

APPENDIX A

Construction Best Management Practices

Best Management Practices (BMPs) would be implemented (as appropriate) before, during, and/or after construction of proposed improvements to provide long-term protection of park resources. BMPs specific to the design cannot be proposed until the full design is complete and specifics of the proposed construction are known. Specific practices would include, but are not limited to, the following:

- Comply with National Environmental Policy Act, National Historic Preservation Act, Endangered Species Act, Clean Air Act, and Clean Water Act Section 404 permitting requirements and other applicable laws, regulations, and policies. The compliance-monitoring program at the Park will oversee these mitigation measures and include reporting protocols.
- Implement standard measures, such as construction scheduling, biological monitoring, erosion and sediment control, use of fencing or other means to protect sensitive resources adjacent to construction, removal of all food-related items or rubbish to bear-proof containers, topsoil salvage, and revegetation. The compliance-monitoring program would include specific construction monitoring by resource specialists, as well as treatment and reporting procedures.
- Implement standard measures, such as consideration of adaptive reuse, relocation, and salvage of historic building materials; archeological monitoring during ground disturbing activities; use of fencing or other means to protect sensitive resources adjacent to construction; and preparation of a discovery plan to handle unanticipated exposure of buried human remains. The compliance-monitoring program would include specific construction monitoring by resource specialists and culturally associated Native American people, as well as treatment and reporting procedures.
- Implement a traffic control plan, as warranted. Standard measures would include strategies to maintain safe and efficient traffic flow during and after the construction period.
- Implement a dust abatement program. Standard dust abatement measures would include the following elements, as appropriate:
 - Water or otherwise stabilize soils.
 - Cover haul trucks.
 - Employ speed limits on unpaved roads.
 - Minimize vegetation clearing.
 - Revegetate post construction.
- Implement standard noise abatement measures during construction. Standard noise abatement measures would include the following elements, as appropriate:
 - A schedule that minimizes impacts to adjacent noise sensitive uses.
 - Use of the best available noise control techniques (wherever feasible).
 - Use of hydraulically or electrically powered impact tools (when feasible).
 - Location of stationary noise sources as far from sensitive uses as possible.
- Implement a noxious weed abatement program. Standard measures would include the following elements, as appropriate:
 - Ensure construction-related equipment arrives on site free of mud or seed-bearing material.
 - Certify all seeds and straw material as weed free.
 - Identify areas of noxious weeds preconstruction.
 - Treat noxious weeds or noxious weed topsoil prior to construction (e.g., topsoil segregation, storage, or herbicide treatment).
 - Revegetate with appropriate native species. Noxious weed abatement would continue as an ongoing activity following construction.
- Implement a Spill Prevention and Pollution Control and Countermeasures program for hazardous materials. Standard measures would include, as appropriate:
 - Hazardous materials storage and handling procedures.
 - Spill containment, cleanup, and reporting procedures.



- Limitation of refueling and other hazardous activities to upland/nonsensitive sites.
- Use barriers, seasonal closures, and other measures to limit visitor access to areas under construction, minimizing safety impacts to visitors.
- Use silt fences, sedimentation basins, and other techniques to reduce erosion, surface scouring, and discharge to water bodies.
- Develop revegetation plans for the disturbed area and require the use of native species. Revegetation plans should specify seed/plant source, seed/plant mixes, soil preparation, etc. Use salvaged vegetation to the extent possible.
- Delineate wetlands and avoid wetlands wherever possible. Apply protection measures during construction in areas where wetlands cannot be avoided. Wetlands would be delineated by qualified National Park Service (NPS) staff or certified wetland specialists and clearly marked prior to construction work. Construction activities should be performed in a cautious manner to prevent damage caused by equipment, erosion, and siltation.
- Develop architectural character guidelines for new construction near historic districts. All new development would be designed to be compatible with historic resources in terms of scale, massing, materials, architectural elements, and orientation with designated historic sites, structures, or districts.

Resource-Specific Measures

Air Quality

The NPS would seek to perpetuate the best possible air quality by aggressively promoting and pursuing measures to preserve, protect, and enhance air resources. Moreover, actions are subject to the provisions of the Clean Air Act. Dust control measures would be implemented to help reduce surface and air movement of dust from disturbed soil surfaces. During construction, dust can be carried off-site, thereby increasing soil loss from the construction area. Land disturbance from clearing and excavation generates a large amount of soil disturbance and open space for wind to pick up dust particles. Mitigation measures would include the following, as appropriate:

- In the future, any transit within the Park (if determined to be feasible by the Transit Business Plan [TBP]) would apply best available clean fuel technology to minimize

air quality emissions, considering the need for reliable, cost-effective transit service with adequate vehicle capacity.

- Dispose of refuse at least weekly. Prohibit burning of refuse inside the Park.
- Employ dust abatement measures (i.e., watering, dust palliative application, etc.) to address environmental impacts from the presence of tractors, trailers, and other equipment involved in ground disturbance.

Soundscapes

The TBP will provide recommendations related to transit in the Park. If a pilot transit program were tested in the Park in the future based on the findings of the TBP, mitigation measures would include the following, as appropriate:

- Ensure that transit vehicles are equipped with best available technology for sound dampening muffler and exhaust systems.
- Design all transit waiting areas to minimize deflection of bus and passenger noise back to visitor waiting areas.

Visual and Scenic Resources

Mitigation measures would be designed to minimize visual intrusions. Many of the mitigation measures identified in the “Vegetation” section in this appendix would assist in mitigating potential scenic impacts. These measures would include the following, as appropriate:

- Minimize development footprints.
- Site facilities in locations outside primary or high value view corridors.
- Choose building materials that are visually compatible or do not compete with the landscape.
- Provide native vegetative screening where applicable.

Soils

Soil erosion and contamination result in impacts to air and water quality, as well as to habitats for plant and wildlife species. The Grand Teton National Park developed a protocol for topsoil management and revegetation; implementation of proposed actions would follow this protocol. Mitigation efforts would focus on minimizing or eliminating these impacts and would include a combination of the following, as appropriate:

- Remove and return topsoil to the same area once construction activities are complete. Live vegetation



less than 3 ft in height and limbs less than 2 inches in diameter may be incorporated as topsoil in the stockpiles. Care will be taken to assure that topsoil and fill material are not mixed and are stockpiled in separate areas (i.e., topsoil to the right of the trench and fill to the left).

- Stockpile topsoil materials (in an area determined by the landscape architect) away from excavations and future work without intermixing with subsoils. Then grade and shape stockpiles to allow unimpeded drainage of surface water. Stockpiles would be temporarily seeded and periodically treated to prevent wind from blowing topsoil and to prevent the introduction of exotics.
- Erect and maintain a temporary fence around the drip line of individual trees or around the perimeter drip line of groups of trees to remain within the construction limits. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not operate or park vehicles and construction equipment or allow foot traffic within the drip line of existing or planted trees. Do not excavate within the drip line of trees, unless otherwise indicated.
- To minimize the amount of ground disturbance, staging and stockpiling areas would be located in previously disturbed sites, away from visitor use areas to the extent possible. All staging and stockpiling areas would be returned to pre-construction conditions following construction.
- Use silt fences in construction areas to reduce erosion and surface scouring.
- Use sedimentation basins and silt fences in grading areas to capture soil erosion before discharge to rivers and other water channels.
- Use semi-permeable materials on temporary access routes to allow for water infiltration through the soil column and aeration of any compacted soils at the completion of construction.
- Use dust abatement measures to reduce airborne soil erosion (including setting speed limits for construction vehicles in unpaved areas) and cover dirt and debris to be hauled away in trucks.
- Employ dust abatement measures (i.e., watering, dust palliative application, etc.) to address environmental

impacts from the presence of tractors, trailers, and other equipment involved in ground disturbance.

- In appropriate locations, employ storm-drain inlet protection measures to help prevent soil and debris (from site erosion) from entering storm-drain drop inlets. Fabric barriers, straw bales, sandbags, block and gravel protection, etc. can be employed to create barriers. These should be used in combination with other measures, such as impoundments or sediment traps.
- Potentially use elevated boardwalk pathways or other feasible mitigation measures on pilings over wetland sections in the Cryaquolis-Cryofibrists Soils Complex.

Vegetation

Mitigation actions would occur prior to, during, and/or after construction to minimize immediate and long-term impacts to vegetation. These actions would vary by specific project, depending upon the extent of construction and the types of species and habitat affected. A rare plant species survey would be conducted within the project area covered by the selected alternative. Mitigation would include the following, as appropriate:

- Develop revegetation plans for the disturbed area, requiring the use of native species preferably from the same gene pool. Specify soil preparation, native seed/plant mixes, and mulching for all areas disturbed by construction activities.
- Develop and implement a monitoring plan to ensure successful revegetation, maintain plantings, and replace unsuccessful plant materials.
- Salvage and preserve vegetation to the extent possible for use in revegetating disturbed areas.
- Enforce construction specifications regarding soil salvage and reuse, trenching, plant protection, and finish grading.
- Site pathways to minimize impacts to vegetation, avoiding large trees where possible.
- Select base course and fill materials for compatibility with native soils to minimize risk of introducing nonnative plant seeds. Monitor areas where fill is imported from outside the Park and eradicate nonnative plants. Apply standard techniques to prevent nonnative plant encroachment.

- Develop monitoring and mitigation plans for managing nonnative plants within and immediately surrounding construction and developed areas. Implementation of the noxious weed abatement program would continue as an ongoing activity after construction is complete.
- Confine all construction operations to specified project work limits. Install temporary barriers to protect natural surroundings (i.e., trees, plants, and root zones) from damage. Repair or replace damaged trees and plants and avoid fastening ropes, cables, or fences to trees.
- Use native or seed-free mulch to minimize surface erosion and introduction of nonnative plants.
- Define pathways and boundaries of development to reduce radiating impacts.
- Protect meadows and other sensitive resource areas by defining parking areas.

Hydrology and Water Quality

Mitigation measures would be applied to protect water resources (see “Soils” section within this appendix). These measures would include the following, as appropriate:

- Take measures to control erosion, sedimentation, and compaction, thereby reducing water pollution.
- Immediately remove hazardous waste materials from project sites.
- Place construction debris in refuse containers at least daily.
- Dispose of refuse at least weekly. No burning or burying of refuse is allowed inside the Park.
- To the extent possible, schedule construction activities during periods of low precipitation and low surface water levels to reduce the risk of accidental hydrocarbon leaks or spills reaching surface and/or groundwater, and to reduce the potential for soil contamination and compaction.
- Dispose of volatile wastes and oils in approved containers for removal from construction sites to avoid contamination of soils, drainages, and watercourses.
- Inspect equipment for hydraulic and oil leaks prior to use on construction sites, and implement inspection schedules to prevent contamination of soil and water.
- Keep absorbent pads, booms, and other materials on site during projects that utilize heavy equipment to contain oil, hydraulic fluid, solvents, and hazardous material spills.
- Integrate storm water pollution controls into design, construction, and operation of new facilities, parking areas, and other paved surfaces that concentrate runoff.
- Employ dust abatement measures (i.e., watering, dust palliative application, etc.) to address environmental impacts from the presence of tractors, trailers, and other equipment involved in ground disturbance.
- In appropriate locations, employ storm-drain inlet protection measures to help prevent soil and debris (from site erosion) from entering storm-drain drop inlets. Fabric barriers, straw bales, sandbags, block and gravel protection, etc. can be employed to create barriers. These should be used in combination with other measures, such as impoundments or sediment traps.

Wetlands

For regulatory purposes under the Clean Water Act, the term wetlands means “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” Executive Order (EO) 11990, Protection of Wetlands requires federal agencies to avoid, where possible, adversely impacting wetlands. Further, Section 404 of the Clean Water Act authorizes the Army Corps of Engineers (ACOE) to prohibit or regulate, through a permitting process, discharge or dredged or fill material or excavation within waters of the United States. The NPS policies for wetlands as stated in 2001 Management Policies and Director’s Order #77-1, Wetlands Protection, strive to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

Once an alternative has been selected, a survey would be performed to certify wetlands within the project area and to identify locations of wetlands and open water habitat more accurately. Wetlands would be delineated by qualified NPS staff or certified wetland specialists and marked before any construction starts. All pathway construction facilities would be sited to avoid wetlands, or if that were not feasible, to otherwise comply with EO 11990, the Clean Water Act, and Director’s Order #77-1. In accordance with



Director's Order #77-1, proposed actions that have the potential to adversely impact wetlands must be addressed in a Statement of Findings for wetlands.

Mitigation measures would be applied to protect wetland resources. These measures would include the following, as appropriate:

- Employ standard avoidance, minimization, and mitigation strategies.
- Avoid wetlands during construction, using bridge crossings or retaining walls wherever possible. Increased caution would be exercised to protect these resources from damage caused by construction equipment, erosion, siltation, and other activities with the potential to affect wetlands. Measures would be taken to keep construction materials from escaping work areas, especially near streams or natural drainages.
- Use elevated pathways over wetland sections where it is not feasible to avoid the wetland or apply feasible mitigation measures (e.g., along portions of the Willow Flats area). This is of particular importance in the Cryaquolis-Cryofibristis Soils Complex (ACOE, Public Notice 3-18-2002, Regional Condition 6.F.); construction of a separated pathway on pilings would protect these unique wetland types.

Wildlife (including Threatened and Endangered and Special Status Species)

Mitigation actions would occur prior to, during, and after construction to minimize immediate and long-term impacts to wildlife. These actions would vary by specific project, depending on the extent of construction, its location, and the types of species and habitat affected. Many of the measures listed above (see "Vegetation" section) would also benefit wildlife by helping to preserve habitat. The NPS is already taking some actions to reduce wildlife-visitor conflicts within the Park. The Park has recently installed signs alerting motorists to migrating wildlife in important crossing areas and plans to install additional digital speed signs. The following actions have occurred within the last year and like actions will continue to be pursued in order to minimize impacts to wildlife:

- Notices appeared in the local weekly paper for 4 weeks, and regularly in the daily paper during the fall migration, alerting the public to drive safely due to the high incident of wildlife mortality (the actual number of fatalities was listed).
- Posters placed in the Moose Visitor Center alerted the public to drive safely due to the high incident of wildlife mortality. Actual numbers of each species wounded or killed per year were listed and updated as needed.
- Flyers were distributed to every vehicle passing through park entrance stations alerting visitors to drive safely due to the high incidence of wildlife mortality.
- New road signs were posted on the three access roads of the Park depicting a fatally wounded animal and serious vehicle damage.
- The Park is working closely with the Jackson Hole Wildlife Foundation to create radio spots and other public service announcements regarding driving more safely due to the wildlife on the roadway.
- The Grand Teton Lodge Company has created bumper stickers for all park vehicles, and possibly to sell to park visitors, encouraging safer driving due to the presence of wildlife.

Additional mitigation actions specific to wildlife would include the following, as appropriate:

- Prior to construction, evaluate habitat for species likely to occur and take steps to minimize impact on those species determined to be especially vulnerable.
- Minimize distance between existing road corridor(s) and any newly constructed pathways to reduce overall wildlife displacement.
- In site design, define pathways and boundaries of developed areas to confine human use and limit radiating impacts.
- During road shoulder and pathways design, several physical design features (e.g., retaining walls and guardrails) may be needed to construct pathways or widen road shoulders in certain topographically-challenging areas. These features would be designed in a manner that would not present a continuous barrier that would affect wildlife movement and migration. Long and continuous barriers to movement would pose unacceptable impacts to wildlife.
- Limit the effects of light and noise on adjacent habitat through control of sources during construction, and through site design of facilities, to limit long-term effects of resulting development.

- If a pilot transit program were tested in the Park in the future (based on the findings of the TBP), application of best available, low noise technologies and use of operating strategies would limit noise from transit vehicles.
- Install additional signs warning motorists and pathway users of the dangers of collisions with animals.
- Provide adequate education and enforcement to limit visitor activities that are destructive to wildlife and habitats.
- When possible, schedule disruptive construction activities to occur when effects on wildlife are less (e.g., after nesting season of birds and when mammals are neither hibernating nor have young).
- Where possible, preserve natural features with obvious high value to wildlife (e.g., tree snags).
- Maintain routes of escape from excavated pits and trenches for animals that might fall in. Cover post holes and other narrow pits with boards. During construction, maintain vigilance for animals caught in excavations and take appropriate actions to free them.
- To minimize the potential for “taking” a nest or egg of a migratory bird species, either (1) any activity that would destroy a nest or egg would occur after July 15 (a timeframe outside of the primary nesting season), or (2) a survey for any nests in the project area would be conducted prior to these activities.
- Take measures to reduce the potential for human-bear conflicts. Educate visitors on appropriate behavior when recreating in bear habitat. Provide bear-proof garbage containers in all developed areas. Require construction personnel to adhere to park regulations concerning food storage and refuse management.
 - “Bearwise” education would be conducted with all personnel involved in road and pathway construction and maintenance projects.
 - All food and other attractants would be properly stored at all times, and all food materials, garbage, and other attractants would be packed out on a daily basis if they cannot be stored in bear-resistant containers.
 - All road-killed wildlife carcasses found less than 100 yards from the roadside would be removed within 24 hours to a location away from roads and human activities.
- Project crews (other than law enforcement personnel) would not carry firearms.
- Project crews would carry bear pepper spray when conducting project activities and would be trained in bear safety.
- All project crews working in grizzly bear habitat would meet standards for sanitation, attractant storage, and access.
- All grizzly bear/human confrontations would be reported to Science and Resource Management personnel.
- Provide adequate cleaning of construction-related areas and garbage pick-up to limit wildlife access to human food.
- Enforce regulations that prohibit feeding of wildlife and that require proper food storage.

Cultural Resources

The NPS would preserve and protect, to the greatest extent possible, resources that reflect human occupation of the Grand Teton National Park. Specific mitigation measures would include the following, as appropriate:

- Conduct additional background research, resource inventory, and National Register evaluation where information about the location and significance of cultural resources is lacking. Incorporate the results of these efforts into site-specific planning and compliance documents.
- Incorporate mitigation measures into site-specific planning and design, including protecting archeological resources from disturbance, designing new construction in historic settings using compatible architectural style, and screening modern facilities from historic districts and ethnographic use areas.
- Develop specific design guidelines for all areas.
- Protect known human burials from disturbance and prepare emergency discovery plans to deal with any unanticipated discoveries.
- Mitigate unavoidable impacts to archeological resources through data recovery excavations and construction monitoring.
- Consult with tribes throughout site-specific design planning and project implementation to avoid or mitigate damage to ethnographic resources.



- Mitigate impacts to ethnographic resources through actions developed in consultation with culturally associated American Indian tribes. Mitigation measures could include designating alternative gathering areas, continuing to provide access to traditional and spiritual locations, and screening new development from traditional use areas.
- Design all new construction within historic districts, or adjacent to historic structures or sites, to be compatible in terms of architectural elements, scale, massing, materials, and orientation.
- Undertake all treatments to historic structures and cultural landscapes in keeping with the Secretary of Interior's standards.
- Coordinate with Southern Teton Area Rapid Transit and other transit-related organizations to understand demand, cost, and feasibility of connecting existing transit services to potential areas within the Park.

Transportation System and Traffic

The TBP will provide recommendations related to transit in the Park. If a pilot transit program were tested in the Park in the future based on the findings of the TBP, mitigation measures would be similar to, but not limited to, those listed below. Any future decision on transit would incorporate these elements.

- Limit noise from transit vehicles through application of best available, low noise technologies and use of operating strategies.
- Apply best available clean fuel technology to minimize air quality emissions.
- Consider the need for reliable, cost-effective transit service with adequate vehicle capacity.

Social and Economic Environments

During future planning and implementation, the NPS would work with local communities and county governments to identify further potential impacts and mitigation measures that would best serve the interests and concerns of both the NPS and the local communities, which may include the following:

- Pursue partnerships to improve the quality and diversity of community amenities and services.
- Coordinate with Teton County and the Town of Jackson such that pathway construction along U.S. Highway 26/89/191 within the Park from the south entrance to Moose Junction occurs at the same time a pathway from the town to the Park's south boundary is being constructed.

