. Only remnants of the corral fence at the barn are still extant today. The park believes the remaining sagebrush-free pasture is a contributing component of the existing Historic District. Formal documentation and consultation with the SHPO will occur regarding the non-extant cultural landscape and contributing hay field at the Hunter Hereford Ranch prior to any federal actions.

Methodology

In order for a structure, building, site, or landscape to be listed in the National Register of Historic Places, it must meet one or more of the following criteria of significance: A) associated with events that have made a significant contribution to the broad patterns of our history; B) associated with the lives of persons significant in our past; C) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; D) have yielded, or may be likely to yield, information important in prehistory or history. In addition, the structure, building, site, or landscape must possess integrity of location, design, setting, materials, workmanship, feeling, association (National Register Bulletin #16, *How to Apply the National Register Criteria for Evaluation*). The thresholds of change for analyzing potential impacts are defined below:

Impact Threshold	Historic Structures and Cultural Landscape Definitions of Impact
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be no adverse effect.
Minor	Adverse impact — alteration of a feature(s) of the historic structures or alteration of a pattern(s) or feature(s) of the landscape would not diminish the overall integrity of the resource. The determination of effect for §106 would be no adverse effect. Beneficial impact — stabilization/preservation of features of historic structures in accordance with the <i>Secretary of the Interior’s Standards for the Treatment of Historic Properties</i> and preservation of landscape patterns and features in accordance with the <i>Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes</i> . The determination of effect for §106 would be no adverse effect.

Moderate	<p>Adverse impact — alteration of a feature(s) of the historic structures would diminish the overall integrity of the resource and alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for §106 would be adverse effect. A memorandum of agreement (MOA) is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.</p> <p>Beneficial impact — rehabilitation of a structure in accordance with the <i>Secretary of the Interior’s Standards for the Treatment of Historic Properties</i> and rehabilitation of a landscape or its patterns and features in accordance with the <i>Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes</i>. The determination of effect for §106 would be no adverse effect.</p>
Major	<p>Adverse impact — alteration of a feature(s) of the historic structures would diminish the overall integrity of the resource and alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for §106 would be adverse effect. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).</p> <p>Beneficial impact — restoration of a structure in accordance with the <i>Secretary of the Interior’s Standards for the Treatment of Historic Properties</i> and restoration of a landscape or its patterns and features in accordance with the <i>Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes</i>. The determination of effect for §106 would be no adverse effect.</p>
Duration	Short-term - Recovers in less than 3 years; Long-term - Takes more than 3 years to recover.

Regulations and Policies

Current laws and policies require that the following conditions be achieved in the park:

Historic Structures and Cultural Landscape Desired Condition	Source
Historic properties are inventoried and their significance and integrity are evaluated under National Register criteria. The qualities that contribute to the eligibility for listing or listing of historic properties on the National Register of Historic Properties are protected in accordance with the Secretary of the Interior’s Standards (unless it is determined through a formal process that disturbance or natural deterioration is unavoidable).	National Historic Preservation Act of 1966, as amended; Executive Order 11593 (1971); Archaeological and Historic Preservation Act of 1974, as amended; Programmatic Memorandum of Agreement Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies (2001).

Impacts of Alternative 1 - No Action – Under the no action alternative, the National Register listed Main Lodge at the TSS would not be rehabilitated. This would have a long-term, minor adverse impact to the historic building. The determination of effect for §106 of the National Historic Preservation Act would be no adverse effect.

Impacts of Alternative 2 – Infrastructure Improvements Only - Like Alternative 1, the National Register listed Main Lodge at the TSS would not be rehabilitated in Alternative 2. This would have a long-term, minor adverse impact to the historic building. The determination of effect for §106 of the National Historic Preservation Act would be no adverse effect.

Impacts of Alternative 3- Relocation of the Hunter Hereford Barn – The Hunter Hereford Barn is located within the Hunter Hereford Ranch Historic District. Relocation of the Hunter Hereford Barn would constitute an adverse effect for purposes of §106 of the National Historic Preservation Act. It is an adverse effect because the historic district would lose its integrity and eligibility for listing in the National Register due to the removal of the most significant building in the district. For the purposes of NEPA and this environmental assessment, the adverse effect would be considered a long-term, major adverse impact. If appropriate mitigation measures were implemented under the terms and conditions of a Memorandum

of Agreement (MOA) with the SHPO, the impact would be considered moderate rather than major. Prior to relocating the barn, the NPS would seek to enter into an MOA with the SHPO. If the NPS and SHPO were unable to reach agreement on an MOA, the preparation of an Environmental Impact Statement (EIS) would be required prior to making any decision regarding relocation of the barn.

Adaptive use modifications to the barn would be performed according to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* and would have short- and long-term, moderate beneficial impacts to the barn. The determination of effect for §106 of the National Historic Preservation Act would be no adverse effect. The impact on the view shed from the National Register listed Main Lodge at the TSS would be negligible, or have no adverse effect, by the addition of the barn because the buildings would be spaced far apart and vegetation would screen the view between the buildings.

Rehabilitation work performed on the Main Lodge would be done in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. This action would have long-term, moderate beneficial impacts, or no adverse effect under §106. Further consultation with the SHPO under §106 of the National Historic Preservation Act will take place prior to the start of the rehabilitation work.

The remaining structures at the Hunter Hereford Ranch Historic District would eventually receive stabilization work, but not as part of this alternative as analyzed in this EA. Because stabilization work will occur in the future, the impacts of this work are addressed in the cumulative effects analysis.

Impacts of Alternative 4 - TSS Builds Facility on the Kelly Campus - The TSS would build an architecturally compatible facility on the Kelly Campus for office space, equipment storage, special functions and housing of five full-time residents and five seasonal residents. The proposed location of this facility is the same as that which was described in Alternative 3 for the relocation of the Hunter Hereford Barn. Consultation with the SHPO would take place prior to construction of the building. The construction of a new facility at the TSS Kelly Campus would have a negligible impact and a no adverse effect on the view shed from the National Register listed Main Lodge because the buildings would be spaced far apart and vegetation would screen the view between the buildings. The new building would have negligible impacts or no adverse effect on historic structures and cultural landscapes.

Rehabilitation work performed on the Main Lodge would be done in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. This action would have long-term, moderate beneficial impacts, or no adverse effect under §106. Further consultation with the SHPO under §106 of the National Historic Preservation Act would take place prior to the start of the rehabilitation work.

Cumulative Effects

The east Antelope Flats portion of the park also includes other historic districts/buildings such as Mormon Row, the Dick and Ethel Reimer residence, and the McCollister Residential Complex. In the past, historic structures on east Antelope Flats received little or no maintenance. As a result, the overall cumulative impact of neglect from the past is long-term, moderate, and adverse due to the deterioration of historic fabric.

For the last nine years, GTNP, with the help of volunteers, has stabilized the Mormon Row Historic District in anticipation of establishing a self-guided walking tour through the district. In 2003, GTNP rehabilitated the Dick and Ethel Reimer residence for use as seasonal employee housing. In February 2004, the NPS published a Finding of No Significant Impact (FONSI) for the environmental assessment/assessment of effect (EA/AEF) titled *McCollister Residential Complex Adaptive Reuse of Historic Structures*. The primary purpose of the project is to preserve the seven-acre McCollister Residential Complex Historic District by rehabilitating and adaptively using some of the structures for seasonal employee housing and preserving the cultural landscape.

The structures at the Hunter Hereford Ranch Historic District would eventually receive stabilization work, but not as part of this EA. Because stabilization work will occur in the future, these impacts affect the cumulative effects analysis. Stabilization work would include installing a waterproof membrane on the roofs, boarding up the windows, and securing the exterior doors. This work would slow down the deterioration of historic materials on the buildings. The historic hay field would also be preserved in consultation with the park's vegetation specialists. Although there would be a short-term, minor beneficial impact to the remaining buildings and hay field at the Hunter Hereford Ranch when stabilized, these structures would still lose their eligibility to the National Register.

There are no other actions regarding historic structures and cultural landscapes, utilities construction, or employee housing planned in the east Antelope Flats area in the reasonably foreseeable future. Routine stabilization and maintenance work of existing structures in the area will occur as needed. These actions are relatively minor maintenance projects to mitigate any immediate hazard to the structure or public, as needed. These actions all have beneficial impacts in the short- and long-term if done routinely. The park does not intend to conduct other actions in the east Antelope Flats area that would render a historic district or building ineligible to the National Register, but rather GTNP plans to continuously improve the condition of historic properties in this area. Therefore, the anticipated affect of this project in relation to other past, present, and future actions is anticipated to have a moderate beneficial cumulative affect.

Conclusion

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative 3 would have an "Adverse Effect" on the Hunter Hereford Ranch Historic District, and a "No Adverse Effect" on the Main Lodge at the TSS. Under NEPA and for the purposes of this environmental assessment, the "Adverse Effect" on the Hunter Hereford Ranch Historic District would be considered major. If appropriate mitigation under the terms of a Memorandum of Agreement between the NPS and the SHPO could be undertaken, the impact would be reduced to moderate.

If the NPS and SHPO enter into an MOA, there would be no major, adverse impacts to a cultural resource or value whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of GTNP; 2) key to the natural or cultural integrity of the park; or 3) identified as a goal in the park's general management plan or other relevant NPS planning documents; hence, there would be no impairment of the park's historic resources or values. However, if the NPS and SHPO cannot agree and do not enter into an MOA, Alternative 3 would have a long-term, major adverse impact on the Hunter Hereford Ranch Historic District and require an Environmental Impact Statement (EIS).

Overall, impacts to the Main Lodge at the TSS would be beneficial and moderate in the long-term in Alternatives 3 and 4. Whereas, the impacts to the Hunter Hereford Ranch Historic District would be long-term, ranging from moderate-to-major and adverse, depending on whether the NPS and SHPO enter into an MOA to address the mitigation of adverse impacts. There would be beneficial and moderate short- and long-term impacts to the Hunter Hereford Barn when adaptively used following the *Secretary of the Interiors Standards for the Treatment of Historic Properties*.

VEGETATION

Affected Environment

The dominant vegetation type of Antelope Flats is sagebrush and agricultural (grassland) fields, found predominantly around the McCollister Residential Complex, the Hunter Hereford Ranch Historic District, Mormon Row, and the Kelly Hayfields. Wildland fire use and prescribed fire have affected the vegetation of east Antelope Flats and the surrounding Kelly Hayfields. In 1994, the Mormon Row Fire, a lightning

caused-fire, burned several hundred acres of domestic grassland in the area. Prescribed burning has also taken place in east Antelope Flats in recent years with a similar effect.

Prior to the human activities of land clearing and hay cultivation begun in the 1890s, dry and moist sagebrush communities, along with wet meadows and cottonwoods lining Ditch Creek, dominated the landscape. Today, these native sagebrush, meadow and cottonwood communities have been displaced to some extent by the cultivated landscape of Mormon Row and the Kelly Hayfields.

Non-native Vegetation: Many non-native plants are found in disturbed areas such as development and road corridors. Non-native species compete with, and in some cases, replace native plants with adverse effects on natural diversity, wildlife foraging, and visual resources. Of the approximately 1,200 identified plant species in GTNP, at least 200 are non-natives, or plants found outside their natural range. Approximately 20 of these non-native species are listed by the State of Wyoming as noxious weeds, with the highest priority being given to their control. A variety of non-native plants has become established in east Antelope Flats with considerable tenacity. These include Canada thistle and musk thistle, spotted knapweed, dalmation toadflax, and yellow toadflax. A large infestation of musk thistle exists to the south of the Hunter Hereford Ranch Historic District.

TSS Kelly Campus: TSS Kelly Campus is approximately eleven acres and has dominant vegetation types of spruce-fir forest and sagebrush-steppe. The Ditch Creek floodplain forms the northern boundary of the TSS and contains mature stands of narrowleaf cottonwood, Booth willow, Geyer willow, yellow willow, dagger rush, and water sedge. Aspen groves, such as those along the Aspen Square Trail, support an understory of mountain snowberry, black twinberry, thick-stemmed aster, and Missouri goldenrod. Sagebrush-steppe communities found along the Left Field Trail support mountain big sagebrush, smooth brome, Pacific aster, little-sunflower, Kentucky bluegrass, and arrow-leaf balsamroot. No plant species of special concern have been identified on Kelly Campus. The site at the TSS where the Hunter Hereford Barn would be relocated is also highly disturbed, with large patches of exposed soil and trampled vegetation, which contains numerous weeds such as musk thistle, bull thistle, and hound's tongue.

Hunter Hereford Ranch Historic District: The Hunter Hereford Ranch is a highly disturbed historic area with sparse vegetation. The majority of the vegetation is non-natives, with no plant species of special concern present. Non-native species include musk thistle, smooth brome, field pepperweed, western stickseed, and prostrate knotweed. Native species present are yarrow and willow dock. The vegetation outside of the immediate area of the barn is a relatively stable sagebrush-grass community, with mountain big sagebrush, smooth brome, Pacific aster, silky lupine, and western coneflower. There is also a small irrigation ditch running through the property, supporting brookgrass, willow-herb, yellow monkeyflower, and Canada thistle.

Methodology

Analyses of the potential intensity of impacts to vegetation were first determined by identifying the area that could be affected. Interdisciplinary specialists defined the affected area as the eastern portion of Antelope Flats, where the McCollister Residential Complex, Hunter Hereford Ranch Historic District, and Kelly Campus of the TSS are located. During the summer of 2003, surveys were done in each of the project areas by walking transects set at 10-15 foot intervals while searching for plants species of special concern. For surveys along trails, the botanist walked along the trails in the areas proposed for modification, while watching for plant species of concern and/or possible habitat. The technique provided nearly 100% visual coverage of approximately five feet beyond both sides of the existing trails. While doing so, the botanist noted the presence of other native and non-native species. The analysis of impacts on vegetation was based on the amount/location of direct disturbance/removal of vegetation to construct the proposed developments, and the effects of increased foot traffic on herbaceous ground cover compared to current conditions. It was also based on the potential for the introduction of non-native species. The impact thresholds are:

Impact Threshold	Vegetation Definitions of Impact
Negligible	No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. No or barely detectable increases in the number of non-native species and extent of their range. The effects would be short-term, on a small scale, and not measurable.
Minor	The alternative would affect some individual native plants and would also affect a relatively minor portion of that species population. Mitigation to offset adverse effects could be required and would be effective. Changes in the extent of non-native species would be short-term, localized and measurable to one or more species. Mitigation of effects would be simple and effective.
Moderate	The alternative would affect some individual native plants and would also affect a sizeable segment of the species population in the long-term and over a relatively large area. Changes in the extent of several or more non-native species would be over a relatively long period of time. Non-native plants would spread beyond the localized area. Mitigation to offset adverse effects could be extensive, but would likely be successful, depending on the species non-native plants involved.
Major	The alternative would have a considerable long-term effect on native plant populations and non-native plants, and would affect over half of the project area for an extended period of time. Mitigation measures to offset the adverse effects would be extensive, and success of the mitigation measures would not be assured.
Duration	Short-term - Recovers in less than 3 years; Long-term - Takes more than 3 years to recover.

Regulations and Policies

Current laws and policies require that the following conditions be achieved in the park:

Vegetation Desired Condition	Source
The NPS is directed by the Organic Act to conserve the scenery and the natural objects unimpaired for future generations. The NPS Management Policies 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. When NPS management actions cause native vegetation to be removed, then the NPS will seek to ensure that such removals will not cause unacceptable impacts to native resource, natural process, or other park resources.	NPS Organic Act NPS Management Policies 2001
Non-native species, also referred to as non-native, exotic or alien, are not a natural component of the ecosystem. Management of populations of exotic plant and animal species, up to and including eradication, will be undertaken wherever such species threaten park resources or public health and when control is prudent and feasible.	NPS Management Policies 2001, DO -77, Natural Resource Protection, Executive Order 13112, Invasive Species

Impacts of Alternative 1 - No Action - Under this alternative the Hunter Hereford Ranch Historic District and TSS would experience no new vegetation impacts, as there would be no new disturbance. Without treatment, non-native species, including noxious weeds, would persist but there would be negligible spreading beyond the project sites. The intensity of impact of the no-action alternative would be localized, adverse, and at the negligible level.

Impacts of Alternative 2 - Water System Improvements Only - Vegetation impacts associated with the utility system upgrade and other minor actions like the accessible trail would result in approximately ½ acre of vegetation disturbance in the center of the TSS complex where vegetation is previously disturbed. These impacts would not affect a sizeable segment of any species population and would take place in a localized area. Exotic plant control and re-vegetation following the disturbance would replace ½ acre of vegetation, with no net loss of vegetation. Short-term, minor, adverse impacts to vegetation would be local. There would also be short-term, minor beneficial impacts to vegetation through treatment of non-native plants and exploring opportunities for salvaging. No impacts to vegetation would occur at the Hunter Hereford Ranch, as there would be no disturbance.

Impacts of Alternative 3 - Relocation of the Hunter Hereford Barn - In the Hunter Hereford Ranch Historic District, Alternative 3 would temporarily disturb about ½ acre of highly-disturbed vegetation through relocation and transport of the Hunter Hereford Barn to the TSS. The barn would be removed from its foundation, placed on a trailer and moved to the TSS. The majority of the relocation would take place on paved roads; however, the route would travel across vegetated land and/or gravel surfaces in three locations: 1) the Hunter Hereford Ranch Historic District; 2) the intersection of the Kelly Road with the Ditch Creek Road; and 3) the Kelly Campus of the TSS (see Map of Relocation Route, page 16). Some limbing and/or tree and other vegetation removal would be required at another “pinch spot” in the route when the trailer pulling the barn crosses Ditch Creek via the bridge on the Kelly Road. Following relocation of the barn, the sites would be revegetated, resulting in no long-term net loss of vegetation. Non-native species would be treated and monitored as needed. Alternative 3 would have short-term, minor adverse impacts on a site-specific level to vegetation through temporary disturbance of plants during relocation of the barn and short-term, minor beneficial vegetation impacts through treatment of non-native plants.

At the Teton Science School, Alternative 3 would result in approximately 1 acre of vegetation and soil disturbance through placement of the Hunter Hereford Barn, development of the accessible trail system, upgrade of utilities to new and relocated buildings, replacement of the Static House with a new duplex unit, and the installation of the utility system upgrade. All disturbed ground resulting from utilities work would be revegetated. These impacts would not affect a sizeable segment of any species population and would take place in a localized area. Exotic plant control and re-vegetation following the disturbance would replace ½ acre of vegetation, with a net loss of ½ acre of vegetation. The total vegetation disturbance is ½ acre at the Hunter Hereford Ranch plus 1 acre at the TSS for a total of 1½ acres of disturbance. The net loss of vegetation is ½ acre. Short-term, minor, adverse impacts to vegetation would be local. There would also be short-term, minor beneficial impacts to vegetation through treatment of non-native plants and exploring opportunities for salvaging.

Impacts of Alternative 4 - TSS Builds Facility on the Kelly Campus – At the Hunter Hereford Ranch Historic District, the impacts are the same as Alternative 1 (No Action). There would be no new impacts to vegetation, as the Hunter Barn would not be removed and relocated. Alternative 4 would have the same impacts to vegetation (½ acre of disturbance, but with no net loss) at the TSS as Alternative 3. Short-term, minor, adverse impacts to vegetation would be local and there would also be short-term, minor beneficial impacts to vegetation through treatment of non-native plants and exploring opportunities for salvaging.

Cumulative Effects

There are no cumulative effects on vegetation at the Hunter Hereford Ranch. It has been over 14 years since any action has occurred on site and no other actions, other than what have been presented in the three action alternatives in this EA, are planned for the future. This area is highly disturbed with sparse vegetation. The majority of the vegetation is non-natives, with no plant species of management concern present. Even though treatment of non-natives is planned as part of all the alternatives, the cumulative effect would be negligible.

The site at the TSS where the Hunter Hereford Barn would be relocated is also highly disturbed, with large patches of exposed soil and trampled vegetation. Additional disturbance of this area would increase impacts, however, all disturbances would be re-vegetated resulting in negligible impacts. Nevertheless, on-going maintenance work would continue at the campus and visitation would continue such that the cumulative events from future actions would likely be long-term, negligible-to-minor and adverse.

Conclusion

Overall, there would be short-term, minor, adverse impacts due to the water system upgrade, trail work, relocation or new construction of the barn, and the relocation of two other buildings at the TSS. Short-

term impacts would be minor, both beneficial (treatment of exotics and salvaging of native plants) and adverse (removal of native vegetation). None of the alternatives pose any significant, adverse, direct or indirect impacts to vegetation with mitigation. Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of GTNP; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park’s general management plan or other relevant National Park Service planning documents, there would be no impairment of the park’s vegetation resources or values.

VISUAL QUALITY

Affected Environment

The regional landscape of the Jackson Hole area is comprised of sagebrush flats and steep mountain terrain. The Bridger-Teton National Forest, Grand Teton National Park, the National Elk Refuge and privately owned lands contribute significantly to the natural scene. The towering granite peaks of the Teton Range are the dominant scenic attribute of Grand Teton National Park. These scenic resources are among the most spectacular in the western United States and are a primary reason for the region’s popularity as a tourist destination. The visual quality of the project area is comprised of cultural features such as historic viewsheds and cultural landscapes such as the Mormon Row Historic District. The towering granite peaks of the Teton Range are the dominant scenic attribute of GTNP. The flat expanses of Antelope Flats also appeal to many visitors who come to view wildlife, hike, bicycle, and photograph scenery. Antelope Flats is a popular place to view and photograph the intermixing of historic and natural features, such as the Moulton Barn set against the Teton Range.

Methodology

The potential intensity of impacts to visual resources was based on field observations, proposed changes in the use of historic buildings, and the proposed addition of new buildings and utilities to the viewshed. Beneficial effects are defined as those that protect the historic viewshed or cultural landscape, as well as views of the Teton Range and Antelope Flats. Adverse effects on visual quality are those that dominate or compete with the historic viewshed, cultural landscape, or views of the park’s natural features. The level of effect is also dependent on a second criterion: the number of park visitors that would be affected and the amount of time they would be affected. The thresholds of change for intensity of impacts to visual resources may be adverse or beneficial and are defined as follows:

Impact Threshold	Visual Quality Definitions of Impact
Negligible	The impact is at the lowest levels of detection and causes very little perceptible change to the existing viewshed of cultural and natural features. It will affect very few visitors for a very short time period.
Minor	The impact is slight, but detectable with few perceptible effects or changes to the existing viewshed of cultural and natural features. A relatively small number of visitors will be affected for a short time period.
Moderate	The impact is readily apparent and has measurable effects or changes to the viewshed and its cultural and natural features. A moderate number of visitors will be affected for a medium time period.
Major	The impact will result in a major change in the existing view of cultural and natural features. A high number of visitors will be affected over a long period of time.
Duration	Short-term - Recovers in less than 1 year; Long-term - Takes more than 1 year to recover.

Regulations and Policy

Current laws and policies require that these conditions be achieved for visual quality in the park:

Visual Quality Desired Condition	Source
The scenery, natural features, historic objects and wildlife are conserved, leaving them unimpaired for future generations.	Organic Act

Impacts of Alternative 1 - No Action – Buildings and utilities at the TSS would be maintained in the same manner in which they are currently being maintained, and any impacts on the visual quality of the area over both the short- and long-term would be negligible.

Impacts of Alternative 2 - Water System Improvements Only – Buildings at the TSS would be maintained in the same manner in which they are currently being maintained, and any impacts on the visual quality of the area over both the short- and long-term would be negligible. Construction activities associated with the upgrade of the water system would have short-term, minor adverse impacts on visual quality, but a negligible impact in the long-term. No viewshed impacts would take place at the Hunter Hereford Ranch.

Impacts of Alternative 3 - Relocation of the Hunter Hereford Barn – Under this alternative, the Hunter Hereford Barn would be removed from its historic location and moved to the Teton Science School Kelly Campus. This action would have a long-term, moderate adverse effect on the visual quality of the historic district. While few visitors see the barn, as it is behind a locked gate about a mile from the paved road, its removal creates a moderate, adverse effect, because the effect to cultural resources is readily apparent and has measurable long-term effects or changes to the viewshed.

Construction activities associated with the various actions at the Teton Science School would result in short-term, minor adverse effects. Long-term effects would be negligible. Minor beneficial effects of a long-term nature would result from replacement of the Static House with a more suitable structure and relocation of the Blacktail Butte and Coyote Rock cabins onto drier ground.

Placement of the Hunter Hereford Barn in a new location at the TSS would have long-term, minor-to-moderate effects that could be either beneficial or adverse, depending on the perspective of the person that is viewing it. Placement of the barn at TSS would introduce a new structure into the landscape at that location, however it will not obstruct views from the Ramshorn Dude Ranch Lodge, nor would it be particularly visible from the Ditch Creek Road.

Impacts of Alternative 4 - TSS Builds Facility on the Kelly Campus – Impacts at the TSS are the same as Alternative 3 with the exception of the effects on visual quality from TSS building a facility, rather than adaptively reusing the Hunter Hereford Barn. The TSS would build a log or a frame structure of a similar size to the Hunter Hereford Barn. This action would require consultation with the SHPO to ensure that the viewshed would not be adversely affected from the National Register listed Main Lodge. This action would have a long-term, minor-to-moderate, beneficial or adverse effect on some visitors, depending on their perception of the building. The effects to the Hunter Hereford Ranch Historic District would be the same as in Alternatives 1 and 2.

Cumulative Effects

The cumulative effects resulting from implementation of Alternative 1 or 2 on the visual character of the East Antelope Flats area would be negligible. In either of these alternatives, any effect on visual quality is very site specific and only visible in the immediate area of the TSS. None of the alternatives would have a measurable impact on the natural landscape. Alternatives 3 and 4 would have a negligible-to-moderate impact on the site-specific cultural viewshed at and from the Hunter Hereford Ranch Historic District and TSS, but not the overall viewshed of east Antelope Flats or the park as a whole. No future actions are anticipated of the magnitude that would have a measurable impact on either the natural or cultural viewshed of east Antelope Flats. Therefore, none of these alternatives would add measurably to the total impact on visual quality in the east Antelope Flats area.

Conclusion

None of the alternatives pose significant, adverse, direct or indirect impacts to visual quality. Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of GTNP; (2) key to the

natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents, there would be no impairment of the park's visual resources or values.

WATER QUALITY

Affected Environment

The redevelopment of the water system at the TSS may have a bearing on the quality of surface water and groundwater. The water source for the TSS is a natural spring (approximately 500 yards from Ditch Creek, a Class I stream with perennial flow) that is captured by a four-foot diameter metal culvert that is 15 feet deep. A frame well house is placed on a concrete slab above the spring. The water supply is termed a groundwater source, which is under the influence of surface water. This water source is maintained as a surface, rather than groundwater supply. As a result, the water is filtered and the chlorine level is monitored on a 24-hour basis. NPS policy is to develop groundwater sources, rather than surface water diversions in parks. If the water supply at the TSS was a groundwater supply it would not require filtering, and chlorine monitoring could be done on a once-per-day basis, rather than a continual basis. Thus, a groundwater supply would require less daily maintenance than a surface water system while meeting federal and state guidelines.

The current capacity and design flow of the system is 7,000 gallons per day. The water system flow capacity is adequate, but the piping system is old and prone to continual maintenance. The current system lacks the capability to conserve water and does not have sufficient water storage to provide adequate fire suppression capability. The water system currently serves up to 100 people daily and accommodates up to 92 people overnight in the summer. Water use records for the TSS, maintained by the NPS, show the highest average daily flows in July of each year with a peak of 4,193 gallons per day for the month. Flows in the winter, spring and fall are elevated due to the practice of leaving faucets open to prevent freezing of lines. Many of the lines have been insulated to minimize this practice. Typical winter flows are between 4,000 and 6,000 gallons per day. Other months are high because of broken lines.

In an effort to find a source of groundwater to replace the surface spring, the NPS dug a production well in 1991 near Ditch Creek. Engineers encountered bedrock at 10 feet. The overlaying material was loamy silt with some gravel and clay. Very little water was encountered at the bedrock surface. Some water was encountered at 115 feet at a low quantity of 1/2 gallon per minute. The NPS abandoned the well and sealed the bore since the site would not provide an adequate water supply. In the fall of 1994, an 8 foot deep hole was dug to check for clay layers, but again, the well proved to be unproductive. The nearest wells are two private, residential wells located about 1/2 mile upstream from the school in the Ditch Creek drainage. Both of these wells tap water bearing seams in the bedrock. Wells at Aspen Ridge, Hunter Hereford Ranch and Mormon Row are no longer used and have been abandoned. The well at the McCollister Residential Complex is planned for NPS use to support seasonal housing. Other wells include the Lost Creek water supply, which is over 2 miles to the north and the town of Kelly, approximately four miles to the southwest, which has numerous individual supply wells. As a result of unproductive wells in the immediate area and the infeasible distance to other productive wells, the TSS must continue using the existing spring for their water supply.

Methodology

The NPS prepared a design analysis for a septic tank/leachfield for the TSS in 1998, which provided information on the spring and past well testing. A US Forest Service hydrologist prepared a watershed evaluation for the project in the spring of 2003, and three NPS water resource specialists and a contract botanist delineated the wetland in the summer of 2003. Through their recommendations, impacts to the wetland adjacent to the well house would be avoided by implementing recommended mitigation measures. Potential affects to surface and groundwater are predicted using the data collected during well drilling activities. Thresholds for level of impact are defined below.

Impact Threshold	Water Quality Definitions of Impact
Negligible	Neither the quality of surface water nor groundwater would be affected, or changes would be either non-detectable or if detected, would have effects that would be considered slight, local, and short-term.
Minor	Changes in the quality of surface water or groundwater would be measurable, although the changes would be small, likely short-term, and the effects would be localized. No mitigation measure associated with the quality of surface water or groundwater would be necessary.
Moderate	Changes in the quality of surface water or groundwater would be measurable and long-term but would be relatively local. Mitigation measures would be necessary and the measures would likely succeed.
Major	Changes in the quality of surface water or groundwater would be readily measurable, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures would be necessary and their success would not be guaranteed.
Duration	Short-term - Following treatment recovery will take less than one year Long-term - Following treatment recovery will take longer than one year

Regulations and Policies

Current laws and policies require that the following conditions be achieved in the park:

Water Quality Desired Condition	Source
The NPS will perpetuate surface waters and groundwater as integral components of park aquatic and terrestrial ecosystems.	NPS Management Policies (2001)
The NPS will determine the quality of park surface and groundwater resources and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside of parks.	NPS Management Policies (2001)
The NPS will take all necessary actions to maintain or restore the quality of surface waters and groundwater within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations.	NPS Management Policies (2001)
The NPS will use water efficiently and sustainably. Water systems will be designed to maximally conserve water and the energy used in its treatment and distribution.	NPS Management Policies (2001)
New water systems, or extensions to existing systems, will be constructed only if properly sized, and the available or projected water supply must be sufficient for expected needs. Where feasible and appropriate, and given resource availability, groundwater sources will generally be developed, rather than surface water diversions in parks.	NPS Management Policies (2001)

Impacts of Alternative 1 - No Action – Although the no action alternative would perpetuate the existing water system at TSS, there would be negligible impacts to surface water quality as no sedimentation or impervious surfaces would be created from construction activities. This alternative would have negligible effects on both groundwater and surface water. However, drinking water quality would not improve at the TSS campus and operational expenses would continue to be high to maintain federal and state drinking water quality standards on a limited basis, also affecting visitor experience.

Impacts of Alternative 2 – Water System Improvements Only - Alternative 2 would rehabilitate the existing TSS water system to provide a more sustainable and compliant water supply for human use and structural fire protection. The updated system would meet all federal and state drinking water standards. Rehabilitation of the water system would include the testing of existing well for adequacy for newer demands. In addition, a 25,000-gallon underground water storage tank and fire pump (and pumphouse) would be installed to provide additional fire protection by providing water to hydrants and indoor sprinklers. A wetland is adjacent to the spring, which was delineated in the summer of 2003; however, none of the proposed actions for redevelopment of the water system would affect the wetland due to the rerouting. New pipes would be laid in a location that is as close as possible to the pumphouse that would prevent freezing.

These activities would result in the removal of vegetation and soil and would increase the potential for erosion and runoff into the Ditch Creek watershed. In order to protect the surface water of Ditch Creek, every effort would be made to limit runoff and protect against soil erosion. Silt fencing and the limiting of the construction area, as well as maintaining the maximum amount of distance between Ditch Creek and construction would help to limit these effects. Construction activities associated with the upgrade of the water system at the TSS would have short-term, minor adverse impacts to surface water with the appropriate mitigation. Construction activities would create no new impervious surfaces that would affect surface water quality by increasing erosion or stormwater discharge in the long-term.

The withdrawal location, method of extraction and quantity of water being removed from the water source would not change, thus not further affecting the groundwater source. Groundwater impacts would be reduced by changes to the distribution system, when the dead end at the Sleeping Indian cabin is extended and connected to piping at the well house. Creating this loop system would improve flows and pressures throughout the system and should eliminate the freezing problem at Sleeping Indian. This action would have a long-term, minor, beneficial impact on groundwater through conservation. Impacts due to construction activities to upgrade the system would be short-term, negligible and adverse.

Impacts of Alternative 3 - *Relocation of the Hunter Hereford Barn* - Alternative 3 would relocate the Hunter Hereford Barn to the south of Ditch Creek. It would also result in replacement of the Static House, the development of a handicap trail system, and the upgrade of the water system, including replacement of the delivery system. These activities would result in relatively the same impacts as Alternative 2.

Impacts of Alternative 4 - *TSS Builds Facility on the Kelly Campus* – Again, since the TSS water system upgrade has the greatest potential to impact water resources and it is included in Alternatives 2, 3, and 4, the impacts for Alternative 4 are relatively the same as in Alternative 2 and 3.

Cumulative Effects

The upgrade of the TSS water system would not be designed to increase water usage and would not extract any more from the spring than currently is removed. No other activities are anticipated in the area that would change the condition of the spring (groundwater) or surface water quality. It is unknown whether the TSS water source is connected in any way to any other water source through the same aquifer. However, the cumulative effect of the action in all three alternatives is negligible in regards to past, present and reasonably foreseeable future actions. Although Alternatives 3 and 4 would provide housing for an additional eleven full-time and five seasonal residents, water usage is not expected to rise, due to new water conservation fixtures and efforts. In addition, use of the Hunter Hereford Barn for office space and other programmatic needs would increase water usage. This would be offset somewhat when the water delivery system is looped, and fewer faucets need to be left running in winter months. Overall, upgrading of the water system would have no cumulative effects on water quality.

Conclusion

None of the alternatives pose significant, adverse, direct or indirect impacts to water quality. Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of GTNP; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents, there would be no impairment of the park's water quality resources or values.

WILDLIFE, INCLUDING THREATENED OR ENDANGERED SPECIES

Affected Environment

Grand Teton National Park provides habitat for a variety of wildlife species, including 61 mammals, 4 reptiles, 6 amphibians, 19 fish, and 99 species of birds (NPS 2000). The park supports four species listed under the Endangered Species Act (ESA) as threatened, endangered, or proposed. The bald eagle, Canada lynx, grizzly bear, and gray wolf are threatened (NPS 2003). In addition, numerous birds listed by the US Fish and Wildlife Service as “migratory bird species of management concern in Wyoming” are found in the park. The ESA requires an examination of impacts on all federally endangered threatened or candidate species. In accordance with the Migratory Bird Treaty Act, NPS policy also requires examination of the impacts on species of management concern in Wyoming, such as greater sage grouse and long-billed curlew. NPS policy is to maintain all components and processes of naturally evolving park ecosystems, including the natural abundance, diversity and ecological integrity of plants and animals.

Because of the sites’ proximity to an existing developed area, habitat quality is probably lower than areas further from human developments. However, suitable habitat for a variety of wildlife species occurs in and adjacent to the proposed project areas. The project area is located within an important wildlife movement and migration corridor and nesting and migrating animals could be affected. Antelope Flats serves as a migration corridor for bison, pronghorn, and elk. Ungulates, including moose and mule deer, also use Antelope Flats as summer habitat for breeding and rearing of young. Bison live on Antelope Flats year-round. The TSS is located along Ditch Creek, which forms an important riparian corridor for wildlife, linking the forests of Shadow Mountain and Mount Leidy Highlands with the Snake River. Given their limited distribution, relatively intact riparian corridors such as Ditch Creek and Spread Creek to the north are important to wildlife disproportionate to their physical extent. Descriptions of wildlife species and their habitats potentially occurring within or adjacent to the project area follow.

Bald eagle: The bald eagle was federally listed as an endangered species in Wyoming in March 1967 under the Endangered Species Preservation Act of 1966. Because of the implementation of recovery plans, bald eagles began to increase by the mid-1980s. Consequently, the status of the bald eagle changed to threatened in Wyoming on July 12, 1995. Since recovery goals have been met, in July 1999 the USFWS announced a proposal to remove the bald eagle from the endangered species list. No final action on this proposal has occurred to date. The bald eagle, besides being a “species of special concern” in the park, is also afforded protection under the 1918 Migratory Bird Treaty Act (16 U.S. Code 703), and the 1940 Bald Eagle Protection Act (16 U.S. Code 668). Grand Teton National Park contains 12 known nesting territories and pairs of bald eagles; however, not all pairs nest in the park each year. Known territories are located along the shorelines of the Snake River and Jackson Lake. In the park, as many as six pairs of eagles for nesting and foraging use the Snake River and adjacent riparian area. Bald eagles that nest along the Snake River may 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, including gut piles left by elk hunters in Antelope Flats. Bald eagle management in the park involves annual nest surveys, seasonal area closures around bald eagle nest sites to protect them from human disturbance, and monitoring of annual nest territory occupancy and productivity. The nearest bald eagle nest is located approximately 5 miles from the TSS.

Canada lynx: The Canada lynx was first proposed for listing as a threatened species under the ESA in July of 1998 (63 FR 36993 37013). The USFWS concluded that the Canada lynx population in the United States was threatened by human alteration of forests, low numbers as a result of past exploitation, expansion of the range of competitors (particularly bobcats [*Felis rufus*] and coyotes [*Canis latrans*]), and elevated levels of human access into Canada lynx habitat (63 FR 36994). A final ruling on March 24, 2000, listed the Canada lynx as a threatened species (65 FR 16051 16086). In Wyoming, the Canada lynx has been protected as a non-game species with no open season since 1973. The State of Wyoming classifies the Canada lynx as a Species of Special Concern-Class 2, which indicates that habitat is limited and populations are restricted or declining.

Canada lynx use young forest stands for hunting and mature stands for denning. A mixture of forest openings, or a mosaic of habitats with mature stands of cover or corridors, is considered best for supporting the species. Although Canada lynx would feed on ducks, mice, sparrows, meadow voles, and moose, their preference for hare is so strong that they would often go hungry, rather than switch to another food source. Thus, Canada lynx habitat nearly always corresponds with snowshoe hare habitat. An abundance of downed wood and stumps may be one of the most important qualities for denning sites since it provides cover for kittens. Limited human disturbance is also of primary importance.

Little information on Canada lynx abundance and distribution is available for the park. Park records include only twelve reports (GTNP wildlife observation files), some of which may not be credible because Canada lynx are easily confused with bobcats. A 1998 snow-track transect survey of 104.8 miles at nine locales in the northern range of the park and surrounding vicinity found no sign of Canada lynx (2002 Annual Inventory and Monitoring Report for Science and Resource Management in GTNP). Recent attempts to determine if Canada lynx are present in the park were made using hair snares, but no hair from this species was detected during the first 2 years (August 2000-2001) of a 3-year survey). However, a radio-collared Canada lynx was documented passing through a small corner of the Parkway in 2001. Suitable habitat is not found within or adjacent to the project area. The project area is not within any Lynx Analysis Units (LAU) identified for GTNP.

Grizzly bear: Grizzly bear management within the park is governed by the park's Human-Bear Management Plan (NPS 1989), and the Interagency Grizzly Bear Guidelines (USFS 1986) (Guidelines). The Guidelines were developed in an effort to provide effective direction for the conservation of grizzly bears and their habitat among the federal agencies responsible for managing land within the recovery zone. They were submitted to the USFWS for formal consultation as required by 50 CFR Section 402.04, which resulted in a Biological Opinion stating "It is our opinion that implementation of the Guidelines would promote conservation of the grizzly bear." The Interagency Grizzly Bear Committee (IGBC) subsequently approved the application of the Guidelines on federal lands throughout grizzly bear ecosystems in Idaho, Montana, and Wyoming.

Grizzly bear home ranges are large (7 to 1,245 square miles). Grizzly bears require a variety of habitat types to provide a rich supply of forage, prey, and secure areas for feeding, breeding, bedding, and denning. Foraging habitat includes open-canopy forests, avalanche chutes, shrubfields (such as berry and huckleberry), and low-elevation meadows. Denning habitat is characterized by upper elevation, steep, open rocky slopes with high snow accumulation generally above 5,000 feet in elevation. In the last 12 years, grizzly bear numbers have increased and they have expanded their range to the south. Grizzly bears are occasionally observed in the Gros Ventre Mountains on the southeastern border of GTNP, adjacent to the project area and southeast to the upper Green River Basin. On the Jackson Hole valley floor, they are common north of the Triangle X Ranch and have been observed south of there in the Snake River drainage on several occasions. Grizzly bears have been observed through the use of radio telemetry throughout the eastern edge of the park and on the Bridger-Teton National Forest adjacent to the park, but not in the area of Antelope Flats and the TSS where the project area is located. Grizzly bear-human conflicts in the park have included human injuries and maulings, nuisance bears associated with unsecured human foods and garbage, and livestock depredations; however, no such conflicts have occurred within several miles of the project area.

Gray wolf: The gray wolf was first listed as an endangered species on March 11, 1967 (32 FR 4001). The subspecies of the northern Rocky Mountain wolf (*Canis lupus irremotus*) was initially listed as an endangered species in 1973 (38 FR 14687). Because of taxonomic concerns the entire species was listed as endangered in the contiguous United States outside of Minnesota, where it was listed as threatened in 1978 (38 FR 9607). In 1990, Congress directed the appointment of a Wolf Management Committee to develop a plan for wolf restoration in YNP and central Idaho. The following year, Congress directed the USFWS to prepare an Environmental Impact Statement (EIS) to consider the reintroduction (USFWS

1994). The final EIS was completed in May 1994. The rules for the introduction were published in November 1994, in which the gray wolf was reclassified as experimental, non-essential (59 FR 60252 60266), according to section 10(j) of the ESA of 1973, as amended (16 USC 1531). In national parks and wildlife refuges, non-essential experimental populations are treated as threatened species, and all provisions of ESA Section 7 apply (50 CFR 17.83(b)).

Gray wolves were reintroduced into Yellowstone National Park in March 1995. In 1997, gray wolves from the experimental population began to disperse and established in GTRE as part of their home range during the 1998 to 1999 winter season. Gray wolf packs now occur throughout the central Greater Yellowstone Area and range widely. Three groups have used areas within the park from Pacific Creek to the National Elk Refuge. The Teton pack successfully denned in the central-eastern part of the park, approximately 17 miles from the project area during 1999, 2001, 2002, and 2003. According to radio telemetry data and observation records, gray wolves have been located in Antelope Flats but not specifically within the project site.

Migratory Bird Species of Management Concern in Wyoming: The Migratory Bird Treaty Act, 16 U.S.C. 703, enacted in 1918, prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations and does not require intent to be proven. Work that could lead to the take of a migratory bird or eagle, their young, eggs, or nests, should be coordinated with the US Fish and Wildlife Service before any actions are taken. Removal of nests or nest trees is prohibited, but may be allowed once young have fledged and/or a permit has been issued. Project areas should also be surveyed for raptor nests and roost areas. There are two management levels for migratory birds:

Level 1. Migratory Bird Species (Conservation Action)

Level 1 species are those that are clearly in need of conservation action. They include species of which Wyoming has a high percentage of and responsibility for the breeding population, and the need for additional knowledge through monitoring and research. Level 1 species that have been observed within the east Antelope Flats project area or are predicted to occur based on habitat type, include the sage grouse, long-billed curlew, Swainson's hawk and Brewer's sparrow.

Breeding habitat for sage grouse consists of sagebrush dominated rangelands with a healthy herbaceous understory. During the late brood-rearing period (June-November) sage grouse use a wider range of habitats including meadows, farmlands, sagebrush, and riparian zones. Sage grouse typically winter in sagebrush dominated habitats where snowfall levels allow access to sage brush plants. These habitats are found within and adjacent to the project area.

A sage grouse lek, or breeding ground, exists several miles from the project area. Sage grouse numbers have declined significantly throughout the West, with declines of up to 51% of historical levels recorded. Recently, the U.S. Fish and Wildlife Service was petitioned by conservation groups to list the sage grouse under the Endangered Species Act. The predominant reasons for declines in both distribution and abundance of sage grouse include permanent loss, degradation and fragmentation of key habitat, as well as low nest productivity. A sage grouse lek, or breeding ground, exists several miles from the project area but would not be influenced by the project due to the distance between the lek and the TSS.

Level 2 Migratory Bird Species (Monitoring)

The action and focus on Level 2 Species is on monitoring, rather than conservation action. Level 2 species include those in Wyoming with a high percentage of and responsibility for the breeding population, species whose population trend is unknown, species that are peripheral for breeding in the habitat or state, or species for which additional knowledge is needed. These include the calliope hummingbird, Williamson's sapsucker, black-chinned hummingbird, red-naped sapsucker, dusky flycatcher, yellow-billed cuckoo, broad-tailed hummingbird, vesper sparrow, golden-crowned kinglet, and MacGillivray's warbler.

Additional Level 2 birds that could be found at the TSS site of relocation also include the following: Lewis' woodpecker, rufous hummingbird, willow flycatcher, hammond's flycatcher, sage thrasher, great gray owl, and brown creeper. Several of these birds have been captured at by the TSS in mist nets as part of a bird banding program and use the riparian area near the proposed relocation site. A cuckoo, a candidate species under the Endangered Species Act in the west, was also captured and released from a mist net at the TSS. Over 60 species of migratory birds have been captured at the TSS in an area not far from the project relocation site.

Methodology

Identification of federally listed species and migratory bird species of management concern was accomplished through discussions with wildlife biologists in GTNP and informal consultation during the scoping period with the Ecological Services Branch of the U.S. Fish and Wildlife Service in Wyoming. A letter requesting a current list of federal threatened, endangered, and special concern species was sent to the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service responded on May 9, 2003 with scoping comments. These comments are summarized on pages 4 and 5 in this EA. Since May 2003, the US Fish and Wildlife Service removed the mountain plover from its proposed status as a threatened or endangered species. Wyoming Game and Fish Department received a copy of the scoping notice and was contacted by telephone but did not comment on the project.

An analysis of the potential impacts to listed species in GTNP is included in this section. Species analyzed include the bald eagle, Canada lynx, grizzly bear, and gray wolf. Analysis is also included for migratory bird species of management concern in Wyoming that are known to occur within the project area. While the US Fish and Wildlife Service did not list the Canada lynx as a species that may occur in the project area, a brief discussion of lynx activity in the park and along the Bridger-Teton National Forest is included in this environmental analysis. Wildlife-related data come from annual GTNP Science and Resource Management reports and databases, staff interviews, and US Fish and Wildlife Service summaries prepared for the park. The impact levels for threatened and endangered, as well as general wildlife are defined below.

Impact Threshold	T&E, Special Concern Species, and General Wildlife Definitions of Impacts
Negligible	<p>T & E: No federally listed species would be affected, or the alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population. Negligible effect would equate with a "no effect" determination in U.S. Fish and Wildlife Service terms.</p> <p>General Wildlife: Wildlife would be affected or the effects would be at or below the level of detection, would be short-term, and the changes would be so slight that they would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.</p>
Minor	<p>T & E: The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small. Minor effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species.</p> <p>General Wildlife: Effects to wildlife would be detectable, although the effects would be localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.</p>
Moderate	<p>T & E: An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect could have some long-term consequence to the individual, population, or habitat. Moderate effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species.</p> <p>General Wildlife: Effects to wildlife would be readily detectable, long-term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.</p>

Major	<p>T & E: An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect could have some long-term consequence to the individual, population, or habitat. Moderate effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species.</p> <p>General Wildlife: Effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.</p>
Duration	Short-term - Recovers in less than 1 year; Long-term - Takes more than 1 year to recover.

Regulations and Policy

Current laws and policies require that the following conditions be achieved in the park:

T&E, Special Concern Species, and General Wildlife Desired Condition	Source
Federal- and state-listed threatened and endangered species and their habitats are sustained.	Endangered Species Act; NPS Management Policies (2001)
Migratory birds, their parts, nests and eggs are protected.	Migratory Bird Treaty Act
Minimize human impacts on native plants, animals, populations, communities and ecosystems in which they occur.	NPS Management Policies (2001)
Preserve and restore the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur	NPS Management Policies (2001)
Management of populations of non-native plant and animal species, up to and including eradication, will be undertaken wherever such species threaten park resources or public health and when control is prudent and feasible.	NPS Management Policies; Executive Order 13112, Invasive Species

Impacts of Alternative 1 - No Action - Under Alternative 1, no rehabilitation or improvement of the infrastructure at the TSS would occur. Therefore, it is in the opinion of the NPS that Alternative 1 would have a negligible impact or “no effect” to threatened species, migratory birds, or other wildlife.

Impacts of Alternative 2 – Water System Improvements Only - The upgrading of the Kelly Campus water system in Alternative 2 would have a negligible effect on wildlife. The bald eagle, grizzly bear, and gray wolf are not found in the project area. Therefore, it is in the opinion of the NPS that Alternative 2 would have a negligible impact or “no effect” to threatened species, migratory birds or other species of general wildlife.

Impacts of Alternative 3 - Relocation of the Hunter Hereford Barn - No nest or den sites for any threatened species are likely to be impacted by this proposal because none are known to exist in the vicinity of the Kelly Campus of the TSS. However, the project area represents suitable habitat for bald eagle, grizzly bear, and wolves and Ditch Creek serves as an important wildlife travel corridor, so they may use the project and adjacent area for traveling or foraging. Therefore it is in the opinion of the NPS that Alternative 3 would have “no effect” on the federally listed bald eagle and Canada lynx. Alternative 3 “may affect, but is not likely to adversely affect,” the grizzly bear and gray wolf.

The removal and relocation of the Hunter Hereford Barn from its current site could pose disturbance or displacement impacts to any species present in the area at the time this action takes place. However, given the relatively short timeframe over which this would occur, any impacts are likely to be negligible and temporary. Construction-related activities at the TSS campus are also likely to cause short-term disturbance (for the length of the project) in the immediate project area and may cause animals to avoid the area. For wide-ranging species with access to habitats of similar quality nearby, this would not present a threat as they would likely move off to secure areas with little energetic cost.

The case may be different for migratory birds that may be disturbed by construction activities. Neotropical migratory birds nesting in the area, disturbance may cause birds to flush from their nests,

spend less time tending their nests, or making prey deliveries and ultimately could result in nest failure or abandonment if the disturbance is high. Implementation of the mitigation measure that requires construction activities to take place outside of the breeding season would minimize these impacts. Removal of nesting structures such as shrubs and mature trees would permanently remove potential nest sites for Neotropical migratory birds. Provided the appropriate measures for surveys and US Fish and Wildlife consultation is done before the start of the project and are followed, there would be a short-term, negligible, adverse impact to migratory birds. This analysis is within a site-specific context. Changes in wildlife due to the removal of the Hunter Hereford Barn would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.

When new sites are developed or existing developed sites expand, wildlife can be displaced from important habitat, become habituated to human activities and presence or placed at increased mortality risk. Placement of the Hunter Hereford Barn at the proposed site on the TSS campus would expand the footprint of the developed site toward the Ditch Creek riparian corridor. This would result in a direct loss of ¼ acre of sagebrush and non-native vegetation. Of greater concern, are the potential disturbance impacts resulting from increased year-round human occupancy at the TSS campus (housing for 11 fulltime and 5 seasonal residents). The physical presence of the building, as well as the increased level and extent of human use in this area, may decrease the effectiveness of the Ditch Creek riparian area as habitat or a travel corridor. The degree that this will affect wildlife species is unknown, but it is likely that human presence would displace some wildlife from the immediate area. In order to limit the effects of dispersed use from humans on wildlife, it is critical that residents do not create social trails into the surrounding sagebrush and forest communities. Such dispersed use, in the form of hiking and wandering would put stress on wildlife and potentially displace them from their preferred habitat.

Bison, moose, and elk live in close proximity to the Kelly Campus and are often seen in the meadows and along Ditch Creek. Alternative 3 would add the Hunter Hereford Barn to a currently open space, between Ditch Creek and a cabin (Two Ocean). Additional changes include the temporary disturbance associated with replacement of the water system, interior remodeling of two buildings, the relocation of two cabins, the replacement of the Static House, and second floor additions to two buildings. The relocation and placement of the Hunter Hereford Barn, the redevelopment of the water system, and the relocation of the two cabins would happen within the next several years. Wildlife may be temporarily displaced during construction due to noise and associated disturbance. As grizzly bears expand their range to the south and human use levels in the area increase, there is some concern that human/bear conflicts could increase. Mitigation measures aimed at reducing human/bear conflicts would help to prevent adverse impacts to individual bears in the future.

The other modifications would take place over a longer period of time, as funding becomes available, and are not scheduled for completion for five to ten years. Another long-term project is the construction of the accessible trail system over a portion of existing trails. Short-term impacts to wildlife from construction of these features over the next ten years would be adverse, minor and site-specific due to noise and temporary displacement from the construction. Over the long-term, wildlife would experience adverse, minor effects at a site-specific level. The impacts are primarily related to the effects of dispersed human use on wildlife, causing displacement, which can lead to animals spending more time in less preferable habitat.

Impacts of Alternative 4 - TSS Builds Facility on the Kelly Campus - Alternative 4 would have similar impacts to wildlife, including threatened or endangered species, as Alternative 3. The only difference between Alternative 3 and 4 is the relocation and adaptive use of the Hunter Hereford Barn, versus the TSS building a facility. Therefore it is in the opinion of the NPS that Alternative 4 would have “no effect” on the federally listed bald eagle and Canada lynx. Alternative 4 “may affect, but is not likely to adversely affect,” the grizzly bear and gray wolf.

Cumulative Effects

The scale of this analysis for wildlife includes the entire southern portion of the park, from Jackson Lake Junction to the National Elk Refuge, since many wildlife species are wide ranging species that have large home ranges. Many other development actions have been, and are being proposed within the park. Past actions include the development of The Murie Center, work on Teton Park Road, and miscellaneous improvements within the Moose and Beaver Creek housing complexes. Current projects include the new Moose Visitor Center, the McCollister Residential Complex, and on-going operations at the Jackson Hole Municipal Airport. Proposed actions in the future include the Spring Gulch Road Employee Housing Project, the proposed White Grass Ranch Rehabilitation and Adaptive Use, the proposed Artist-in-Residence at the Lucas-Fabian property, and private land development in the Spring Gulch area.

Although many of the current proposals are relatively small in scale and seemingly minor, the combination of these impacts is additive in terms of direct habitat loss, reduction of habitat security/effectiveness and must be adequately monitored and addressed. Potential impact sources include activities or actions that displace wildlife from important habitats, reduce their effectiveness, or render them unusable as well as opportunities for human conflicts, etc.

The combination of all past, present, and proposed actions results in a relatively small loss of habitat and impact in comparison to overall suitable habitat within the area of analysis. Because habitat loss and fragmentation is always a concern, actions are limited as much as possible to existing developed areas or previously disturbed areas in order to minimize effects to wildlife. Threatened and endangered species habitat and individuals are directly affected very little from the cumulative effect of all these actions combined. Provided mitigation measures are followed, the increased human use associated with Alternative 3 and 4, combined with existing human activity, would not have a significant, additive cumulative effect on wildlife.

Conclusion

None of the alternatives pose significant, adverse, direct or indirect impacts to threatened and endangered species, migratory bird species of management concern in Wyoming, or other general species of wildlife. Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation and proclamation of GTNP; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents, there would be no impairment of the park's wildlife resources or values.

PARK OPERATIONS

Affected Environment

The 11-acre TSS Kelly Campus contains the historic Ramshorn Dude Ranch Lodge (48TE1165), over fifteen residences and small cabins (the majority of them moved to the site), an icehouse, a historic barn, and the Hunter Hereford residence. The TSS is accessed by Ditch Creek Road. Nearby facilities in Antelope Flats include the Aspen Ridge Ranch (Smith Talbot Ranch), the McCollister Residential Complex, and the Mormon Row Historic District. All of the surrounding historic properties in the park, with the exception of the TSS, are currently undeveloped insofar as utilities and lack electricity, water and septic systems. The adaptive use of the McCollister Residential Complex for NPS seasonal housing was addressed under separate environmental analysis in November 2003, with a decision notice issued in February 2004.

Methodology

Information on the facilities and utilities at the TSS was obtained through personal communication with

park buildings and utilities staff, as well as a TSS engineering support contractor. Thresholds for level of impact are defined below.

Impact Threshold	Park Operations Definitions of Impact
Negligible	The effect would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations. If mitigation was needed to offset adverse effects, it would be simple and likely successful.
Minor	The effect would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations. If mitigation was needed to offset adverse effects, it would be simple and likely successful.
Moderate	The effects would be readily apparent, likely long-term, and would result in a substantial change in park operations in a manner noticeable to staff and to the public. Mitigation measure would be necessary to offset adverse effects and would likely be successful.
Major	The effects would be readily apparent, long-term, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations. Mitigation measure to offset adverse effects would be needed, would be extensive and their success could not be guaranteed.
Duration	Short-term - Effects lasting for the duration of the treatment action. Long-term - Effects lasting longer than the duration of the treatment action.

Regulations and Policies

Current laws and policies require that the following conditions be achieved in the park:

Desired Condition	Source
Utilities (i.e., energy, water, and wastewater systems) will be as unobtrusive as possible, and have the least resource impact.	NPS Management Policies (2001)
The NPS will use water efficiently and sustainably and design water systems to maximally conserve water and the energy used in its treatment and distribution. Water supply and delivery systems will be designed and maintained to provide sufficient water to operate fire sprinkler systems and fire hydrants. Water supply systems, and their operators, must comply with all applicable state and federal health standards.	NPS Management Policies (2001)

Impacts of Alternative 1 - No Action – Under this alternative, the existing conditions and trends would be continued at the TSS. The existing water system would continue to be operated, perpetuating the relatively high maintenance requirements to keep the system functional. These impacts would be long-term, minor, and adverse.

Impacts of Alternative 2 – Water System Improvements Only - The rehabilitation of the water system would take place through a combination of park labor, TSS labor, and contract work. TSS staff have the primary responsibility for long-term maintenance of the facilities and utility systems that serve the TSS. In the short-term, the NPS would continue to assist with daily management of the water system until the TSS obtains a water system operator with state and federal certification. Currently NPS maintenance personnel drive to the TSS once a day, 365 days a year, to conduct water testing that ensures a safe water supply. It would be necessary for daily sampling to continue with the new water system, since the water supply remains a surface water supply requiring daily monitoring. Maintenance staff would also continue to respond to emergency repairs of the water and septic systems. However, upgrade of the water system would result in a lower maintenance and more sustainable operation, reducing the number of maintenance calls due to frozen lines and deteriorating pipes. In the long-term, this would reduce the existing minor, adverse impact on park operations to a minor beneficial impact on park operations. The construction period would result in short-term, minor adverse impacts on park operations.

Impacts of Alternative 3 - Relocation of the Hunter Hereford Barn – The transportation of the barn, rehabilitation of historic structures at the TSS, installation and upgrade of utilities, and trail work would

take place through a combination of park labor, TSS labor, and contract work. In the short-term, these actions would have a minor, adverse effect on park operations. Adaptive use of the Hunter Hereford Barn by the TSS would ensure that the structure was in good condition and continually maintained, primarily by TSS staff. While this will result in additional maintenance responsibilities for the TSS, it would reduce the potential maintenance burden on NPS, resulting in a long-term, minor beneficial impact on park operations.

Impacts to park operations regarding the water system would be the same as in Alternative 2.

Impacts of Alternative 4 - TSS Builds Facility on the Kelly Campus – Short- and long-term impacts regarding the water system and improvements to infrastructure would be the same as in Alternatives 2 and 3. Alternative 4 would construct and maintain a new facility, rather than adaptively using a historic structure; however, this would not change the effect on park operations since the TSS would be responsible for maintaining these facilities.

Cumulative Effects

Alternative 2, 3, and 4 would compete with other future operational and maintenance requirements, increasing the demand for the park's operational resources. Reasonably foreseeable actions in the park with an impact on park operations include the future, adaptive use of additional historic structures at the McCollister Residential Complex, the White Grass Ranch, and the Geraldine Lucas Homestead/Fabian Place Historic District. The Murie Ranch Historic District and the AMK Ranch also require long-term maintenance of park facilities. A new visitor center will also be constructed at Moose. The additive effect of these actions would have both direct and indirect, long-term, moderate adverse effects on park operations in the future.

Conclusion

The proposed action would not have adverse impacts on park operations that are readily apparent; however, there would be long-term, adverse impacts that would cause slight changes in park operations in a manner noticeable to some park staff. These changes would not be noticeable to the public. It is not possible to mitigate these effects since routine maintenance and emergency repairs must be done as needed. These impacts would be short- and long-term, minor-to-moderate and adverse. However, improvements to the water system that increase its safety, improve its delivery, and reduce water waste have a long-term, minor beneficial impact on park operations. In addition, the adaptive use of the Hunter Hereford Barn maintains the structure, thus having a long-term, minor beneficial impact on park operations.

VISITOR USE AND EXPERIENCE

Affected Environment

The TSS Kelly Campus receives little general visitor use and the proposed changes would not increase that number, except occasionally during special public events. Use of the Kelly Campus is for staff and participants in TSS programs, whether they are present for overnight programs involving residential use or for day use events. Although use of the Kelly Campus by the general public is not discouraged, "incidental" use by the public is very low. The TSS supported over 10,000 participants last year and approximately 30,000 participant days.

Methodology

Effects to visitor experience are based on the number of visitors affected, how they would be affected in regards to expectations and opportunities, and provisions for visitors with disabilities. Thresholds for level of impact are defined below.

Impact Threshold	Visitor Use and Experience Definitions of Impact
Negligible	Changes in visitor use and/or experience would be below the level of detection or visitors would not be affected at all. Any effects would be short-term and affect a very small proportion of the total visitor population. The visitor would not likely be aware of the effects associated with the alternative.
Minor	Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. Changes would affect a small proportion of the total visitor population. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate	Changes in visitor use and/or experience would be readily apparent and likely long-term. Changes would affect a moderate proportion of the total visitor population. The visitor would be aware of the effects associated with the alternative, and would likely be able to express an opinion about the changes.
Major	Changes in visitor use and/or experience would be readily apparent and have substantial long-term consequences. Changes would affect a large proportion of the total visitor population. The visitor would be aware of the effects associated with the alternative, and would likely express a strong opinion about the changes.
Duration	Short-term - Effects lasting for the duration of the treatment action. Long-term - Effects lasting longer than the duration of the treatment action.

Regulations and Policies

Current laws and policies require that the following conditions be achieved in the park:

Visitor Use and Experience Desired Condition	Source
Visitor and employee safety and health are protected.	NPS Management Policies (2001), National Environmental Policy Act
Visitors understand and appreciate park values and resources and have the information necessary to adapt to park environments; visitors have opportunities to enjoy the parks in ways that leave park resources unimpaired for future generations.	NPS Organic Act; NPS Management Policies (2001)
Park recreational uses are promoted and regulated and basic visitor needs are met in keeping with park purposes.	NPS Organic Act; Title 36 of the Code of Federal Regulations; NPS Management Policies
All reasonable efforts will be made to make NPS facilities, programs, and services accessible to and usable by all people, including those with disabilities.	Americans with Disabilities Act; Architectural Barriers Act; Rehabilitation Act; NPS Management Policies
Visitors who use federal facilities and services for outdoor recreation may be required to pay a greater share of the cost of providing those opportunities than the population as a whole.	NPS Management Policies (2001); 1998 Executive Summary to Congress: Recreational Fee Demonstration Program; Progress Report to Congress, Volume I - Overview & Summary (DOI, NPS, USFWS, BLM, USFS)
The park has identified implementation commitments for visitor carrying capacities for all areas of the unit.	1978 National Park and Recreation Act (P.L. 95-625); NPS Management Policies

Impacts of Alternative 1 - No Action – Changes in visitor use and/or experience for TSS participants would be readily apparent and likely long-term (moderate and adverse) due to unsuitable housing, space and utility conditions. However, because these impacts would affect only a small proportion of the total visitor population, the overall effect to visitor use and experience would be long-term, minor and adverse.

Impacts of Alternative 2 – Water System Improvements Only – At the TSS, upgrade of the water system would result in short-term, minor adverse impacts due to construction activities. Over the long-term, however, upgrade of the water system would result in a minor beneficial impact on visitor use and experience. As in Alternative 1, the lack of housing and space at the TSS would result in a minor-to-moderate adverse effect on visitor use and experience.

Impacts of Alternative 3 - Relocation of the Hunter Hereford Barn – The Hunter Hereford Ranch Historic District receives very little visitation. Although removal of the barn from its current site would be obvious to visitors that are familiar with the site and would perhaps be noticeable to others, the overall impact to visitor experience would be negligible-to-minor because few visitors would be adversely affected over the

long-term. This does not diminish the adverse effect on individual visitors who enjoy the presence of the barn in its current location, but simply reflects the fact that only a very small percentage of the park's visitors would be affected. Nevertheless, the impact would be partially mitigated by providing interpretative exhibits describing the history of the Hunter Hereford Ranch Historic District.

The other actions under Alternative 3 include the TSS water system upgrade, creation of handicap accessible trails, and restoration of buildings at the TSS. All these actions would require some level of construction and rehabilitation activities that would result in short-term, minor adverse effects on employees, students, and other visitors. Over the long-term, these improvements would result in minor-to-moderate beneficial effects.

Impacts of Alternative 4 - TSS Builds Facility on the Kelly Campus – Impacts on visitor use and experience at the TSS would be generally the same as described for Alternative 3. The primary difference would be that a new building would be constructed on site in lieu of relocating the barn. Construction of the new building would take an additional year, thereby stretching the duration of the short-term construction impacts.

Cumulative Effects

Taking into consideration the overall number of visitors affected and the nature of the impacts, the cumulative effect on visitor use and experience in Grand Teton National Park is negligible. Previous and reasonably foreseeable future actions that could affect visitor use and experience include the opening of The Murie Center, construction of a new visitor center at Moose, ongoing interpretive programs and activities, opportunities offered by concessioners, and the vast array of activities that continue to be available in the park.

Conclusion

Changes in visitor use and/or experience would not be readily apparent and have substantial long-term consequences. Most visitors would not be aware of the effects associated with the alternative, and would not likely express a strong opinion about the changes.

CONSULTATION/COORDINATION

PLANNING TEAM, CONTRIBUTORS AND CONSULTANTS

Jim Bellamy, Deputy Superintendent
Jon Christensen, Landscape Architect
Rich Fedorchak, Chief of Interpretation
Sheri Fedorchak, Resource Planner
Steve Haynes, Vegetation Management Specialist
Pam Holtman, Park Historian
Christine Jacobs Landrum, Former Museum Curator
April Landale, TSS Kelly Campus Director
Mike Machupa, Utilities Foreman
Steve Martin, Former Superintendent
Susan O'Ney, Hydrologist
Gary Pollock, Management Assistant
Jacquelin St. Clair, Park Archaeologist
Suzy Schulman, Environmental Planner
Mary Gibson Scott, Superintendent
Ralph Tingey, Former Acting Superintendent
Bob Wemple, Engineer
Margaret Wilson, Planning Assistant
Sue Wolff, Wildlife Biologist

AGENCIES/TRIBES/ORGANIZATIONS/INDIVIDUALS CONTACTED

Advisory Council on Historic Preservation
Crow Tribal Council
Eastern Shoshone Business Council
Fish and Wildlife Service
Northern Arapaho Business Council
Northern Cheyenne Tribal Council
Shoshone-Bannock Tribes
Teton Science School
U.S. Army Corps of Engineers
Wyoming Department of Environmental Quality
Wyoming Game and Fish Department
Wyoming State Historic Preservation Office

A scoping letter was sent to approximately 150 individuals, organizations, agencies and groups in the spring of 2003, soliciting comments on the issues concerns and alternatives to be addressed in the EA. Nineteen comment letters were received. See the section titled *Scoping* starting on page 4 for a summary of these comments.

LIST OF ENVIRONMENTAL ASSESSMENT/ASSESSMENT OF EFFECT RECIPIENTS

Federal Agencies

Advisory Council on Historic Preservation
Greater Yellowstone Ecosystem Interagency Visitor Center
U.S. Army Corps of Engineers
U.S. Department of Agriculture, Bridger-Teton National Forest
U.S. Department of Agriculture, Targhee National Forest
U.S. Department of the Interior, National Park Service, Yellowstone National Park
U.S. Department of the Interior, Fish and Wildlife Service, Cheyenne Office
U.S. Department of the Interior, Fish and Wildlife Service, National Elk Refuge
U.S. Department of the Interior, Bureau of Land Management, Cheyenne and Pinedale
U.S. Department of the Interior, Bureau of Reclamation, Boise and Moran
U.S. Department of the Interior, National Park Service, Yellowstone National Park

State and Local Agencies

Jackson Hole Chamber of Commerce
Jackson Hole Historical Society
Teton County Commissioners
Teton County Historic Preservation Board
Teton County Library
Teton County Planning Office
Town of Jackson
Wyoming Department of Environmental Quality
Wyoming Department of Game and Fish
Wyoming Department of State Parks & Cultural Resources - State Historic Preservation Office
Wyoming Office of Federal Land Policy
Wyoming Office of the Governor
Wyoming State Library

Affiliated American Indian Tribes

Crow Tribal Council
Eastern Shoshone Business Council
Northern Arapaho Business Council
Northern Cheyenne Tribal Council
Shoshone-Bannock Tribes

Other Agencies and Organizations

Audubon Society
Craighead Environmental Research Institute
Defenders of the Rockies
Grand Teton Natural History Association
Grand Teton National Park Foundation
Greater Yellowstone Coalition
Jackson Hole Bird Club
Jackson Hole Conservation Alliance
Jackson Hole Historical Society and Museum
National Parks Conservation Association
Teton Group of the Sierra Club
Teton Science School
The Murie Center
The Nature Conservancy
The Wilderness Society, Idaho, Montana
Wyoming Wildlife Federation
Yellowstone Association

Individuals

Due to the large number of individuals receiving this EA, their names have not been listed. The list of individuals and additional organizations that received the Environmental Assessment is kept in the project file and is available from the planning office at Grand Teton National Park.

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Wolff, Susan. 2003. Personal Communication. Wildlife Biologist, Grand Teton National Park, WY.

APPENDIX A

History of TSS and Hunter Hereford Ranch Historic District

History and Significance of the Teton Science School

Prior to the NPS's acquisition of the property now known as the TSS, several owners inhabited the land. In the early 1900s, Ransom Adams homesteaded the site. Ill health caused Adams to leave Jackson Hole and sell his property to Jack and Dollye Woodman in 1928. The Woodmans operated the Flying V Dude Ranch, one of the more impressive dude ranches in the valley. A fire in 1932 destroyed the main lodge, and the Woodmans sold the property to Gustav Koven and Paul Petzoldt. At this time the ranch changed its name to the Ramshorn Dude Ranch. Koven had a new lodge, cabins, and outbuildings constructed in the late 1930s. The Ramshorn operated until 1951 when Alvin Adams purchased the property, and five years later he sold it to the NPS. In 1958, GTNP issued a concession permit to Katie Starratt who operated the new Elbo Ranch, a modest dude ranch, at the site. After Starratt died in 1974, the NPS issued a special use permit to the Grand Teton Environmental Education Center to operate the TSS at the ranch.

The TSS Kelly Campus consists of the historic Ramshorn Dude Ranch Lodge (48TE1165), over fifteen non-historic residences and small cabins (the majority of them moved to the site), an ice house, the Ramshorn barn, and the Hunter Hereford Residence. The Wyoming State Historic Preservation Office concurred in 1989 that the property retained insufficient integrity in setting and association for listing in the National Register as a historic district yet requested reevaluation of the Ramshorn Dude Ranch lodge and barn. Upon reevaluation, the park determined that only the lodge was eligible for listing in the National Register since the barn had been significantly altered on the exterior, diminishing its integrity. The Ramshorn Dude Ranch Lodge retains remarkable integrity of design, workmanship, and materials, contributes to our understanding of the characteristics of dude ranch rustic architecture, and is eligible to the National Register under Criterion C. The Ramshorn Dude Ranch Lodge was listed in the National Register in August 1998.

TSS Cultural Landscape

During the 1999 GTNP Level 0 Cultural Landscape Inventory, the NPS determined that the setting, association, and feeling of the historic Ramshorn Dude Ranch (now the TSS Kelly campus) was lost due to modifications made at the site, including the addition of several modern buildings, the change in circulation on the property, and the adaptive use of the site as the TSS, a major change from dude ranching. The remaining Ramshorn landscape will be formally evaluated for listing in the National Register under the dude ranching context in consultation with SHPO. However, the park believes the landscape will be ineligible for listing because the integrity of the Ramshorn property has been lost. The TSS Kelly Campus cultural landscape will be evaluated once the property meets the fifty-year rule of the National Register. The Teton Science School moved to the property in 1974.

History and Significance of the Hunter Hereford Ranch Historic District

The Hunter Hereford Ranch Historic District (48TE1629-1636) was listed in the National Register of Historic Places in August 1998. The Historic District is eligible under Criterion A for its association with the growth of hobby ranches, a locally significant historic theme, and under Criterion C for its association with vernacular architecture and with architect-designed rustic architecture. The property is associated with the settlement historic context outlined in the Grand Teton National Park Multiple Property Nomination of August 1998. The Historic District is locally significant, and has 8 contributing buildings. The 160 acres that comprise the historic district were first homesteaded in the early 1900s by James Williams. William and Eileen Hunter purchased the old homestead in 1946 and developed the site into a prototype Jackson Hole hobby ranch. The Hunters hired an architect to design a "complete high class

ranching operation” where they could spend their retirement raising Hereford cattle as a hobby. William Hunter passed away in 1951, and in 1957 Eileen sold the property to the NPS yet retained rights to the water, land, graze, and buildings for the remainder of her lifetime. The ranch operated until 1989 when Eileen Hunter died and the property transferred to the NPS.

In 1991 the NPS signed a FONSI (Finding of No Significant Impact) for relocation of the Hunter Hereford Residence, also known as the Hunter Lodge. The Hunter Lodge is the former home of William and Eileen Hunter, which the TSS now uses as a dining hall, and for office and meeting space. Since 1989 the NPS has used the Hunter Hereford Ranch for vehicle and equipment storage and limited seasonal (trailer) use, as well as occasional NPS functions.

Hunter Hereford Ranch Cultural Landscape

The original Hunter Hereford Ranch National Register nomination, written in 1998, did not include evaluated landscape components, except for the Limestone Ditch. The Limestone Ditch, which historically irrigated the Hunter’s cultivated fields, was determined ineligible for listing because the structure retained no integrity of workmanship, design, association, or feeling. The ditch has been plowed over and infilled, and is now only a slight, grass-filled depression virtually indiscernible as it cuts across the once cultivated fields. Additionally, the park believes the Hunter Hereford Ranch cultural landscape retains no integrity of workmanship, design, association, or feeling as a result of the removal of a majority of the landscape features that would have contributed to the understanding of hobby ranches. By 1956, the Hunter Hereford Ranch infrastructure included 5.375 miles of buck fence; 1.25 mile wire fence; 4 cattle guards and gates; corral fences and gates; head works and fencing at springs; 1.5 miles of 3-inch water line; .5 mile 2-inch water line, and a log entryway. Only remnants of the corral fence at the barn are still extant today. The significant landscape features that characterize the land use as a hobby ranch have been removed.

Land Use and Activities

The 160-acre landscape contains minimal tangible features related to the use of the land. The northern section of the landscape consists of the barn, chicken house, hay shed, garage, foreman’s residence, cabin/bunkhouse, stud barn, and equipment shed. The historic buildings represent the working portion of the ranch. The southern section of the landscape contains the pasture/hay field where the Hereford cattle grazed. The landscape features that define where the cattle were kept, such as the corral and other fencing, are no longer extant or are near ruin, with the exception of the sagebrush-free pasture. Character defining landscape features like the buck fences, wire fences, cattle guards and gates, corral fences, and irrigation ditch have been removed. The lack of significant ranching features has compromised the integrity of the landscape. However, the sagebrush-free pasture has enough integrity to be considered a contributing component of the historic district.

Patterns of Spatial Organization

A paved road through the northern section of the landscape separates the ranch buildings from the pasture to the south. The ranch buildings are accessible via a two-track road that runs north-south off of the paved road, and they are situated close together in an east-west pattern. Little vegetation exists around them with the exception of the aspens on the east side of the bunkhouse and foreman’s residence, and the buildings are at a higher elevation than the pasture to the south providing unobstructed views of the pasture and Teton Range. The lack of fencing makes it difficult to delineate the ranch from its natural surroundings.

Response to the Natural Environment

The Hunters chose this particular location for the clear views of the Teton Range and the ability to graze cattle in a large area free of trees. The Hunters hired an architect, Eber Piers, to design a “high-class” hobby ranch, and the Nelson Brothers Construction Company saw the Hunter’s wish to fruition by building six rustic log ranch structures. Little or no vegetation planning occurred around the buildings; rather the working portion of the ranch was left to stand out on the landscape.

Cultural Traditions

The establishment of hobby ranches in the Jackson Hole valley started in the mid-twentieth century. This type of settlement exemplified a change from the need to live off the land to survive. The Hunter's hobby ranch also represented a change from other settlements that used local materials and local craftsmanship to build modest homesteads, ranches, and residences. The wealthy Hunters spent money until it was done correctly. They foreshadowed what Jackson Hole has become in the last fifty years, a community of large expensive properties.

Circulation Networks

The Hunter Hereford Ranch Historic District is situated within the boundaries of Grand Teton National Park. The property is accessible from Jackson by heading north on Highway 26/89/191, turning east onto Antelope Flats Road, driving approximately six miles until arriving at the Hunter Hereford Ranch on the north. A gravel two-track road leads from the paved road up to the barn. Lack of use has resulted in the re-vegetation of historic circulation networks and social pathways, including the dirt roads around the pasture, which would otherwise indicate the spatial use of the site.

Boundary Demarcations

Fences that once demarcated the Hunter Hereford Ranch are no longer extant. Distinguishing between the ranch property and the natural environment is difficult.

Vegetation Related to Land Use

Vegetation includes stands of aspen, sagebrush, arrowleaf balsamroot, noxious weeds, mixed grasses and forbes.

Buildings, Structures, and Objects

The Hunter Hereford Ranch consists of the barn, chicken house, hay shed, garage, foreman's residence, cabin/bunkhouse, stud barn, and equipment shed. All buildings are contributing to the historic district that was listed in the National Register of Historic Places in August 1998.

Clusters

The Hunter Hereford Ranch includes a cluster of eight buildings. The historic district lacks significant cultural landscape features to delineate the property from the surrounding natural environment.

Small-scale Elements

The landscape is void of small-scale elements.

Conclusion

The park believes the sagebrush-free pasture is a contributing component of the existing Historic District. However, the significant landscape features that characterize the land use as a hobby ranch are no longer extant, and therefore the cultural landscape retains no integrity of workmanship, design, association, or feeling. The park will consult with the SHPO regarding the ineligibility of the overall cultural landscape and the eligible pasture.

APPENDIX B
Cultural Resources Documentation

1. Copy of scoping letter sent to affiliated tribes.

L7615 (GRTE)

CERTIFIED MAIL: Return Receipt Requested

May 1, 2003

Cultural Resource Coordinator
Shoshone-Bannock Tribes
Diana K. Yupe
PO Box 306
Fort Hall, ID 83203-0306

Dear Ms. Yupe:

Grand Teton National Park would like to notify you that we are conducting a scoping period for a project titled, East Antelope Flats Adaptive use of Historic Structures Environmental Assessment/Assessment of Effect. The attached brochure and map explain the purpose and need of the project, as well as the individual project components.

Please inform us of any issues you would like addressed. The comment period is from April 25-May 24, 2003. We would appreciate receiving your response within this timeframe. If you would like to speak to a staff person, please contact Jacquelin St. Clair at 307/739-3664. We will mail you a copy of the environmental assessment/assessment of effect once it is written.

Thank you for the interest you may have in this project.

Sincerely,

(signed)
Stephen P. Martin
Superintendent
Enclosure

cc: Archaeologist
Resource Planner

***Identical scoping letter was sent to the following addresses:**

Northern Arapaho Business Council
Mr. Burton Hutchinson, Sr., Chairman
P.O. Box 396
Fort Washakie, WY 82514

Crow Tribal Council
Mr. Carl Venne, Chairperson
P.O. Box 159
Crow Agency, MT 59002

Shoshone- Bannock Tribes
Fort Hall Business Council
Mr. Blaine Edmo, Chairman
P.O. Box 306
Fort Hall, ID 83203- 0306

Eastern Shoshone Business Council
Mr. Vernon Hill, Chairman
P.O. Box 538
Fort Washakie, WY 82514

Northern Cheyenne Tribal Council
Ms. Geri Small, President
P.O. Box 128
Lame Deer, MT 59043

2. Copies of letters sent to the Advisory Council on Historic Preservation and the SHPO in September 2003, serving as official notification that Grand Teton National Park proposed to move the barn from the Hunter Hereford Ranch Historic District to the Teton Science School. As described on page 1 of this EA, the NPS has decided to release the TSS EA without identifying a preferred alternative. The NPS will reinstate Section 106 consultation with the SHPO prior to selection of a final alternative.

H30 (GRTE)

SEP 26, 2003

Mr. Don Klima
Director
Advisory Council on Historic Preservation
12136 West Bayaud, Suite 330
Lakewood, CO 80226

Reference: Adverse effect: Move the Hunter Hereford Barn (HS-1271, 48TE1629) to the Teton Science School (48TE1165)

Dear Mr. Klima:

This letter serves as official notification that Grand Teton National Park proposes to move the barn from the Hunter Hereford Ranch Historic District to the Teton Science School. The Teton Science School proposes to use the barn for employee housing, office and meeting space, and storage.

This federal undertaking would be an adverse effect on a National Register listed cultural resource. Therefore, Grand Teton National Park plans to consult with the Wyoming State Historic Preservation Office (SHPO) on how to best avoid, minimize, and mitigate adverse effects associated with moving the Barn, and execute a memorandum of agreement between the park, the SHPO and, if necessary, the Advisory Council on Historic Preservation, to record the terms and conditions of all mitigation agreed upon. Please contact the park if the Advisory Council wishes to participate.

Grand Teton National Park is in the process of completing an environmental assessment for this project, which is necessary to meet the requirements of the National Environmental Policy Act. Your office will receive a copy of the document for review and comment upon completion.

If you have any questions or concerns, please contact Pam Holtman, Park Historian, at 307-739-3671.

Sincerely,

(signed)
Stephen P. Martin
Superintendent

H30 (GRTE)

SEP 26, 2003

Mr. Richard L. Currit
State Historic Preservation Officer
Wyoming State Historic Preservation Office
2301 Central Avenue, 3rd Floor
Cheyenne, WY 82002

Reference: Adverse effect: Move the Hunter Hereford Barn (HS-1271, 48TE1629) to the Teton Science School (48TE1165)

Dear Mr. Currit:

This letter serves as official notification that Grand Teton National Park proposes to move the barn from the Hunter Hereford Ranch Historic District to the Teton Science School. The Teton Science School proposes to use the barn for employee housing, office and meeting space, and storage.

This federal undertaking would be an adverse effect on a National Register listed cultural resource. Therefore, Grand Teton National Park wants to discuss with your staff how to best avoid, minimize, and mitigate adverse effects associated with moving the barn, and execute a memorandum of agreement between the park, your office and, if necessary, the Advisory Council on Historic Preservation, to record the terms and conditions of all mitigation agreed upon.

Grand Teton National Park is in the process of completing an environmental assessment for this project, which is necessary to meet the requirements of the National Environmental Policy Act. Your office will receive a copy of the document for review and comment upon completion.

If you have any questions or concerns, please contact Pam Holtman, Park Historian, at 307-739-3671.

Sincerely,

(signed)
Stephen P. Martin
Superintendent