

## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This chapter analyzes and describes the potential environmental consequences (impacts or effects) that would occur as a result of implementing the proposed project. Direct, indirect, and cumulative effects are analyzed for each resource topic carried forward. Potential impacts are described in terms of type, context, duration, and intensity. General definitions are defined as follows, while more specific impact thresholds are given for each resource at the beginning of each resource section.

- **Type** describes the classification of the impact as either beneficial or adverse, direct or indirect:
  - *Beneficial*: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
  - *Adverse*: A change that moves the resource away from a desired condition or detracts from its appearance or condition.
  - *Direct*: An effect that is caused by an action and occurs in the same time and place.
  - *Indirect*: An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.
- **Context** describes the area or location in which the impact will occur. Are the effects site-specific, local, regional, or even broader?
- **Duration** describes the length of time an effect will occur, either short-term or long-term:
  - *Short-term* impacts generally last only during construction, and the resources resume their pre-construction conditions following construction.
  - *Long-term* impacts last beyond the construction period, and the resources may not resume their pre-construction conditions for a longer period of time following construction.
- **Intensity** describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed in this environmental assessment.

### Cumulative Impact Scenario

The Council for Environmental Quality (CEQ) regulations that implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects. A cumulative impact is defined in 40 CFR §1508.7 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.” By Memorandum dated June 24, 2005, from the Chairman of the CEQ to the Heads of Federal Agencies, entitled “Guidance on the Consideration of Past Actions in Cumulative Effects Analysis,” CEQ made clear in its interpretation that “generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions” and that the “CEQ regulations do not require agencies to catalogue or exhaustively list and analyze all individual past actions.”

NPS, along with EPA, Region 9, recommended methodology for the assessment of cumulative impacts, which was developed jointly by the EPA, Federal Highway Administration, and California Department of Transportation, was used in preparation of this document. *Defining Cumulative*

*Impact, Approach and Guidance* (California Department of Transportation, EPA, and FHWA, 2005) identifies eight steps for a cumulative impact analysis. The CEQ published guidance in 1997 on cumulative effects analysis that detailed an eleven-step process. The eight-step process noted above and used in this analysis combines some of the steps outlined by CEQ. This EA is consistent with the guidance from both documents; some of the steps were completed in greater detail in earlier chapters of this EA (e.g., descriptions of existing conditions). In such instances, this chapter attempts to refer the reader to earlier sections of the EA for more detailed discussion and additional information regarding each resource area. The following is a list of the steps taken for this cumulative impacts analysis:

1. **Identify resources to consider in the cumulative impact analysis.** Chapter 4 addresses the proposed action's impacts on the following resources: geology and soils, hydrothermal resources, wetlands, vegetation and rare plants, water resources/water quality, wildlife, special status species, climate change, archeological resources, ethnographic resources, historic resources, cultural landscapes, visitor use and experience, scenic resources, natural soundscapes, human health and safety, and park operations.
2. **Define the study area for each resource.** Defining the study area for each resource is a critical step in the cumulative impacts analysis and is not always the same for each resource. For example, climate change crosses many boundaries. The geographic boundaries for the resources are as follows:
  - geology and soils (Project Survey Area)
  - wetlands (Yellowstone National Park [YNP])
  - vegetation and rare plants (YNP)
  - water resources/water quality (Yellowstone Lake)
  - wildlife (YNP)
  - special status species (Greater Yellowstone Area [GYA])
  - climate change (Global, with emphasis on local effects)
  - archeological resources (GYA)
  - ethnographic resources (GYA)
  - historic structures (YNP)
  - cultural landscapes (YNP)
  - visitor use and experience (YNP)
  - scenic resources (YNP)
  - natural soundscapes (YNP)
  - human health and safety (YNP)
  - park operations (YNP)
3. **Describe the current health and historical context for each resource.** Chapter 3, Affected Environment, describes the current status of the resources along with a background of the resource on how it reached its current state.
4. **Describe direct and indirect impacts of the proposed project that might contribute to a cumulative impact.** The individual impacts of the proposed actions are described in this chapter. The direct, indirect, and cumulative impacts from the proposed actions are described.
5. **Identify other reasonably foreseeable future actions that affect each resource.** As described under Step 3, Table 4-1 lists cumulative projects considered in the cumulative impact analysis for the LACP/EA. This table includes the reasonably foreseeable future

- projects in the study area. Reasonably foreseeable projects are anticipated to be completed by 2032. The following actions were taken to complete step #5;
6. Develop a list of recently completed, present, and reasonably foreseeable future actions, referred to as “cumulative projects,” within a designated timeframe (1988-2032) beginning with completion of the Fishing Bridge Development Concept Plan/Environmental Impact Statement and ending at the proposed life of this plan (20 years) (see Table 4-1).
  7. Screen the projects to develop a list of cumulative projects to be used in the assessment of cumulative impacts (see 4.3-5). Projects were eliminated from the analysis if:
    - a. They are located outside the geographic boundaries identified in step #2.
    - b. They are proposed beyond the cumulative project timeline (2032).
    - c. There is insufficient, readily available data on project magnitude, location, or description such that potential impacts from the project cannot be ascertained.
    - d. The project would have *de minimus* impact on the environment (e.g., maintenance and repair of existing facilities or construction of minor or accessory structures within a built environment).
    - e. The project is a plan or policy, not a physical action or development.
  8. **Assess potential cumulative impacts.** The cumulative impact analysis was primarily qualitative due to the absence of detail for most of the reasonably foreseeable future projects in the study area. The assessment discussion indicates whether the alternatives could have an additive cumulative impact, when considered in conjunction with the listed cumulative projects, and describes the anticipated extent of the proposed action’s contribution to the cumulative impact expected to result from past, present, and reasonably foreseeable future actions.
  9. **Report the results.** The cumulative impact assessment results are presented for each resource in this chapter.
  10. **Assess the need for mitigation.** NPS policy is to develop and analyze mitigation measures even when the impacts are not significant. Mitigation measures to avoid or reduce impacts are listed in Chapter 4.4. In addition to avoiding or reducing impacts resulting from the proposed action, these mitigation measures would avoid or reduce cumulative impacts.

### Past, Present, and Reasonably Foreseeable Future Actions

The Past, Present, and Reasonably Foreseeable Future Actions, herein referred to as the “cumulative projects list,” were developed through a variety of internal and external sources. Table 4-1 lists projects that were identified in the study area, based on readily available information. The status of these would change and proposals for new projects would continue to be developed. The table is divided by region and not all projects listed are discussed in detail. The Lake Project Area is shown in Map 1-1. The Yellowstone National Park category includes projects within the confines of the Park. The Greater Yellowstone Area (often referred to as the Greater Yellowstone Ecosystem) encompasses 13 million acres of land across three states and includes the Beaverhead-Deerlodge National Forest, Bridger-Teton National Forest, Caribou-Targhee National Forest, Custer National Forest, Gallatin National Forest, Grand Teton National Park, National Elk Refuge, Red Rocks Lake National Wildlife Refuge, Shoshone National Forest, and Yellowstone National Park. The projects in the table below were identified for the purpose of conducting the cumulative effects analysis.

**Table 4-1. Project List for Cumulative Effects Analysis**

Description/Responsible Agency	Timeframe	Resource Impacts that could be cumulative
	P: Past C: Current/ Present RF: Reasonably Foreseeable	1-geology and soils 2-hydrothermal resources 3-wetlands 4-vegetation and rare plants 5-water resources/water quality 6-wildlife 7-special status species 8-climate change 9-archeological resources 10-ethnographic resources 11-historic resources 12-cultural landscapes 13-visitor use and experience 14-scenic resources 15-natural soundscapes 16-human health and safety 17-park operations
<b>Lake Project Area</b>		
Native Fish Conservation Plan 2011/NPS	P	3, 4, 5, 6, 7, 9, 13, 17
Invasive Plant Management Plan/NPS	RF	4, 9
Fishing Bridge RV site Electrical renovations	P, C, RF	1, 13
Implementation of the 1988 Fishing Bridge Development Concept Plan EIS/NPS	P, RF	1, 2, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15, 16, 17
Implementation of 1993 Lake Development Concept Plan EA/NPS	P, RF	1, 2, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15, 16, 17
Hazardous Fuels Reduction (Wildland Urban Interface Project)/NPS	P, RF	1, 4, 5, 6, 7, 9, 16
Lake Hotel Seismic Stabilization and Renovation Project/NPS	C, RF	1, 11, 13, 16
Lake Power line Improvements/NPS	P	1, 3, 4, 9
Wireless EA/NPS	P, C, RF	1, 2, 9, 11, 14, 16, 17
Replacement of leaking underground storage tank (UST) and site remediation at Lake Maintenance Facility/NPS	P	1, 5, 17
Fishing Bridge Vault toilet installation/NPS	P	1, 9, 13, 17
Lake Fish Hatchery repair and stabilization/NPS	P	11, 12, 16, 17
<b>Yellowstone National Park</b>		
Winter Use Plan/NPS	C, RF	6, 7, 8, 9, 13, 14, 15, 16, & 17
Norris Area water/wastewater project/NPS	P	1, 3, 4, 5, 9, 17
Madison wastewater project, ongoing/NPS	C	1, 3, 4, 5, 17

Reconstruction of Norris to Golden Gate Rd 2014/NPS	RF	6, 7, 8, 9, 13, 14, 15, 16, & 17
Reconstruction of East Entrance Rd 2010/NPS	P	6, 7, 8, 9, 13, 14, 15, 16, & 17
Reconstruction of West Entrance Rd 2008/NPS	P	6, 7, 8, 9, 13, 14, 15, 16, & 17
Norris to Madison Road Reconstruction/NPS	P	6, 7, 8, 9, 13, 14, 15, 16, & 17
Implementation of the Grizzly Bear Mgmt Plan 1994/NPS	P, C	6, 7, 9
Wildland-Urban Interface Fuels Mgmt/NPS	P, C, RF	4, 6, 7, 9
Tower-Roosevelt Comprehensive Plan Implementation/NPS	P, C, RF	1, 4, 6, 9, 11, 12, 13, 14
Old Faithful Area Comprehensive Plan/NPS	RF	1, 3, 4, 6, 7, 9, 11, 12, 13, 14, 15, 16, 17
Canyon-Tower Road Improvement Project/NPS	P	1, 3, 4, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17
Yellowstone Fire Management Plan 2004/NPS	P, C, RF	4, 6, 9
Lamar River Bridge Reconstruction 2010-2012/NPS	C	1, 3, 4, 5, 6, 9, 13, 14, 15, 16, 17
<b>Greater Yellowstone Area</b>		
Implementation of the Northern Rockies Lynx Mgmt FEIS/multi-agency	P, C, RF	6, 7
Implementation of the Interagency Bison Mgmt Plan/NPS	P, C, RF	6, 7, 9
Resource Mgmt Plan for Geothermal Leasing in the Western US/BLM-USFS	RF	2
Drilling and subsequent decommissioning of geothermal well in Corwin Springs, MT	P	2
Local population growth, which leads to increased development, recreation, pollution and roads.	P, C, RF	1, 3, 4, 5, 6, 7, 8, 9, 13, 15, 16, & 17
Bison and elk management plans/NPS-USFWS	P, C, RF	6, 7, 9
Cattle and sheep grazing/USFS-BLM	P, C, RF	6, 7
Fuels reduction projects on surrounding National Forest land/USFS	P, C, RF	4, 5, 6, 7, & 9
Proposed Targhee Revised Forest Plan Amendment EIS/USFS	C	4, 6, 7 & 9
Nationwide Aerial Application of Fire Retardant on National Forest System Lands EIS/USFS	C	3, 5, & 6
Reintroduction of gray wolves 1995/multi-agency	P	4, 6, 7, 9, 13

The following comparison table (**Table 4-1**) presents a concise summary of the impacts of each alternative within each resource section. This chapter follows with a separate section for each resource presenting an analysis of the environmental consequences of each alternative.

**Table 4-1: Environmental Impacts Summary by Alternative**

Impact Topic	Alternative A (No Action)	Alternative B (Preferred)	Alternative C
<b>Natural Resources</b>			
<b>Geology and Soils</b>	Short- and long-term minor adverse impacts to geology and soils.	Adverse and beneficial effects, overall short- and long-term minor adverse impacts to geology and soils.	Adverse and beneficial effects, overall short- and long-term minor adverse impacts to geology and soils.
<b>Wetlands</b>	Short and long-term minor adverse impacts to wetlands.	Short-term minor adverse impacts to wetlands.	Short term minor adverse impacts to wetlands.
<b>Vegetation, including Rare Plants</b>	Short and long-term minor adverse impacts to vegetation and rare plants.	Short and long-term minor adverse impacts to vegetation and rare plants.	Short and long-term minor adverse impacts to vegetation and rare plants.
<b>Water Resources/ Water Quality</b>	Adverse and beneficial effects, overall short- and long-term minor adverse impacts to water resources/water quality.	Adverse and beneficial effects, overall short- and long-term minor adverse impacts to water resources/water quality.	Adverse and beneficial effects, overall short- and long-term minor adverse impacts to water resources/water quality.
<b>Wildlife</b>	Short and long-term minor adverse impacts to wildlife.	Short and long-term minor adverse impacts to wildlife.	Short and long-term minor adverse impacts to wildlife.
<b>Special Status Species</b>	Overall, short- and long-term moderate adverse impacts to special status species, “no effect” to Canada lynx, “may affect, but is not likely to adversely affect” to whitebark pine, and “likely to adversely affect” the grizzly bear and gray wolf.	Overall, short- and long-term moderate adverse impacts to special status species, “no effect” to Canada lynx, “may affect, but is not likely to adversely affect” to whitebark pine, and “likely to adversely affect” the grizzly bear and gray wolf.	Overall, short- and long-term moderate adverse impacts to special status species, “no effect” to Canada lynx, “may affect, but is not likely to adversely affect” to whitebark pine, and “likely to adversely affect” the grizzly bear and gray wolf.
<b>Climate Change</b>	Long-term, negligible adverse impacts to climate change	Long-term, negligible adverse impacts to climate change	Long-term, negligible adverse impacts to climate change

<b>Cultural Resources</b>			
<b>Archeological Resources</b>	The potential exists for minor to moderate adverse impacts to archeological resources. The park would strive to reach a “no adverse effect” determination for §106 using mitigation measures and continuing consultation	The potential exists for minor to moderate adverse impacts to archeological resources. The park would strive to reach a “no adverse effect” determination for §106 using mitigation measures and continuing consultation.	The potential exists for minor to moderate adverse impacts to archeological resources. The park would strive to reach a “no adverse effect” determination for §106 using mitigation measures and continuing consultation
<b>Ethnographic Resources</b>	Short- and long-term negligible to minor adverse impacts to ethnographic resources.	Short- and long-term negligible to minor adverse impacts to ethnographic resources.	Short- and long-term negligible to minor adverse impacts to ethnographic resources.
<b>Historic Structures</b>	With a programmatic agreement or memorandum of agreement in place, this action would result in moderate, long-term adverse impacts to historic structures. The action will result in a Section 106 of NHPA determination of “adverse effect.”	With a programmatic agreement or memorandum of agreement in place, this action would result in moderate, long-term adverse impacts to historic structures. The action will result in a Section 106 of NHPA determination of “adverse effect.”	With a programmatic agreement or memorandum of agreement in place, this action would result in moderate, long-term adverse impacts to historic structures. The action will result in a Section 106 of NHPA determination of “adverse effect.”
<b>Cultural Landscapes</b>	With a memorandum of agreement in place, this action would result in moderate, long-term adverse impacts to historic structures. The action will result in a Section 106 of NHPA determination of “adverse effect.”	With a memorandum of agreement in place, this action would result in moderate, long-term adverse impacts to historic structures. The action will result in a Section 106 of NHPA determination of “adverse effect.”	With a memorandum of agreement in place, this action would result in moderate, long-term adverse impacts to historic structures. The action will result in a Section 106 of NHPA determination of “adverse effect.”
<b>Safety, Operations, and Visitor Experience</b>			
<b>Visitor Use and Experience</b>	Long-term minor adverse impacts to visitor use and experience.	Short-term, minor adverse impacts due to construction with long-term minor beneficial impacts to visitor use and experience.	Short-term, minor adverse impacts due to construction with long-term minor beneficial impacts to visitor use and experience.

<b>Scenic Resources</b>	In the short-term, the proposed action would have temporary, minor, adverse effects, but in the long-term the effects would be minor and beneficial. Overall, the effects would be negligible.	In the short-term, the proposed action would have temporary, minor, adverse effects, but in the long-term the effects would be minor and beneficial. Overall, the effects would be negligible.	In the short-term, the proposed action would have temporary, minor, adverse effects, but in the long-term the effects would be minor and beneficial. Overall, the effects would be negligible.
<b>Natural Soundscapes</b>	Short and long-term minor adverse impacts to natural soundscapes.	Short and long-term minor adverse impacts to natural soundscapes.	Short and long-term, minor adverse impacts to natural soundscapes.
<b>Health and Human Safety</b>	Short-term minor adverse impacts to human health and safety. Overall, long-term impacts would be beneficial.	Short-term minor adverse impacts to human health and safety. Overall, long-term impacts would be beneficial.	Short-term minor adverse impacts to human health and safety. Overall, long-term impacts would be beneficial.
<b>Park Operations</b>	Short- and long-term moderate adverse impacts to park operations.	Short and long-term minor adverse impacts and minor beneficial impacts to park operations.	Short and long-term minor, adverse and minor beneficial impacts to park operations.

## 4.1 NATURAL RESOURCES

### 4.1.1 Geology and Soils

#### Guiding Regulations and Policies

36 C.F.R. § 2.1: Prohibits possessing/destroying/disturbing mineral resources in park units.

NPS Management Policies, Section 4.8.1: Requires NPS to allow natural geologic processes to proceed unimpeded. NPS can intervene in these processes only when required by Congress, when necessary for saving lives, or when there is no other feasible way to protect other natural resources/park facilities/historic properties.

The geologic setting is the fundamental underlying factor for the behavior and characteristics of a landscape. NPS geologic resources are important for their role in the ecosystem, their scenic grandeur, and their contribution to visitor enjoyment. Yellowstone National Park was established specifically to protect geologic resources. The park contains geologic resources of international renown, including both geologic features and processes.

#### Methodology and Intensity Thresholds

This analysis reviewed and compiled available information regarding the geologic resources in the Lake Area that could be impacted by the proposed actions. For the proposed project, soil compaction, soil loss, and resultant erosion effects have been identified as the primary impacts to geologic resources. The intensity of impacts to geology and soils are defined as follows:

Impact Intensity	Impact Description
Negligible	An action that could result in a change to a natural physical resource, but the change would be so small that it would not be of any measurable or perceptible consequence. Soils would not be affected or the effects on soils would not be detectable.
Minor	Operations would cause localized or limited alteration to geologic layers, surficial, and shallow geology. Alteration to soils and geology would affect its ability to sustain biota, water quality, and hydrology, such that reclamation would be achievable within 2 years. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Operations would cause alteration to geologic layers, surficial, and shallow geology. Alteration to soils and geology would affect its ability to sustain biota, water quality, and hydrology, such that reclamation would be achievable within 3-5 years. Mitigation measures, if needed to offset adverse effects, could be extensive but would likely be successful.
Major	Operations would cause substantial alteration to geologic layers, surficial, and shallow geology. Alteration to soils and geology would have a lasting effect on the geology/soil's ability to sustain biota, water quality, and hydrology, such that reclamation could not successfully be achieved. Extensive mitigation measures would be needed to offset any adverse effects and their success could not be guaranteed.

#### 4.1.1.1 Impacts of Alternative A to Geology and Soils

##### Impact Analysis

The analysis of potential impacts to geology and soils considers both direct and indirect impacts. Such disturbance may cause increased erosion and loss of productive soil. Direct impacts result from physical soil disturbances or topographic alterations, while indirect impacts include risks to individuals from geologic hazards, as well as impacts to water resources away from the construction/operation site. Factors considered in determining whether an impact would be significant include the potential for substantial change in soil or slope stability. Project effects and constraints that can take place during construction and operations or may limit activities may include:

- Cut and fill activities leading to soil erosion
- Removal of vegetation and landscaping leading to soil erosion
- Use of heavy equipment resulting in soil compaction
- Impacts to topography
- Risk of damage from seismic activity
- Impervious surface increase resulting in increased runoff and soil erosion
- Vehicle movements on unpaved surfaces resulting in increased soil erosion and compaction

The emphasis of the No Action alternative would be to adaptively use existing buildings, modify existing roads and parking areas, and channel new development into previously disturbed areas. Nevertheless, this alternative would result in some road construction for access, parking, and circulation, along with new facility construction and trail development. These actions would cause both temporary and permanent disturbance, displacement, and removal of surface soils.

The redesign of the lakeshore road in front of the general store as a separate pedestrian trail and vehicular roadway would make use of a previously disturbed area and would not result in any additional impacts to soils. Natural erosion along the shoreline would continue.

Relocating the Fishing Bridge Service Station/auto repair facility to a previously disturbed site near the entrance to Lake would increase use and soil compaction in that area, resulting in some degradation of soils.

Redesigning the access road to the Lake Hotel, redesigning parking areas, and constructing facilities (including a service station/auto repair facility, employee housing and recreational facilities, and concessioner housing) would disturb approximately 20 acres of coarse-loamy soils and wet forest habitat. Of this total, approximately 6 acres are within the current development zone and have been previously disturbed, while approximately 14 acres are on the periphery of the development and would extend the area of disturbance. Removing existing road segments and scattered buildings, consolidating the Lake Lodge cabins, and using native plant materials to return sites to more natural conditions would revegetate approximately 9 acres.

The No Action alternative would result in both adverse and beneficial land disturbances that would alter topography, geology, and soils within the project area. A majority of the disturbance would be within previously disturbed areas. Areas of erosion, soil loss, and soil compaction would be vegetated and closed to human and vehicular traffic. To minimize effects to this resource, mitigation measures would be implemented such as topsoil replacement, native vegetation replacement, and noxious weed treatments to reduce impacts of disturbance.

Under this alternative seismic stabilization of facilities would not occur. The Lake Area is seismically active and the lack of stabilization could have potential adverse effects upon structures and human safety.

Overall, impacts of Alternative A on topography, geology, and soils would be adverse, short- and long-term, and minor.

### **Cumulative Impacts**

Cumulative impacts on geology and soils are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in the Lake Area of Yellowstone National Park. The Fishing Bridge RV site electrical renovations, hazardous fuels reduction, power line improvements, UST replacement, vault toilet installation, and other construction projects listed above have all had minor impacts due to localized soil disturbance, erosion, and mixing. Ongoing administrative activities such as road reconstruction and maintenance, backcountry operations, facilities maintenance, and hazard fuels reduction projects would continue to have adverse effects on geologic resources in the park. Road maintenance activities would require disturbance and removal of soils by heavy equipment operation. Trail maintenance would involve localized removal of soil. Most facilities maintenance would take place in developed areas where minimal impacts to geologic resources would occur. Park visitation is expected to increase each year as a result of population growth in nearby communities and elsewhere. Therefore, recreational use such as fishing and hiking would increase parkwide. An increase in recreational users will likely place additional pressures on geologic resources as more people hike and camp in Yellowstone. The impacts of Alternative A in conjunction with the past, present, and reasonably foreseeable future actions are minor, short- and long-term adverse.

**Conclusion**

Under Alternative A, continued soil compaction and construction-related soil disturbance would result in minor, short- and long-term adverse impacts.

**4.1.1.2 Impacts of Alternative B to Geology and Soils**

**Impact Analysis**

The analysis of potential impacts to geology and soils considers both direct and indirect impacts. Such disturbance may cause increased erosion and loss of productive soil. Direct impacts result from physical soil disturbances or topographic alterations, while indirect impacts include risks to individuals from geologic hazards, as well as impacts to water resources away from the construction/operation site. Factors considered in determining whether an impact would be significant include the potential for substantial change in soil or slope stability. Project effects and constraints that can take place during construction and operations or may limit activities may include:

- Cut and fill activities leading to soil erosion (including trenching for utilities)
- Removal of vegetation and landscaping leading to soil erosion
- Use of heavy equipment resulting in soil compaction
- Impacts to topography
- Risk of damage from seismic activity
- Impervious surface increase resulting in increased runoff and soil erosion
- Vehicle movements on unpaved surfaces resulting in increased soil erosion and compaction

Potential geology and soils impacts are limited to elements of current and proposed activities that could affect topography, soil physiochemical characteristics due to excavation and other ground disturbance activities, loss of soil to wind and water erosion from alteration to soil structure and removal of vegetation, a decrease in soil biological activity in newly disturbed areas, an increase in soil compaction, and a suitable stratum for establishment of non-native vegetation. Potential soil contamination issues are addressed in Section 4.3.5, Park Operations. Increased soil erosion also may indirectly impact water quality and aquatic ecosystems. Potential impacts to these resources are described in Section 4.1.5, Water Resources/Water Quality. Indirect groundwater impacts associated with the construction and operational activities include direct contamination of groundwater resources through percolation or surface runoff. Stormwater runoff can contribute to groundwater contamination. Water impacts are addressed in Section 4.1.5.

Alternative B would disturb approximately 19 acres of soil from construction and construction related activities, 36% coming from the infill of the RV Park. Building construction, removal, and relocation activities would disturb approximately 3.5 acres, with road and parking area construction affecting 2.9 acres. An additional 7 acres result from infill in the RV Park and 6 acres from the water main and water tank replacement. Since building construction is happening within developed areas, a majority of the soils have been previously disturbed. The water main replacement will also occur mainly in previously disturbed areas. Construction activities are expected to be phased throughout future years with the duration depending on the magnitude of the project.

**Ground Disturbance for Alternative B**

Project	Square Feet
Water Main replacement/improvements (25,000 LF X 10 FT wide)	250,000

Water Tank replacement	8,000
Construct administrative-related buildings	52,500
Construct entry kiosk and overlook expansion	3,000
Construct shower and laundry facilities	17,000
Renovate RV Park	305,000
Construct dorms and new housing	81,000
Road and parking improvements	128,000

Utility upgrades would occur throughout the Lake Area under this plan. These upgrades would be completed in place whenever possible. In the case of utility replacements, the new utility line may be placed alongside the existing to ensure utilities are provided during the replacement. This project would disturb soil throughout the Lake Area, but a majority of the upgrades would occur in previously disturbed areas.

The proposed action would result in both adverse and beneficial land disturbances that would alter topography, geology, and soils within the project area. A majority of the disturbance would be within previously disturbed areas. Areas of erosion, soil loss, and soil compaction would be vegetated and closed to human and vehicular traffic. To minimize effects to this resource, mitigation measures would be implemented such as topsoil replacement, native vegetation replacement, and noxious weed treatments to reduce impacts of disturbance.

Seismic stabilization of the Lake Hotel and employee dorms would have a beneficial effect in this seismically active area. Health and human safety would be increased and the possibility of a structure failing during a seismic event would be decreased.

Overall, impacts of Alternative B on topography, geology, and soils would be adverse, short- and long-term, and minor. Beneficial impacts would be minor to moderate and long-term.

**Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.1.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to geology and soils.

**Conclusion**

Alternative B would result in adverse and beneficial effects to the resource. Overall, implementation of Alternative B would result in minor, short- and long-term adverse effects to geology and soils.

**4.1.1.3 Impacts of Alternative C to Geology and Soils**

**Impact Analysis**

Direct impacts result from physical soil disturbances or topographic alterations, while indirect impacts include risks to individuals from geologic hazards, as well as impacts to water resources away from the construction/operation site. Similar to Alternative B, the factors considered in determining whether an impact would be significant include the potential for substantial change in soil or slope stability. Project effects and constraints that can take place during construction and operations or may limit activities may include:

- Cut and fill activities leading to soil erosion

- Removal of vegetation and landscaping leading to soil erosion
- Use of heavy equipment resulting in soil compaction
- Impacts to topography
- Risk of damage from seismic activity
- Impervious surface increase resulting in increased runoff and soil erosion
- Vehicle movements on unpaved surfaces resulting in increased soil erosion and compaction

Potential geology and soils impacts are limited to elements of current and proposed activities that could affect topography, soil physiochemical characteristics due to excavation and other ground disturbance activities, loss of soil to wind and water erosion from alteration to soil structure and removal of vegetation, a decrease in soil biological activity in newly disturbed areas, an increase in soil compaction, and a suitable stratum for establishment of non-native vegetation. As stated in Alternative B, potential soil contamination issues are addressed in Section 4.3.5, Park Operations and impacts related to surface runoff are addressed in Section 4.1.5, Water Resources/Water Quality.

Alternative C would disturb approximately 22 acres of soil from construction and construction related activities, 52% coming from the infill of the RV Park. Building construction, removal, and relocation activities would disturb approximately 2.5 acres, with road and parking area construction affecting 2 acres. An additional 11.5 acres result from infill in the RV Park and 6 acres from the water main and water tank replacement. Since building construction is happening within developed areas, a majority of the soils have been previously disturbed. The water main replacement will also occur mainly in previously disturbed areas. Construction activities are expected to be phased throughout future years with the duration depending on the magnitude of the project.

**Ground Disturbance for Alternative C**

Project	Square Feet
Water Main replacement/improvements (25,000 LF X 10 FT wide)	250,000
Water Tank replacement	8,000
Construct administrative-related buildings	45,000
Construct entry kiosk and overlook expansion	3,000
Construct shower and laundry facilities	19,000
Renovate RV Park	501,000
Construct dorms and new housing	45,000
Road and parking improvements	87,500

Utility upgrades would occur throughout the Lake Area under this plan. These upgrades would be completed in place whenever possible. In the case of utility replacements, the new utility line may be placed alongside the existing to ensure utilities are provided during the replacement. This project would disturb soil throughout the Lake Area, but a majority of the upgrades would occur in previously disturbed areas.

Under Alternative C, construction activities associated with the plan would result in both adverse and beneficial land disturbances that would alter topography, geology, and soils within the project area. A majority of the disturbance would be within previously disturbed areas. Areas of erosion, soil loss, and soil compaction would be vegetated and closed to human and vehicular traffic. For example, formalizing a pedestrian path in front of the Lake Hotel would confine pedestrians to the

formal paths and reduce erosion along the lakeshore. To minimize effects to this resource, mitigation measures would be implemented such as topsoil replacement, native vegetation replacement, and noxious weed treatments to reduce impacts of disturbance.

Overall, impacts of Alternative C on topography, geology, and soils would be adverse, short- and long-term, and minor. Beneficial impacts would be minor to moderate, and long-term.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.1.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to geology and soils.

### **Conclusion**

Alternative C would result in adverse and beneficial effects to the resource. Overall, implementation of Alternative C would result in minor, short- and long-term adverse effects to geology and soils.

## **4.1.2 Wetlands**

### **Guiding Regulations and Policies**

Executive Order 11990 – Protection of Wetlands (42 Fed. Reg. 26961) directs the NPS: 1) to provide leadership and to take actions to minimize the destruction, loss, or degradation of wetlands 2) to preserve and enhance the natural and beneficial values of wetlands; and 3) to avoid direct or indirect support of new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable measures to minimize harm to wetlands.

Director's Order #77-1: Wetland Protection and the accompanying Procedural Manual #77-1: Wetland Protection (Reissued February 2008) These documents establish NPS policies, requirements, and standards for implementing Executive Order (E.O.) 11990: "Protection of Wetlands" (421 Fed Reg.26961). Included in Director's Order #77-1 is adoption of a "no net loss of wetlands" goal, which was first proclaimed in 1989 by President George H. W. Bush and has been sustained by subsequent Administrations.

Section 404 of the Clean Water Act: The U.S. Army Corps of Engineers issues permits for activities that result in the discharge of dredged or fill material into waters of the United States, including wetlands. Regulated activities range from depositing fill for building pads or roads to discharges associated with mechanized land clearing. The NPS #77 -1 procedural manual for wetland protection explains the relationship between Section 404 and the requirements of D.O. #77-1:

*"Although portions of the Corps of Engineers 404 permit procedures (33 CFR 320-330) are similar to some of the requirements found in D.O. #77-1 and these implementing procedures, there are significant differences in scope that warrant a separate NPS wetland protection process. First, the 404 permit program regulates only the discharge of dredged or fill material, while Executive Order 11990 covers a much broader range of actions that can have adverse impacts on wetlands, including ground water withdrawals, water diversions, nutrient enrichment, and other examples listed in Section 4.1.2 of these procedures. Second, the wetland definition used for the 404 permit program (33 CFR 328.3) is narrower than the Cowardin et al. (1979) wetland definition used for NPS*

*compliance with E.O. 11990 (see Section 4.1.1 of these procedures). Therefore, a broader range of aquatic habitat types fall under these procedures than under the wetland procedures of the 404 permit program. Third, the Corps of Engineers has "general permit" provisions that allow many projects affecting wetlands to proceed with minimal review.*

All NPS actions with the potential to have adverse impacts on wetlands (as defined in Section 4.1.1) and must comply with D.O. #77-1 and these procedures, and those actions that involve placing dredged or fill material in wetlands or other “waters of the U.S.” (as defined in 33 CFR 320-330) must comply with Section 404 of the Clean Water Act as well. In cases where both NPS and Corps of Engineers procedures apply, it is important to avoid duplication of effort by coordinating with the appropriate Corps of Engineers office early in the process of developing alternatives to assure that they are workable under both these procedures and Section 404 regulations.

**Methodology and Intensity Thresholds**

The planning team based the impact analysis and conclusions for possible impacts from the on-site inspection of known and potential jurisdictional wetlands within the park, review of existing literature and studies, information provided by experts in the NPS and other agencies, and park staff insights and professional judgment. The intensity of impacts to wetlands is defined as follows:

Impact Intensity	Impact Description
Negligible	Operations would affect less than 0.1 acre and would not alter wetland functions and values. Reclamation would not be necessary.
Minor	Impacts could result in a change to wetland functions and values, but the change would be of little consequence. Operations would have minimal risk and have few mitigation measures.
Moderate	Impacts could result in a change to wetland functions and values; the change would be measurable and consequential. Mitigation measures, if needed to offset adverse effects, could be extensive, but would likely be successful.
Major	Impacts would result in a noticeable change to wetland functions and values; the change would result in a severely adverse or substantially beneficial impact. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

**4.1.2.1 Impacts of Alternative A to Wetlands**

**Impact Analysis**

A wetlands inventory of this area has been completed, and all construction sites would avoid areas identified as wetlands. The new service station complex would be in an already disturbed area; an identified wetland does exist east of this site. Care would be taken so that the service station complex would have no effect on this wetland. Visitors traveling off formal trails impact wetland vegetation and compact wetland soils throughout the Lake Area.

**Cumulative Impacts**

Cumulative impacts on wetlands are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in YNP. Ongoing administrative activities such as road construction and repair, and facilities maintenance would continue to have adverse impacts to wetlands in Yellowstone. Road construction and repair has direct and indirect adverse impacts to wetlands. Direct impacts have resulted from roads being constructed in existing wetland areas and disturbing wetland components (i.e., soils, vegetation, and hydrology) and function. Mitigation to compensate for these actions has been implemented. Indirect effects of

road construction include increased sedimentation and altered hydrology. The proposed Norris to Golden Gate road reconstruction will impact 2.7 acres of wetlands with mitigation consisting of restoring previously impacted wetlands. Lake trout removal has resulted in minor, adverse impacts to wetlands around Yellowstone Lake. Past and ongoing recreational use such as angling, camping, and hiking would continue park wide. These activities result in the trampling of wetland vegetation and soils and result in negligible, short- and long-term, adverse impacts to wetlands. Under Alternative A, visitor use would lead to further disturbance to wetland resources.

### **Conclusion**

Under Alternative A, ongoing and future impacts to wetlands would result in minor, short- and long-term, adverse effects. While these impacts would be primarily localized, they would be spread throughout the Lake Area and their combined effects would continue to impact wetland resources and values.

#### **4.1.2.2 Impacts of Alternative B to Wetlands**

##### **Impact Analysis**

The proposed actions under the Preferred Alternative have been designed to avoid and minimize potential impacts to wetlands. The replacement and/or repair of utility lines and installation of electrical lines in the Bridge Bay Campground are the only projects that have been identified with the potential to adversely impact wetlands. As described in section 3.1.2 and figure 3-1, wetlands occur throughout the Lake survey area. Installation, repair, and/or replacement of these lines would qualify for U.S. Army Corps of Engineers nationwide permit #12, which allows for “Activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2 acre of waters of the United States.” Nationwide permits are a type of general permit designed to authorize certain activities that have minimal adverse effects on the aquatic environment. Under the terms of the nationwide permit there can be no change in pre-construction contours. If any of the following criteria are met, notification in the form of a pre-construction notification is required: (1) the activity involves mechanized land clearing in a forested wetland for the utility line right-of-way; (2) a Section 10 permit is required; (3) the utility line in waters of the United States, excluding overhead lines, exceeds 500 feet; (4) the utility line is placed within a jurisdictional area (i.e., water of the United States), and it runs parallel to a streambed that is within that jurisdictional area; (5) discharges that result in the loss of greater than 1/10-acre of waters of the United States; (6) permanent access roads are constructed above grade in waters of the United States for a distance of more than 500 feet; or (7) permanent access roads are constructed in waters of the United States with impervious materials. Installation of the electrical lines is not expected to impact more than 1/10 of an acre. Replacement of the water main in the Fishing Bridge area will not impact wetlands but future repair of other water and sewer lines has the potential to impact wetlands. If the impacts are above 1/10 of an acre a pre-construction notification will be submitted. Although the planning area has been delineated, if it is discovered that a project would impact wetlands above what is allowable with a nationwide permit, the appropriate section 404 general permit would be sought and the appropriate mitigation completed. Similar to the No Action alternative, visitors traveling off formal trails would still impact wetland vegetation and compact wetland soils. These potential impacts would be minor, adverse, both short- and long-term.

##### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.3.1). Alternative B, in conjunction with

these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to wetlands.

### **Conclusion**

Implementation of the Preferred Alternative would result in short-term, minor adverse effects on wetlands due to electrical line installation and future utility repairs.

### **4.1.2.3 Impacts of Alternative C to Wetlands**

#### **Impact Analysis**

Alternative C has the same utility projects as Alternative B with the same resulting effects. The proposed actions under the Preferred Alternative have been designed to avoid and minimize potential impacts to wetlands. The replacement and/or repair of utility lines and installation of electrical lines in the Bridge Bay Campground would qualify for U.S. Army Corps of Engineers nationwide permit #12 (see section 4.1.2.2 above). Installation of the electrical lines is not expected to impact more than 1/10 of an acre. Replacement of the water main in the Fishing Bridge area will not impact wetlands but future repair of other water and sewer lines has the potential to impact wetlands. If the impacts are above 1/10 of an acre a pre-construction notification will be submitted. Although the planning area has been delineated, if it is discovered that a project would impact wetlands above what is allowable with a nationwide permit, the appropriate section 404 general permit would be sought and the appropriate mitigation completed. Similar to the No Action alternative, visitors traveling off formal trails would still impact wetland vegetation and compact wetland soils. These potential impacts would be minor, adverse, both short- and long-term.

#### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.3.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to wetlands.

### **Conclusion**

Implementation of this alternative would result in short-term, minor adverse effects on wetlands due to electrical line installation and future utility repairs.

### **4.1.3 Vegetation and Rare Plants**

#### **Guiding Regulations and Policies**

Section 4.4 of the NPS Management Policies (2006) addresses biological resource management including general vegetation management. This policy states that the NPS will maintain all plants native to park ecosystems. This will be done by preserving native plant populations, restoring native plant populations in parks when they have been extirpated by past human-caused actions and minimizing human impacts on native plants, populations, communities and ecosystems and the process that sustain them.

Guidance for management of rare plants is found in NPS Management Policies Section 4.4.2.3 (Management of Threatened or Endangered Plants and Animals): “The National Park Service will inventory, monitor, and manage state and locally listed species plant species of concern in a manner similar to its treatment of federally listed species to the greatest extent possible. In addition, the Service will inventory other native species that are of special management concern to parks (such as

rare, declining, sensitive, or unique species and their habitats) and will manage them to maintain their natural distribution and abundance.” Adverse impacts to rare plants will be avoided to the extent possible. Impacts that cannot be avoided will be minimized and if possible mitigated via seed collection and plant salvage from on-site or nearby suitable habitats prior to disturbance and re-established following construction. Revegetation, utilizing exiting native plant species found in the area, would occur wherever possible according to *Vegetation Management for Construction Disturbance in Yellowstone National Park* (1995).

**Methodology and Intensity Thresholds**

The methodology used for assessing impacts to vegetation and rare plants are based upon the results of the 2009-2010 rare plant survey within the Lake Area planning boundary for the proposed LACP/EA (see Natural Resource Map Appendix B). This plan compares these survey results with the planning components of buildable planning, planning prescriptions and design guidelines in the action alternatives B and C but not for the No Action alternative. Included in the evaluation of the vegetative communities is the introduction or spread of non-native species. The intensity of impacts to vegetation and rare plants are defined as follows:

Impact Intensity	Impact Description
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. The effects would be on a small scale and no special status species would be affected.
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, including special measures to avoid affecting species of special concern, could be required and would be effective.
Moderate	The alternative would affect some individual native plants and would also affect a sizeable segment of the species’ population and over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected.
Major	The alternative would have a considerable effect on native plant populations, including species of special concern, and affect a relatively large area in and out of the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

**4.1.3.1 Impacts of Alternative A to Vegetation and Rare Plants**

**Impact Analysis**

Under the No Action alternative, approximately 14 acres of vegetation would be cleared. Construction of the service station/auto repair facility with the associated dorms would remove approximately 4 acres of vegetation. Projects in the administrative area and the Lake Village would remove approximately 10 acres of vegetation. Removing existing road segments and scattered buildings, consolidating the Lake Lodge cabins, and using native plant materials to return sites to more natural conditions would revegetate approximately 9 acres. Approximately 1400 square feet of Curled starwort (*Stellaria crispa*) would be removed during construction. The Curled starwort is listed as a rare plant in Wyoming. Prior to construction the plants would be removed and transplanted to another location within the Lake Area. The eradication of non-native species would continue to occur in the area. Required facility maintenance and repair would continue to occur with negligible impacts on vegetation. Alternative A would have a minor, short- and long-term adverse impact on vegetation and rare plants.

### **Cumulative Impacts**

Cumulative impacts on vegetation and rare plants are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in YNP. Due to the requirement for rare plant surveys and avoidance through project or plant relocation, the impacts to rare plants are minor.

Ongoing administrative activities such as road reconstruction and maintenance, backcountry operations, facilities maintenance, and hazard fuels reduction projects would continue to have adverse effects on vegetation in the park. Road maintenance activities would require disturbance and removal of soils and vegetation by heavy equipment operation. Backcountry operations include horse and foot patrol and trail maintenance. Trail maintenance involves localized disturbance of soil and vegetation and overnight use of campsites and cabins lead to some vegetation trampling and development of social trails. Most facilities maintenance activities occur in developed areas where minimal impacts to vegetation would occur. However, adverse impacts to vegetation may become necessary because some plant material may be cleared and removed for general operation practices. Additionally, Yellowstone's hazard fuels reduction projects require the removal of excess fuel (trees) from developed areas. Impacts to vegetation can be reduced by ensuring trails are maintained, including the use of barriers to prevent development of social trails and by monitoring construction and maintenance activities. Park visitation is expected to increase each year as a result of population growth in nearby communities and elsewhere. The growth and visitation will increase recreational use, such as angling, camping, and hiking. These activities trample vegetation and soils resulting in minor, short- and long-term adverse impacts to vegetation. Alternative A would lead to further minor disturbance to vegetation.

### **Conclusion**

Under Alternative A, ongoing and future impacts to vegetation would result in short- and long-term, minor, adverse effects. However, these impacts would be primarily localized and, while trees or areas of vegetation might be removed or otherwise degraded, the effect would not be considered severe within the context of vegetative resources throughout the Lake Area.

#### **4.1.3.2 Impacts of Alternative B to Vegetation and Rare Plants**

##### **Impact Analysis**

Implementation of the Preferred Alternative would result in the removal of trees, most of these in association with water main replacement and RV park improvements. Construction of the new water main in the Fishing Bridge area would require removal of trees in limited areas, such as the route from the Grand Loop Road water main to the Fishing Bridge Museum. A majority of the water main would lie alongside the existing water main and be located within road beds. Alternative B would also result in removal of existing vegetation in association with improvements to the north loop of the RV park. The proposed project would remove the vegetated islands within the north loop of the RV park. The removal would consist of approximately 7 acres of vegetation, the majority being lodgepole pine, shrubs, and sedges. Construction of additional parking by the general store and ranger station would remove less than one acre of trees. Projects in the administrative location may impact individual trees and shrubs, but impacts are expected to be minimal. With the exception of the RV park, any construction would protect trees within the construction zone to the maximum extent practicable. Potential impacts to whitebark pine are discussed in section 4.1.6.

These would be considered local, minor, adverse effects on vegetation. However, under the Preferred Alternative many of the facilities and land uses that are currently resulting in minor

adverse impacts on vegetation would be addressed. Relocating facilities and improving trail connections would reduce the incidence of “social trails” that have adverse impacts on vegetation. Topsoil would be salvaged during construction for later revegetation work. No imported topsoil would be used in reclamation. Borrow and aggregate materials from sources outside the park would be heated (or the source certified weed-free), and construction equipment would be carefully checked to avoid the importation of exotic vegetation. After construction activities are completed, revegetation with native plant materials would return disturbed areas to a more natural state. Reclamation and revegetation efforts would follow Yellowstone’s policy on vegetation management for construction, which also includes procedures for long-term management of non-native vegetation. Plant species used during reclamation would reflect the vegetation native and typical to the area. Because the project area would be revegetated, the effects on vegetation would be localized and direct, short-term, and minor. The potential for proliferation of non-native plants is possible with any ground disturbance, and the potential for spreading non-native plant species during construction operations is a concern. Contractors would be required to adhere to proper construction techniques and precautions, including washing of equipment before entering the park in order to eliminate any non-native plant seeds.

Overall, implementation of Alternative B would result in minor, short-term adverse and beneficial effect on vegetation.

### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.4.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to vegetation and rare plants.

### **Conclusion**

Several activities associated with Alternative B would result in short-term, minor, adverse effects on vegetation. However, these impacts would be primarily localized and the removal and/or relocation of vegetation would not be considered severe within the context of vegetative resources throughout the Lake Area.

Additionally, many of the activities themselves are intended to ameliorate and repair existing degradation of vegetative resources. Restoration of currently degraded areas to a natural condition will be achieved using native stock. Therefore, the net effects of Alternative B would be short- and long-term, minor, adverse effect on vegetative resources and values.

### **4.1.3.3 Impacts of Alternative C to Vegetation Rare Plants**

#### **Impact Analysis**

Implementation of Alternative C would result in the removal of trees, most of these in association with water main replacement and RV park improvements. Construction of the new water main in the Fishing Bridge area would require removal of trees in limited areas, such as the route from the Grand Loop Road water main to the Fishing Bridge Museum. A majority of the water main would lie alongside the existing water main and be located within road beds. Alternative C would also result in removal of existing vegetation in association with improvements to the south loop of the RV Park. The proposed project would remove the vegetated islands within the north and south loop of the RV Park. The removal would consist of approximately 12 acres of vegetation, the majority being lodgepole pine, shrubs, and sedges. Projects in the administrative location may

impacts individual trees and shrubs, but impacts are expected to be minimal. With the exception of the RV Park, any construction would protect trees within the construction zone to the maximum extent practicable. Potential impacts to whitebark pine are discussed in section 4.1.6.

These would be considered local, minor, adverse effects on vegetation. Similar to Alternative B, many of the facilities and land uses that are currently resulting in minor adverse impacts on vegetation would be addressed. Relocating facilities and improving trail connections would reduce the incidence of “social trails” that have adverse impacts on vegetation. Topsoil would be salvaged during construction for later revegetation work. No imported topsoil would be used in reclamation. Borrow and aggregate materials from sources outside the park would be heated (or the source certified weed-free), and construction equipment would be carefully checked to avoid the importation of exotic vegetation. After construction activities are completed, revegetation with native plant materials would return disturbed areas to a more natural state. Reclamation and revegetation efforts would follow Yellowstone’s policy on vegetation management for construction, which also includes procedures for long-term management of non-native vegetation. Plant species used during reclamation would reflect the vegetation native and typical to the area. Because the project area would be revegetated, the effects on vegetation would be localized and direct, short-term, and minor. The potential for proliferation of non-native plants is possible with any ground disturbance, and the potential for spreading non-native plant species during construction operations is a concern. Contractors would be required to adhere to proper construction techniques and precautions, including washing of equipment before entering the park in order to eliminate any non-native plant seeds.

Overall, implementation of Alternative C would result in minor, short-term adverse and beneficial effect on vegetation.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.4.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to vegetation and rare plants.

### **Conclusion**

Several activities associated with Alternative C would result in long-term, minor, adverse effects on vegetation. However, these impacts would be primarily localized and the removal and/or relocation of vegetation would not be considered severe within the context of vegetative resources throughout the Lake Area.

Additionally, many of the activities themselves are intended to ameliorate and repair existing degradation of vegetative resources. Restoration of currently degraded areas to a natural condition will be achieved using native stock. Therefore, the net effects of Alternative C would be short- and long-term, minor, adverse effect on vegetative resources and values.

## **4.1.4 Water Resources/Water Quality**

### **Guiding Regulations and Policies**

The National Park Service *Management Policies 2006* state that the Park Service 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.” A water quality standard defines the water quality goals of a water body by designating uses to be made of the water, by setting minimum criteria to protect the uses, and by preventing degradation of water quality through anti-degradation provisions. The anti-degradation policy is only one portion of a water quality standard. Part of this policy (40 Code of Federal Regulations [CFR] 131.12(a) (2)) strives to maintain water quality at existing levels if it is already better than the minimum criteria. Anti-degradation should not be interpreted to mean that “no degradation” can or will occur, as even in the most pristine waters, degradation may be allowed for certain pollutants as long as it is temporary and short-term.

Other considerations in assessing the magnitude of water quality impacts are the effect on those resources dependent on a certain quality or condition of water. Sensitive aquatic organisms, submerged aquatic vegetation, riparian areas, and wetlands are affected by changes in water quality from direct and indirect sources.

**Methodology and Intensity Thresholds**

Particular attention is given to alterations of water flow (e.g., diversions, impediments to flow, or release of spring flow) and soil-disturbing construction activities. Other considerations in assessing the magnitude of water quality impacts are the effect on those resources dependent on a certain quality or condition of water. Sensitive aquatic organisms, submerged aquatic vegetation, riparian areas, and wetlands are affected by changes in water quality from direct and indirect sources. Given the above water quality issues and methodology and assumptions, the following impact thresholds were established in order to describe the relative changes in water quality under the alternatives.

Impact Intensity	Impact Description
Negligible	Impacts (chemical, physical, or biological effects) would not be detectable, would be well below water quality standards or criteria, and would be within historical or desired water quality conditions.
Minor	Impacts (chemical, physical, or biological effects) would be detectable but would be well below water quality standards or criteria and within historical or desired water quality conditions.
Moderate	Impacts (chemical, physical, or biological effects) would be detectable but would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions would be temporally altered.
Major	Impacts (chemical, physical, or biological effects) would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical, physical, or biological water quality standards or criteria would temporarily be slightly and singularly exceeded.

**4.1.4.1 Impacts of Alternative A to Water Resources/Water Quality**

**Impact Analysis**

Construction activities would result in minor impacts to creeks in the Lake Area and to Yellowstone Lake. Constructing roads and parking areas would cause increased runoff to adjacent drainages, and minor chemical and petroleum leaks and spills on paved surfaces could seep into the groundwater table and wet meadow areas.

With the exception of bulkhead improvements, overlook improvements, and dredging at the mouth of the marina, the projects under Alternative A are located away from the edges of water bodies. Repairing the bulkhead in the marina and dredging would result in temporary impacts to water quality from sediment. The amount of material proposed for dredging is approximately 2,400 cubic

yards, and is located at the mouth of the marina. Dredging would be done mechanically and the spoils disposed of in an approved location.

A majority of the projects would qualify for a small construction general permit (i.e., < 5 acres) from the Wyoming Department of Environmental Quality. A small construction general permit requires a Stormwater Pollution Prevention Plan (SWPPP) be developed and implemented and periodic inspections of Best Management Practices (BMPs) conducted.

The construction of the service station complex, post office, two dorms, and associated parking and roads would disturb a large area (i.e., >5 acres) and, therefore, would qualify as a large construction activity per Phase I Stormwater Regulations. Under this requirement, a Notice of Intent (NOI) would be submitted to Wyoming Department of Environmental Quality to seek coverage under the Wyoming Construction General Permit (CGP). A SWPPP would also be prepared and readily available on-site as a condition of the CGP. An NOI is not a permit or a permit application, but by submitting an NOI, the owner or operator of the project acknowledges that it is eligible for coverage under the CGP and agrees to the conditions in the CGP.

Under Alternative A, proposed construction activities in the Lake Area would result in the potential for a temporary increase in stormwater runoff, erosion, and sedimentation. To minimize these potential temporary increases, a CGP would be obtained and followed and a SWPPP would be prepared and implemented. The SWPPP would identify construction-specific BMPs that would be implemented as part of the action.

Under Alternative A, construction activities in the Lake Area would include surface water protection measures that would also serve to protect groundwater quality. By adhering to the provisions of the CGP and implementing BMPs associated with addressing site- and activity-specific water resource protection needs, there would be a reduction in stormwater pollutant loading potential and thus a reduction in pollution loading potential to the underlying groundwater subbasins.

As part of Low Impact Development (LID) planning, vehicle parking areas may use pervious paving designs when practicable. The potential use of such paving systems would be balanced with the requirement to avoid percolation of contaminated stormwater into groundwater; this protection of groundwater would have the highest priority when considering such paving designs. Drainage swales instead of stormwater conveyance piping systems are also being considered as a way to reduce the quantity and velocity of stormwater while simultaneously improving stormwater quality. The combination of LID technologies and compliance with federal and state regulations would reduce potential impacts to the storm drainage system and nearby receiving water bodies. With the implementation of LID measures to reduce impacts, stormwater flow paths would continue to mimic area topography and no diversion or restriction of surface water flow would occur.

Under Alternative A, the increase in impervious area in the Lake Area would result in an associated relatively minor increase in stormwater discharge intensities and volume. Existing stormwater infrastructure or stormwater infrastructure improvements included as part of the proposed action would incorporate LID measures and BMPs to ensure stormwater retention would be consistent with local and federal requirements and thus minimize potential impacts to surface water quality.

Alternative A would be conducted in accordance with all applicable orders, laws, and regulations. SWPPPs and Stormwater Management Plans (SWMPs) are documents designed to identify ways to

reduce the potential impacts associated with potential pollution sources, and potential erosion and sedimentation impacts, respectively. In addition, the Oil Pollution Act (OPA) mandates the implementation of the Spill Prevention, Control, and Countermeasure (SPCC) Plan that is used to prevent and control potential leaks and spills. Implementation of the required plans and permits with their associated protective measures would minimize potential impacts of runoff, spills and leaks. The combination of LID technologies and compliance with federal and State regulations would ensure that no significant impacts to receiving water bodies would result from Alternative A. Therefore, implementation of Alternative A would result in minor, short- and long-term adverse effects to water resources/water quality.

### **Cumulative Impacts**

Cumulative impacts on water resources/water quality are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in the Yellowstone Lake Area. Construction and facilities maintenance can adversely affect water quality by disturbing soils and hardening surfaces (e.g. paving) near stream corridors and promoting erosion and increased runoff, which can contribute to increased turbidity levels in adjacent surface waters. Implementation of the Native Fish Conservation Plan has resulted in minor adverse impacts due to increased in-water activities. The leaking underground storage tank in the maintenance area that has been replaced and the site remediated, contributed an adverse effect to water quality. Past and ongoing recreational use such as fishing, camping, and hiking would continue, resulting in adverse localized, temporary impacts to water quality. Hiking and camping activities can disturb soils which can promote erosion leading to increased sedimentation in adjacent water bodies. Alternative A, coupled with past, present, and foreseeable future actions would result in minor, short- and long-term adverse effects to water resources/water quality.

### **Conclusion**

Alternative A would result in minor, short- and long-term adverse impacts to water quality/water resources. The adverse effects would be a result of construction, dredging, and increased impervious surface.

#### **4.1.4.2 Impacts of Alternative B to Water Resources/Water Quality**

##### **Impact Analysis**

Under Alternative B, some of the existing erosion areas and conditions leading to degradation of water quality would be corrected. Trails would be improved to confine pedestrians and reduce “social trails,” thereby reducing sediment runoff.

With the exception of bulkhead improvements, overlook improvements, and dredging at the mouth of the marina, the projects under Alternative B are located away from the edges of water bodies. Repairing the bulkhead in the marina and dredging would result in temporary impacts to water quality from sediment. The amount of material proposed for dredging is approximately 2,400 cubic yards, and is located at the mouth of the marina. Dredging would be done mechanically and the spoils disposed of in an approved location.

Replacement of the water main at Fishing Bridge and the water tank in the administrative location would have a beneficial effect on water resources due to the reduction in loss from leakage.

A majority of the projects would qualify for a small construction general permit (i.e., < 5 acres) from the Wyoming Department of Environmental Quality. A small construction general permit requires

a Stormwater Pollution Prevention Plan (SWPPP) be developed and implemented and periodic inspections of Best Management Practices (BMPs) conducted.

The improvements to the upper loop of the RV park would disturb a large area (i.e., >5 acres) and, therefore, would qualify as a large construction activity per Phase I Stormwater Regulations. Under this requirement, an NOI would be submitted to Wyoming Department of Environmental Quality to seek coverage under the Wyoming Construction General Permit (CGP). A SWPPP would also be prepared and readily available on-site as a condition of the CGP. An NOI is not a permit or a permit application, but by submitting an NOI, the owner or operator of the project acknowledges that it is eligible for coverage under the CGP and agrees to the conditions in the CGP.

Under Alternative B, proposed construction activities in the Lake Area would result in the potential for a temporary increase in stormwater runoff, erosion, and sedimentation. To minimize these potential temporary increases, a CGP would be obtained and followed and a SWPPP would be prepared and implemented. The SWPPP would identify construction-specific BMPs that would be implemented as part of the action.

Under Alternative B, construction activities in the Lake Area would include surface water protection measures that would also serve to protect groundwater quality. By adhering to the provisions of the CGP and implementing BMPs associated with addressing site- and activity-specific water resource protection needs, there would be a reduction in stormwater pollutant loading potential and thus a reduction in pollution loading potential to the underlying groundwater subbasins.

As stated in Alternative A, LID planning and measures would be used to protect groundwater, nearby water bodies, and allow stormwater flow paths to mimic area topography with no diversion or restriction of surface water flow.

Under Alternative B, the increase in impervious area in the Lake Area would result in an associated relatively minor increase in stormwater discharge intensities and volume. Existing stormwater infrastructure or stormwater infrastructure improvements included as part of the proposed action would incorporate LID measures and BMPs to ensure stormwater retention would be consistent with local and federal requirements and thus minimize potential impacts to surface water quality.

Alternative B would be conducted in accordance with all applicable orders, laws, and regulations. SWPPPs and Stormwater Management Plans (SWMPs) are documents designed to identify ways to reduce the potential impacts associated with potential pollution sources, and potential erosion and sedimentation impacts, respectively. In addition, the Oil Pollution Act (OPA) mandates the implementation of the Spill Prevention, Control, and Countermeasure (SPCC) Plan that is used to prevent and control potential leaks and spills. Implementation of the required plans and permits with their associated protective measures would minimize potential impacts of runoff, spills and leaks. The combination of LID technologies and compliance with federal and State regulations would ensure that no significant impacts to receiving water bodies would result from Alternative B. Therefore, implementation of Alternative B would result in minor, short- and long-term adverse effects to water resources/water quality.

### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.5.1). Alternative B, in conjunction with

these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to water resources/water quality.

### **Conclusion**

Alternative B would result in minor, short- and long-term adverse and beneficial impacts to water quality/water resources. The adverse effects would be a result of construction, dredging, and increased impervious surface. The beneficial effects would result from reducing the effects of erosion and sedimentation and thereby improving water quality. Overall, the effects would be minor and adverse.

#### **4.1.4.3 Impacts of Alternative C to Water Resources/Water Quality**

##### **Impact Analysis**

Under Alternative C, some of the existing erosion areas and conditions leading to degradation of water quality would be corrected. Trails would be improved to confine pedestrians and reduce “social trails”, thereby reducing sediment runoff.

With the exception of bulkhead improvements, overlook improvements, and dredging at the mouth of the marina, the projects under Alternative C are located away from the edges of water bodies. Repairing the bulkhead in the marina and dredging would result in temporary impacts to water quality from sediment. The amount of material proposed for dredging is approximately 2,400 cubic yards, and is located at the mouth of the marina. Dredging would be done mechanically and the spoils disposed of in an approved location.

A majority of the projects would qualify for a small construction general permit (i.e., < 5 acres) from the Wyoming Department of Environmental Quality. A small construction general permit requires a SWPPP be developed and implemented and periodic inspections of BMPs conducted.

The improvements to the upper and lower loop of the RV park would disturb a large area (i.e., >5 acres) and, therefore, would qualify as a large construction activity per Phase I Stormwater Regulations. Under this requirement, an NOI would be submitted to Wyoming Department of Environmental Quality to seek coverage under a CGP. A SWPPP would also be prepared and readily available on-site as a condition of the CGP. An NOI is not a permit or a permit application, but by submitting an NOI, the owner or operator of the project acknowledges that it is eligible for coverage under the CGP and agrees to the conditions in the CGP.

Under Alternative C, proposed construction activities in the Lake Area would result in the potential for a temporary increase in stormwater runoff, erosion, and sedimentation. To minimize these potential temporary increases in stormwater runoff, erosion, and sedimentation, a CGP would be obtained and followed and a SWPPP would be prepared and implemented. The SWPPP would identify construction-specific BMPs that would be implemented as part

Under Alternative C, construction activities in the Lake Area would include surface water protection measures that would also serve to protect groundwater quality. By adhering to the provisions of the CGP and implementing BMPs associated with addressing site- and activity-specific water resource protection needs, there would be a reduction in stormwater pollutant loading potential and thus a reduction in pollution loading potential to the underlying groundwater subbasins.

As stated in Alternative A, LID planning and measures would be used to protect groundwater, nearby water bodies, and allow stormwater flow paths to mimic area topography with no diversion or restriction of surface water flow.

Under Alternative C, the increase in impervious area in the Lake Area would result in an associated relatively minor increase in stormwater discharge intensities and volume. Existing stormwater infrastructure or stormwater infrastructure improvements included as part of the proposed action would incorporate LID measures and BMPs to ensure stormwater retention would be consistent with local and federal requirements and thus minimize potential impacts to surface water quality.

Alternative C would be conducted in accordance with all applicable orders, laws, and regulations. SWPPPs and Stormwater Management Plans (SWMPs) are documents designed to identify ways to reduce the potential impacts associated with potential pollution sources, and potential erosion and sedimentation impacts, respectively. In addition, the Oil Pollution Act (OPA) mandates the implementation of the Spill Prevention, Control, and Countermeasure (SPCC) Plan that is used to prevent and control potential leaks and spills. Implementation of the required plans and permits with their associated protective measures would minimize potential impacts of runoff, spills and leaks. The combination of LID technologies and compliance with federal and State regulations would ensure that no significant impacts to receiving water bodies would result from Alternative C. Therefore, implementation of Alternative C would result in minor, short- and long-term adverse effects to water resources/water quality.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.5.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to water resources/water quality.

### **Conclusion**

Alternative C would result in minor, short- and long-term adverse and beneficial impacts to water quality/water resources. The adverse effects would be a result of construction and increased impervious surface. The beneficial effects would result from reducing the effects of erosion and sedimentation and thereby improving water quality. Overall, the effects would be minor and adverse.

## **4.1.5 Wildlife**

### **Guiding Regulations and Policies**

NPS regulations and policies, including the NPS Organic Act of 1916, *NPS Management Policies 2006* (NPS 2006a), and the NPS Natural Resource Management Reference Manual 77, direct national parks to provide for the protection of park resources. The Organic Act directs national parks to conserve “wild life” unimpaired for future generations and is interpreted to mean that native animal and plant life is to be protected and perpetuated as part of a park unit’s natural ecosystem.

The *NPS Management Policies 2006* state that the NPS “will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems. The term ‘plants and animals’ refers to all five of the commonly recognized kingdoms of living things and includes such groups as flowering plants, ferns, mosses, lichens, algae, fungi, bacteria, mammals, birds, reptiles, amphibians,

fishes, insects, worms, crustaceans, and microscopic plants or animals” (NPS 2006a). The NPS will achieve this by

- Preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur
- Restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions
- Minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them (NPS 2006a).

Section 4.1 of NPS *Management Policies 2006* states that “natural resources will be managed to preserve fundamental physical and biological processes, as well as individual species, features, and plant and animal communities. The Service will not attempt to solely preserve individual species (except threatened or endangered species) or individual natural processes; rather, it will try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems” (NPS 2006a). According to Section 8.2.2.1 of the NPS *Management Policies 2006*, “Superintendents will develop and implement visitor use management plans and take action, as appropriate, to ensure that recreational uses and activities in the park are consistent with its authorizing legislation or proclamation and do not cause unacceptable impacts on park resources or values” (NPS 2006a).

The NPS adheres to the North American Wildlife Conservation Model, which focuses on the health and management of wildlife *populations*. Overall, the goal of the NPS is to minimize human impacts (including impacts to individual wildlife) and avoid significant effects from disturbance to the abundance, diversity, dynamics, distributions, habitats, and behaviors of wildlife populations and communities and ecosystems in which they occur, pursuant to 36 CFR 2.18 and NPS *Management Policies 2006*, section 4.4.1. Although the focus of the impact analysis is predominantly the impacts to wildlife populations, the NPS acknowledges that adverse impacts to individual animals would likely occur and seeks to minimize them. In addition to NPS management policies, federally listed species in national parks are protected by the Endangered Species Act (ESA). The ESA (16 USC 1531 et seq.) mandates all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. If the NPS determines that an action may affect a federally listed species, consultation with the U.S. Fish and Wildlife Service (USFWS) is required to ensure that the action would not jeopardize the species’ continued existence or result in the destruction or adverse modification of critical habitat. NPS *Management Policies 2006* state that the NPS will survey for, protect, and strive to recover all species native to NPS units that are listed under the ESA, and proactively conserve listed species and prevent detrimental effects on these species (NPS 2006a, sec. 4.4.2.3). NPS *Management Policies 2006* also state that “[the NPS will] manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible” (NPS 2006a, sec. 4.4.2.3).

### **Methodology and Intensity Thresholds**

YNP wildlife biologists used scientific literature, site-specific information, and professional knowledge to define intensity thresholds (i.e., degree of change) for impacts to wildlife. For these thresholds, the term habitat is defined as the resources (e.g., food, shelter, and range) and environmental conditions (e.g., precipitation, predators) that enable the presence, survival, and

reproduction of a population, even if potentially suitable areas are currently unoccupied. The intensity of impacts to wildlife is defined as follows:

Impact Intensity	Impact Description
Negligible	There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining the species. Impacts would be well within natural fluctuations.
Minor	Impacts would be detectable, but they would not be expected to be outside the natural range of variability of native species' populations, their habitats, or the natural processes sustaining the species. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the parks unit. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability. Key ecosystem processes might be disrupted. Loss of habitat might affect the viability of at least some native species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

#### 4.1.5.1 Impacts of Alternative A to Wildlife

##### Impact Analysis

Numerous wildlife species inhabit the Lake Area. The wildlife present varies on a seasonal basis. Those that are most common in the forests and meadows adjacent to developed areas during the summer months when visitation is highest would generally be species that are tolerant of, if not habituated to, human presence and activity. For example, ravens, magpies, chipmunks, squirrels, and jays are attracted to food sources provided by the human activity around the Lake Area. Wildlife present within the immediate vicinity of most of the proposed activities are habituated to human activity and adverse effects on these animals as a result of the activities proposed under Alternative A are generally expected to be negligible. The species that use this area could be temporarily displaced by construction activity and equipment, but they would be expected to return following completion of the project. Construction activities along the road corridor would temporarily displace various bird species. Where previously undisturbed ground was developed, such as the service station/auto repair complex, a permanent loss of habitat would occur. Some nesting birds could be displaced by tree cutting activities that occur prior to May-July, (the typical nesting period). The water main replacement and road widening at Fishing Bridge could be expected to have a local, short-term effect on migratory birds, small mammals, and ungulates. Since additional lodging is not proposed under this alternative, wildlife mortalities should remain at current levels. The potential impacts from construction activities are expected to be short-term (temporary) and confined to the immediate project areas. As with all Yellowstone construction projects, the NPS would direct contractors to manage food and garbage so that they are not available to grizzly or black bears. Contractor staff would have to attend bear/food management orientation sessions and abide by the normal bear management guidelines. Under Alternative A, minor, short- and long-term adverse impacts to park wildlife would be expected to occur.

### **Cumulative Impacts**

Cumulative impacts on wildlife are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Construction projects in the Lake Area and YNP would continue to occur. Ongoing administrative activities such as hazing, wildlife monitoring, road construction, and facilities maintenance would continue to affect some wildlife resources. Hazing efforts are carried out by park personnel to discourage wildlife (e.g. bears, wolves, and coyotes) from using developed areas and to move bison back into the park during winter months. Some wildlife would be permanently removed from the population if they become habituated to human food and pose a threat to human safety. Wildlife monitoring practices are used to document various demographics of wildlife populations in the park and may cause adverse impacts ranging from generalized disturbance to sedation and handling of the animals. Noise from road construction and facilities maintenance could disturb wildlife in localized areas. Impacts from these disturbances could range from no impact to movement away from the immediate area. Park visitation is expected to increase each year as a result of population growth in nearby communities and elsewhere. Past and ongoing recreational uses such as boating, angling, camping, and hiking would continue park wide. Fishing occurs park wide during the summer months and could contribute to generalized disturbance of all wildlife species that occur near streams and lakes. Camping and hiking occur throughout the park and could lead to generalized disturbance which could affect feeding and resting behavior. Camping activities risk habituation of bears and other carnivores to human foods which could lead to some individual animals being euthanized. Both ongoing administration activities and increased visitor use could lead to impacts to wildlife populations throughout the park at both short- and long-term negligible to minor level. Alternative A, coupled with past, present, and foreseeable future actions would result in minor, short- and long-term adverse impacts to wildlife.

### **Conclusion**

Under Alternative A, short- and long-term, minor, adverse effects upon wildlife would continue. However, these impacts would be primarily localized and, while individual animals might occasionally be killed on the road or suffer reproductive failure due to human disturbance, this would be within the natural range of variability of native species' populations and the effect would not be considered severe within the context of wildlife resources throughout the Lake Area.

#### **4.1.5.2 Impacts of Alternative B to Wildlife**

##### **Impact Analysis**

The long standing development of the Lake Area has resulted in localized, minor degradation of wildlife habitat but a diversity of wildlife species still inhabit the area. Wildlife present within the immediate vicinity of most of the proposed activities are habituated to human activity and adverse effects on these animals as a result of the activities proposed under Alternative B are generally expected to be negligible. The species that use this area could be temporarily displaced by construction activity and equipment, but they would be expected to return following completion of the project. Construction activities along the road corridor (e.g., road widening, entry kiosk) would temporarily displace various bird species. Where previously undisturbed ground was developed, a permanent loss of habitat would occur. Some nesting birds could be displaced by tree cutting activities that occur prior to May-July, (the typical nesting period). The water main replacement and road widening at Fishing Bridge could be expected to have a local, short-term effect on migratory birds, small mammals, and ungulates. Since additional visitor lodging is not proposed under this alternative, wildlife mortalities should remain at current levels. The potential impacts

from construction activities are expected to be short-term (temporary) and confined to the immediate project areas. As with all Yellowstone construction projects, the NPS would direct contractors to manage food and garbage so that they are not available to grizzly or black bears. Contractor staff would have to attend bear/food management orientation sessions and abide by the normal bear management guidelines. Wildlife habitat, mainly bird and small mammal, would be removed with the RV park renovations and the Fishing Bridge road widening and would result in a long-term adverse impact. Under Alternative B, minor, short- and long-term adverse impacts to park wildlife would be expected to occur.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.6.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to wildlife.

### **Conclusion**

Under Alternative B impacts to wildlife could result from construction of new facilities and other proposed activities and could result in short- and long-term, minor, adverse effects. However, these impacts would be primarily localized and, while individual animals might occasionally be killed on the road or suffer reproductive failure due to human disturbance, this would be within the natural range of variability of native species' populations and the effect would not be considered severe within the context of wildlife resources throughout the Lake Area.

### **4.1.5.3 Impacts of Alternative C to Wildlife**

#### **Impact Analysis**

As discussed under Alternative B, since a majority of the wildlife present in the immediate vicinity of the proposed activities are habituated to human activity any adverse effects on these animals are generally expected to be negligible. The species that use this area could be temporarily displaced by construction activity and equipment, but they would be expected to return following completion of the project. Construction activities along the road corridor (e.g., road widening, entry kiosk) would temporarily displace various bird species. Where previously undisturbed ground was developed, a permanent loss of habitat would occur. Some nesting birds could be displaced by tree cutting activities that occur prior to May-July, (the typical nesting period). The water main replacement at Fishing Bridge could be expected to have a local, short-term effect on migratory birds, small mammals, and ungulates. Since additional visitor lodging is not proposed under this alternative, wildlife mortalities should remain at current levels. The potential impacts from construction activities are expected to be short-term (temporary) and confined to the immediate project areas. As with all Yellowstone construction projects, the NPS would direct the contractor to manage food and garbage so that they are not available to grizzly or black bears. Contractor staff would have to attend bear/food management orientation sessions and abide by the normal bear management guidelines. Wildlife habitat, mainly bird and small mammal, would be removed with the RV park renovations and the Fishing Bridge road widening and would result in a long-term adverse impact. Under Alternative C, minor, short- and long-term adverse impacts to park wildlife would be expected to occur.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.6.1). Alternative C, in conjunction with

these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to wildlife.

**Conclusion**

Under Alternative C impacts to wildlife could result from construction of new facilities and other proposed activities and could result in, short- and long-term, minor, adverse effects. However, these impacts would be primarily localized and, while individual animals might occasionally be killed on the road or suffer reproductive failure due to human disturbance, this would be within the natural range of variability of native species’ populations and the effect would not be considered severe within the context of wildlife resources throughout the Lake Area.

**4.1.6 Special Status Species**

**Guiding Regulations and Policies**

In addition to NPS management policies described in section 4.1.6, federally listed species in national parks are protected by the Endangered Species Act (ESA). The ESA (16 USC 1531 et seq.) mandates all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. If the NPS determines that an action may affect a federally listed species, consultation with the U.S. Fish and Wildlife Service (USFWS) is required to ensure that the action would not jeopardize the species’ continued existence or result in the destruction or adverse modification of critical habitat. NPS *Management Policies 2006* state that the NPS will survey for, protect, and strive to recover all species native to NPS units that are listed under the ESA, and proactively conserve listed species and prevent detrimental effects on these species (NPS 2006a, sec. 4.4.2.3). NPS *Management Policies 2006* also state that “[the NPS will] manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible” (NPS 2006a, sec. 4.4.2.3).

**Methodology and Intensity Thresholds**

Impacts to threatened species in Yellowstone National Park were evaluated by YNP wildlife biologists. Evaluations of threatened and endangered species were completed using records sightings within at least three miles (5 km) of Lake Area, records of sightings, and knowledge of habitats. The evaluation of effects included direct, indirect, interrelated, interdependent, and cumulative impacts as defined by the Endangered Species Act (ESA). Consultation with the U.S. Fish and Wildlife Service (USFWS) will occur for this plan. Mitigation proposed by the park for impacts on threatened or endangered species could include avoidance, minimization, and conservation measures as agreed upon by the USFWS. The intensity of impacts to special status species are defined as follows:

Impact Intensity	Impact Description
Negligible	The action could result in a change to a population or individuals of a species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence.
Minor	The action could result in a change to a population or individuals of a species or designated critical habitat. The change would be measurable but small and localized and of little consequence. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate	The action would result in some change to a population or individuals of a species or designated critical habitat. The change would be detectable and could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	The action would result in a substantial change to a population or individuals of a species or designated critical habitat. Impacts would be expected to be outside the natural range of variability and might affect the viability of at least some special-status species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

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#### 4.1.6.1 Impacts of Alternative A to Special Status Species

##### Impact Analysis

Eleven special-status species were determined to have potential to occur within the Lake Area, nine animals and two plant species. Whitebark pine and Yellowstone sand verbena are known to occur in the Lake Area, although Yellowstone sand verbena has been extirpated in the survey area. Special status plant species found in a project area would be relocated or avoided to the maximum extent practicable. With the exception of grizzly bears, gray wolves, and bison, special-status wildlife species are generally not expected to occur within developed areas of the Lake Area due to the habitat disturbance and human use. Bison may be temporarily displaced during construction activities, but will return once equipment use, noise, etc. subside.

The trumpeter swan, bald eagle, peregrine falcon, and boreal toad are not known to regularly inhabit the project area. Any effects to these species would be negligible and short-term.

Selection of this alternative would have negligible to minor effects on the Canada lynx, gray wolf, and whitebark pine and a moderate effect on grizzly bears. The effects on these federally listed species are evaluated below.

**Canada Lynx:** The Lake Area does not occur in a Lynx Analysis Unit and few, if any, lynx occur in the area. Lynx prefer upper elevation coniferous forests in cool, moist vegetation types, particularly those that support snowshoe hares. The best evidence of lynx presence is along the east shore of Yellowstone Lake, but no evidence exists within the boundary of the Lake planning area. Since all of the projects are in high human use areas, movements of lynx near the project site are not anticipated. While there is always the potential that there could be some direct or indirect impacts to lynx, these impacts are expected to be short-term and negligible. Alternative A would have no effect on the Canada lynx.

**Gray Wolves:** While the Lake development is within the territory of the Mollie's pack, no significant impacts are expected. The Mollie's pack regularly uses the area within and surrounding the lake planning area for travel and foraging. Wolves would continue to be hazed out of the developed areas and habituated wolves may be removed.

Potential effects to wolves that result directly from construction-related activities include: (1) injury or mortality resulting from vehicle strikes; (2) control actions to remove wolves that are food-conditioned due to poor food storage or deliberate feeding; (3) displacement of wolf families from natal dens or traditional rendezvous sites associated with construction-related disturbance; and (4) temporary displacement or barriers to movement of adult wolves in the road corridor and disruption of predator-prey relationships due to noise, vehicles, and related human activity.

YNP does not expect any vehicle-strike losses of wolves directly related to road widening, as no such losses have been documented in the park since wolf reintroduction (D. Smith, pers. comm.). Vehicle-strike deaths are highly unlikely because contractors are required to reduce speed (35 mph maximum) in construction zones. However, wolves often travel on or immediately adjacent to major Yellowstone roads at night, a behavior that may increase their odds of being killed by construction vehicles (also often active at night) because wolves are not easily seen. No removals or aversive conditioning of food-conditioned wolves have occurred related to road work (D. Stahler, pers. comm.). Such removals are unlikely because strict adherence to food storage regulations and prohibitions on wildlife feeding are required for contractors.

Sources of displacement from the road corridor on wolves due to visual and auditory disturbance, and barrier effects, include construction noise from blasting, use and parking of trucks and heavy equipment, and night lighting. Although Yellowstone wolves appear tolerant of routine visitor traffic along roads, construction work could trigger construction site and corridor avoidance. In particular, human disturbance at or in the vicinity of active natal dens or rendezvous sites could increase pup mortality due to displacement of adults or trigger relocation of dens (Carbyn 1974, Chapman 1977, D. Smith, pers. comm., but see Thiel et al. 1998 and Frame et al. 2007). In view of this potential effect, no blasting, road reconstruction, or asphalt overlays will occur from April 1 to August 1 within one mile of an active wolf natal den or rendezvous site. Although construction may cause adult wolves to avoid construction sites, we do not expect them to be displaced entirely from their territories or significantly change their travel patterns in response to construction activities.

Improved road surfaces and widened roads are likely to increase vehicle driving speed and vehicle-strike mortality, an adverse effect (Gunther et al. 1998). Vehicle collisions are the largest known source of human-caused mortality for wolves in the Canadian Rockies (Noss et al. 1996). Vehicle strikes associated with visitors resulted in 27 wolf mortalities in Yellowstone from 1995 through 2011. Of these, 16 occurred on U.S. Highway 191 along the western border of the park north of West Yellowstone, likely due to higher actual and posted (55 mph) travel speeds there compared to the rest of the park (Gunther et al. 1998). The road-related wolf deaths that were not associated with Highway 191 were well distributed across packs and major roads.

Little is known about how wolves respond behaviorally to automobiles and pedestrians in road corridors. In general, wolves are tolerant of human activity and may travel on roads (Thurber et al. 1994, Thiel et al. 1998, Mech et al. 1998). Due to the number of visitors and interest in viewing wolves, the Yellowstone population appears tolerant because of high exposure to human activity. Wolves or their tracks (in snow) are commonly seen on major park roads by visitors and staff. Wolves apparently do not substantially avoid the portions of their territories that are in close proximity to roads. They also bed near (< 0.25 miles) roads and may prey on ungulates in the vicinity. Efforts to prevent and manage habituated wolves in developed areas and along roads has increased in recent years due to several cases of habituated wolves believed to have been fed by visitors (two of which were lethally removed by park staff). Although visitors typically observe food storage restrictions and prohibitions on feeding wildlife, park staff is increasing efforts to educate park visitors and staff about preventing habituated wolves in lieu of increased cases in recent years. Consequently, we expect few, if any, removals of wolves by park managers to protect human safety. Park staff is assigned to observe human-wolf interactions along roads and intervene when necessary. Alternative A would result in a “may effect, likely to adversely affect” determination for the gray wolf.

**Grizzly Bear:** Grizzlies are often observed in the lake area and live and forage in the lake survey area. The developed areas are designated Management Situation 3 habitat, which are managed for regular human use or occupation. No increase in human visitation or occupation of the area is expected because of the proposed projects. Removal of NPS and Concessions housing from the Fishing Bridge area, as well as consolidation of the Lake Lodge cabins would reduce potential conflicts with bears. The relocated housing would be replaced in a forested area south of the concessioner housing area. The relocation would benefit bears in the Fishing Bridge area but would also impact bears in the main developed area of Lake. Existing management wildlife closures would be maintained for the area. All contractor employees would be required to attend and abide by the park's grizzly bear orientation sessions. These sessions focus on proper food and garbage storage, how to avoid disturbing or encountering bears, and how to minimize unavoidable effects or encounters. Food storage and disposal procedures at the construction sites and the contractor housing camp would be strictly enforced to minimize the potential for bears to obtain food. By confining construction to within the Lake developed area, there would be no loss of grizzly bear habitat. By providing *Living in Bear Country* orientation sessions for construction workers and strictly enforcing management regulations, the potential direct and indirect effects on grizzly bears and would be minimized and minor. During construction activities there would be short-term displacement of bears adjacent to the developed areas. Under this alternative there would not be an increase in overnight visitor lodging in the Lake Area. The park-wide trend of increased visitation would continue to have a negative effect on grizzly bears and could lead to increased bear-human conflicts. Since 1980 there has been six human-caused grizzly bear mortalities in the Fishing Bridge, Lake developed area, and Bridge Bay area. Hazing of bears out of the developed areas would continue. Implementation of Alternative A will result in a likely to adversely affect determination for the grizzly bear.

**Whitebark Pine:** As stated in Chapter 3, whitebark pine exists both as an overstory and understory component within the survey area. Mature, seed producing whitebark pine occurs as a minor component of the overstory and is common along the Yellowstone Lake shore habitats, especially at Fishing Bridge from the Fishing Bridge Museum to the mouth of Pelican Creek up to 500 meters inland. Prior to construction, surveys would be completed for whitebark pine and mature, cone-bearing trees would be flagged for avoidance during construction. Since whitebark pine is generally found along the lakeshore, it is subject to minor, adverse effects resulting from human-caused erosion and trampling. Mitigation measures would be taken to transplant specimens or to protect plants from trampling through the installation of vegetation barriers. The removal of non-mature, understory whitebark pine may occur under this proposal. Alternative A would result in a may effect, not likely to adversely affect for the whitebark pine.

### Cumulative Impacts

Cumulative impacts on special status species are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in the Greater Yellowstone Area. Continuing construction projects in the Lake Area and the GYA would occur, but each project's effects on threatened and endangered species must be independently and collectively evaluated, and all moderate or major impacts on park endangered species must be mitigated. Ongoing administrative activities such as road reconstruction and maintenance, backcountry operations, hazing activities, and facilities maintenance would continue to have adverse effects on special status species in the park. These would cause temporary displacement of special status species from generalized disturbance; feeding and resting behavior of wildlife species may be interrupted and some special status plant species may be adversely impacted from equipment working in construction areas. Use of trails and backcountry campsites and cabins

could also temporarily displace or disrupt special status species. Effects from these activities would be direct, short-term, and negligible because of the limited duration of the activity. Hazing activities usually take place near developed areas where wildlife has become habituated to the presence of humans. The grizzly bear and wolf are the two species most likely affected by hazing activities. Most facilities maintenance would take place in developed areas where minimal impacts to special status species would occur. However, adverse impacts to some species may occur because they are disturbed by noise and people associated with maintenance activities. Park visitation is expected to increase each year as a result of population growth in nearby communities and elsewhere. Past and ongoing recreational use such as fishing, camping, and hiking would continue park wide. These activities could lead to negligible to minor adverse impacts because special status species can become disturbed from human activity. Outside of the park, recent hunting regulations for gray wolves would have an adverse effect on the population, but compliance with the individual state's wolf management plan would ensure genetic viability and survival of the species. Oil and gas drilling operations in the surrounding states would have an adverse impact on the four listed species.

### **Conclusion**

Under Alternative A, ongoing impacts to special-status species would result in local, short-and long-term, moderate, adverse effects. These impacts would be localized and would not jeopardize the continued existence of any species or result in the destruction or adverse modification of critical habitat for any species.

### **4.1.6.2 Impacts of Alternative B to Special Status Species**

#### **Impact Analysis**

Eleven special-status species were determined to have potential to occur within the Lake Area, nine animals and two plant species. Whitebark pine and Yellowstone sand verbena are known to occur in the Lake Area, although Yellowstone sand verbena has been extirpated in the survey area. Special status plant species found in a project area would be relocated or avoided to the maximum extent practicable. With the exception of grizzly bears, gray wolves, and bison, special-status wildlife species are generally not expected to occur within developed areas of the Lake Area due to the habitat disturbance and human use. Bison may be temporarily displaced during construction activities, but will return once equipment use, noise, etc. subside.

The trumpeter swan, bald eagle, peregrine falcon, and boreal toad are not known to regularly inhabit the project area. Any effects to these species would be negligible and short-term.

Selection of this alternative would have negligible to minor effects on the Canada lynx, gray wolf, and whitebark pine and a moderate effect on grizzly bears. The effects on these federally listed species are evaluated below.

**Canada Lynx:** The Lake Area does not occur in a Lynx Analysis Unit and few, if any, lynx occur in the area. Lynx prefer upper elevation coniferous forests in cool, moist vegetation types, particularly those that support snowshoe hares. The best evidence of lynx presence is along the east shore of Yellowstone Lake, but no evidence exists within the boundary of the Lake planning area. Since all of the projects are in high human use areas, movements of lynx near the project site are not anticipated. While there is always the potential that there could be some direct or indirect impacts to lynx, these impacts are expected to be short-term and negligible. Alternative B would have no effect on the Canada lynx.

**Gray Wolves:** As stated in Alternative A, impacts could result from the direct and indirect effects of construction and visitor use of the area. While the Lake development is within the territory of the Mollie's pack, no significant impacts are expected. The Mollie's pack regularly uses the area within and surrounding the lake planning area for travel and foraging. Wolves would continue to be hazed out of the developed areas and habituated wolves may be removed. Alternative B would result in a "may affect, likely to adversely affect" determination for the gray wolf.

**Grizzly Bear:** Grizzlies are often observed in the lake area and live and forage in the lake survey area. The developed areas are designated Management Situation 3 habitat, which are managed for regular human use or occupation. No increase in human visitation or occupation of the area is expected because of the proposed projects. Consolidation of the Lake Lodge cabins away from Lodge Creek would reduce potential conflicts with bears. Existing management wildlife closures would be maintained for the area. All contractor employees would be required to attend and abide by the park's grizzly bear orientation sessions. These sessions focus on proper food and garbage storage, how to avoid disturbing or encountering bears, and how to minimize unavoidable effects or encounters. Food storage and disposal procedures at the construction sites and the contractor housing camp would be strictly enforced to minimize the potential for bears to obtain food. By confining construction to within the Lake developed area, there would be no loss of grizzly bear habitat. By providing *Living in Bear Country* orientation sessions for construction workers and strictly enforcing management regulations, the potential direct and indirect effects on grizzly bears and would be minimized and minor. During construction activities there would be short-term displacement of bears adjacent to the developed areas. Under this alternative there would not be an increase in overnight visitor lodging in the Lake Area. The park-wide trend of increased visitation would continue to have a negative effect on grizzly bears and could lead to increased bear-human conflicts. Since 1980 there has been six human-caused grizzly bear mortalities in the Fishing Bridge, Lake developed area, and Bridge Bay area. Hazing of bears out of the developed areas would continue. Implementation of Alternative B will result in a "may affect, likely to adversely affect" determination for the grizzly bear.

**Whitebark Pine:** As stated in Chapter 3, whitebark pine exists both as an overstory and understory component within the survey area. Mature, seed producing whitebark pine occurs as a minor component of the overstory and is common along the Yellowstone Lake shore habitats, especially at Fishing Bridge from the Fishing Bridge Visitor Center to the mouth of Pelican Creek up to 500 meters inland. Prior to construction, surveys would be completed for whitebark pine and mature, cone-bearing trees would be flagged for avoidance during construction. Since whitebark pine is generally found along the lakeshore, it is subject to minor, adverse effects resulting from human-caused erosion and trampling. Mitigation measures would be taken to transplant specimens or to protect plants from trampling through the installation of vegetation barriers. Replacement of the water lines in the Fishing Bridge location may result in the removal of non-mature, understory whitebark pine. Alternative B would result in a "may affect, not likely to adversely affect" for the whitebark pine.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.7.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to special status species.

## Conclusion

Under Alternative B, impacts to special-status species would result in local, short-and long-term, moderate, adverse effects. These impacts would be localized and would not jeopardize the continued existence of any species or result in the destruction or adverse modification of critical habitat. In addition, enhancement of pedestrian and vehicular circulation, which is partially intended to avoid use of unpaved areas, would reduce trampling of special status plant species and result in long-term, minor beneficial effects.

### 4.1.6.3 Impacts of Alternative C to Special Status Species

#### Impact Analysis

Eleven special-status species were determined to have potential to occur within the Lake Area, nine animals and two plant species. Whitebark pine and Yellowstone sand verbena are known to occur in the Lake Area, although Yellowstone sand verbena has been extirpated in the survey area. Special status plant species found in a project area would be relocated or avoided to the maximum extent practicable. With the exception of grizzly bears, gray wolves, and bison, special-status wildlife species are generally not expected to occur within developed areas of the Lake Area due to the habitat disturbance and human use. Bison may be temporarily displaced during construction activities, but will return once equipment use, noise, etc. subside.

The trumpeter swan, bald eagle, peregrine falcon, and boreal toad are not known to regularly inhabit the project area. Any effects to these species would be negligible and short-term.

Selection of this alternative would have negligible to minor effects on the Canada lynx, gray wolf, and whitebark pine and a moderate effect on grizzly bears. The effects on these federally listed species are evaluated below.

**Canada Lynx:** The Lake Area does not occur in a Lynx Analysis Unit and few, if any, lynx occur in the area. Lynx prefer upper elevation coniferous forests in cool, moist vegetation types, particularly those that support snowshoe hares. The best evidence of lynx presence is along the east shore of Yellowstone Lake, but no evidence exists within the boundary of the Lake planning area. Since all of the projects are in high human use areas, movements of lynx near the project site are not anticipated. While there is always the potential that there could be some direct or indirect impacts to lynx, these impacts are expected to be short-term and negligible. Alternative C would have no effect on the Canada lynx.

**Gray Wolves:** As stated in Alternative A, impacts could result from the direct and indirect effects of construction and visitor use of the area. While the Lake development is within the territory of the Mollie's pack, no significant impacts are expected. The Mollie's pack regularly uses the area within and surrounding the lake planning area for travel and foraging. Wolves would continue to be hazed out of the developed areas and habituated wolves may be removed. Alternative C would result in a "may affect, likely to adversely affect" determination for the gray wolf.

**Grizzly Bear:** Grizzlies are often observed in the lake area and live and forage in the lake survey area. The developed areas are designated Management Situation 3 habitat, which are managed for regular human use or occupation. No increase in human visitation or occupation of the area is expected because of the proposed projects. Existing management wildlife closures would be maintained for the area. All contractor employees would be required to attend and abide by the park's grizzly bear orientation sessions. These sessions focus on proper food and garbage storage,

how to avoid disturbing or encountering bears, and how to minimize unavoidable effects or encounters. Food storage and disposal procedures at the construction sites and the contractor housing camp would be strictly enforced to minimize the potential for bears to obtain food. By confining construction to within the Lake developed area, there would be no loss of grizzly bear habitat. By providing *Living in Bear Country* orientation sessions for construction workers and strictly enforcing management regulations, the potential direct and indirect effects on grizzly bears and would be minimized and minor. During construction activities there would be short-term displacement of bears adjacent to the developed areas. Relocation of the power line corridor would have a beneficial effect by reducing the potential for human-grizzly interactions in the Bridge Bay campground. Under this alternative there would not be an increase in overnight visitor lodging in the Lake Area. The parkwide trend of increased visitation would continue to have a negative effect on grizzly bears and could lead to increased bear-human conflicts. Since 1980 there has been six human-caused grizzly bear mortalities in the Fishing Bridge, Lake developed area, and Bridge Bay area. Hazing of bears out of the developed areas would continue. Implementation of Alternative C will result in a “may affect, likely to adversely affect” determination for the grizzly bear.

**Whitebark Pine:** As stated in Chapter 3, whitebark pine exists both as an overstory and understory component within the survey area. Mature, seed producing whitebark pine occurs as a minor component of the overstory and is common along the Yellowstone Lake shore habitats, especially at Fishing Bridge from the Fishing Bridge Visitor Center to the mouth of Pelican Creek up to 500 meters inland. Prior to construction, surveys would be completed for whitebark pine and mature, cone-bearing trees would be flagged for avoidance during construction. Since whitebark pine is generally found along the lake shore, it is subject to minor, adverse effects resulting from human-caused erosion and trampling. Mitigation measures would be taken to transplant specimens or to protect plants from trampling through the installation of vegetation barriers. Replacement of the water lines in the Fishing Bridge location may result in the removal of non-mature, understory whitebark pine. Alternative C would result in a “may affect, not likely to adversely affect” for the whitebark pine.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.7.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to special status species.

### **Conclusion**

Under Alternative C, impacts to special-status species would result in local, short-and long-term, moderate, adverse effects. These impacts would be localized and would not jeopardize the continued existence of any species or result in the destruction or adverse modification of critical habitat. In addition, enhancement of pedestrian and vehicular circulation, which is partially intended to avoid use of unpaved areas, would reduce trampling of special status plant species and result in long-term, minor beneficial effects.

#### 4.1.7 Climate Change

##### Guiding Regulations and Policies

###### **Executive Order 13514-Federal Leadership in Environmental, Energy and Economic Performance**

EO 13514 shifts the way the government operates by: 1) establishing GHGs (Greenhouse Gas) as the integrating metric for tracking progress in federal sustainability; 2) requiring a deliberative planning process; and 3) linking to budget allocations and OMB scorecards to ensure goal achievement. The targets for reducing GHG emissions discussed in EO 13514 for Scope 1 - direct greenhouse gas emissions from sources that are owned or controlled by a federal agency - and Scope 2 – direct greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a federal agency - have been set for NPS at a 50% reduction of GHG from the 2008 baseline by 2020. Scope 3 targets - greenhouse gas emissions from sources not owned or directly controlled by a Federal agency but related to agency activities such as vendor supply chains, delivery services, and employee travel and commuting – were set at a 10% reduction. In response to EO 13514, NPS published the Climate Change Response Strategy in September 2010. The Strategy provides direction to address the impacts of climate change.

###### **CEQ Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions, February 18, 2010**

This draft memo provides guidance to “help explain how agencies of the Federal government should analyze the environmental effects of GHG emissions and climate change when they describe the environmental effects of a proposed agency action in accordance with Section 102 of NEPA.” It contains several proposals for public consideration and comment. It proposes to “advise Federal agencies that they should consider opportunities to reduce GHG emissions caused by proposed Federal actions and adapt their actions to climate change impacts through the NEPA process and to address these issues in their agency NEPA procedures.”

###### **The Secretary of the Interior’s Order No. 3289, Addressing the Impacts of Climate Change on America’s Water, Land, and Other Natural and Cultural Resources, February 22, 2010**

This order states that “Each bureau and office of the Department must consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans, and making major decisions regarding potential use of resources under the Department’s purview.”

##### **Methodology and Intensity Thresholds**

There are two aspects of climate change to consider when completing an environmental impact analysis:

- **The effect of a proposed project on climate change** [GHG (Greenhouse Gas) emissions and carbon cycling]. Examples include: short-term GHG emissions and alteration to the carbon cycle caused by hazardous fuels reduction projects or GHG emissions from construction-related projects.
- **The effect of climate change on a proposed project.** Examples include: effects of expected shifts in rainfall and temperature patterns on spring runoff and fish spawning or whitebark pine and its corresponding effect on grizzly bears.

The potential effects of proposed GHG emissions are by their nature, global and cumulative. It is not currently feasible to quantify the indirect effects of minor individual or multiple projects on global climate change and therefore determining significant effects of those projects or project alternatives on global climate change cannot be made at any scale. The global effects of emissions from the proposed action are not considered meaningful and GHG emissions of the individual projects are not analyzed in detail.

The full extent of climate change impacts to resources and visitor experience is not known, nor do managers and policy makers agree on the most effective response mechanisms for adapting to climate change. All of the LACP/EA alternatives include a number of management actions that the NPS would implement to respond to the climate change challenge. As more specific information on climate change response becomes available, the Park will incorporate climate change considerations into future management actions and carry out any necessary compliance processes, as appropriate.

The intensity of impacts to the environment as a result of climate change is defined as follows:

Impact Intensity	Impact Description
Negligible	The effects of climate change could result in changes to an ecosystem or individuals of a species, but the change would be so small that it would not be of any measurable or perceptible consequence.
Minor	Climate change could result in changes to an ecosystem or individuals of a species. The change would be measurable but small and localized and of little consequence. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Climate change would result in changes to a population or individuals of a species or the ecosystem as a whole. The change would be detectable and could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Climate change would result in a substantial change to a population and/or the ecosystem. Impacts would be expected to be outside the natural range of variability and might affect the viability of some species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

4.1.7.1 Impacts of Alternative A to Climate Change

Impact Analysis

Adoption of the No Action alternative is not expected to result in more than a negligible increase in GHG emissions. Under this alternative, the proposed projects would be constructed and management would continue to follow the planning direction outlined in previous plans. Due to deterioration of facilities over time, construction/repairs would occur in the future. There would be temporary increases in GHG emission associated with future construction/repairs, but is not expected to result in more than a negligible increase in the current amount of greenhouse gas emissions in the park or the region. The NPS is committed to incorporating energy efficiency and reduction in greenhouse gas emissions for park operations. Management actions in the LACP/EA alternatives would comply with NPS sustainable energy design and energy management requirements. Any facility development, whether it is a new building, a renovation, or an adaptive reuse of an existing facility, must include improvements in energy efficiency and reduction in greenhouse gas emissions. All projects that include visitor services facilities must incorporate

Leadership in Energy and Environmental Design (LEED) standards and strive to achieve the highest LEED certification possible.

### **Cumulative Impacts**

Cumulative impacts on climate change are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in the Greater Yellowstone Area. The change in climate conditions caused by GHG resulting from the burning of fossil fuels from both stationary and mobile sources is a global effect, and requires that the emissions be assessed on a global scale. Therefore, the disclosure of localized increments has limited or no weight in addressing climate change. Consequently, overall global GHG emissions are likely to remain near the current level on a regional or global scale under the proposed action, resulting in an insignificant cumulative impact to global climate change.

### **Conclusion**

Alternative A, when combined with past, present, and reasonably foreseeable future actions would result in negligible impacts to climate change. Based on current knowledge, the potential impacts to resources in the Lake Area from climate change are unclear and difficult to quantify.

#### **4.1.7.2 Impacts of Alternative B to Climate Change**

### **Impact Analysis**

The actions proposed in alternative B is not expected to result in more than a negligible increase in GHG emissions. There would be some increase in GHG emission associated with construction, but is not expected to result in more than a negligible increase in the current amount of greenhouse gas emissions in the park or the region. The NPS is committed to incorporating energy efficiency and reduction in greenhouse gas emissions for park operations. Management actions in the LACP/EA alternatives would comply with NPS sustainable energy design and energy management requirements. Any facility development, whether it is a new building, a renovation, or an adaptive reuse of an existing facility, must include improvements in energy efficiency and reduction in greenhouse gas emissions. All projects that include visitor services facilities must incorporate Leadership in Energy and Environmental Design (LEED) standards and strive to achieve the highest LEED certification possible.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.8.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to climate change.

### **Conclusion**

Alternative B, when combined with past, present, and reasonably foreseeable future actions would result in negligible impacts to climate change. Based on current knowledge, the potential impacts to resources in the Lake Area from climate change are unclear and difficult to quantify.

#### **4.1.7.3 Impacts of Alternative C to Climate Change**

### **Impact Analysis**

The actions proposed in alternative C is not expected to result in more than a negligible increase in GHG emissions. There would be some increase in GHG emission associated with construction, but

is not expected to result in more than a negligible increase in the current amount of greenhouse gas emissions in the park or the region. The NPS is committed to incorporating energy efficiency and reduction in greenhouse gas emissions for park operations. Management actions in the LACP/EA alternatives would comply with NPS sustainable energy design and energy management requirements. Any facility development, whether it is a new building, a renovation, or an adaptive reuse of an existing facility, must include improvements in energy efficiency and reduction in greenhouse gas emissions. All projects that include visitor services facilities must incorporate Leadership in Energy and Environmental Design (LEED) standards and strive to achieve the highest LEED certification possible.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.1.8.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to climate change.

### **Conclusion**

Alternative C, when combined with past, present, and reasonably foreseeable future actions would result in negligible impacts to climate change. Based on current knowledge, the potential impacts to resources in the Lake Area from climate change are unclear and difficult to gauge.

## **4.2 CULTURAL RESOURCES**

In this environmental assessment, impacts on cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council of Environmental Quality (CEQ) that implement NEPA. These impact analyses are intended to comply with the requirements of both NEPA and §106 of the NHPA. In accordance with the Advisory Council on Historic Preservation's regulations implementing §106 of the NHPA (36 CFR Part 800, Protection of Historic Properties), impacts on cultural resources were also identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected, National Register eligible or listed cultural resources; and (4) considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of adverse effect or no adverse effect would be made for affected National Register listed or eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for the National Register, such as diminishing the integrity of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, Assessment of Adverse Effects). A determination of no adverse effect means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the National Register.

The CEQ regulations and the NPS's Conservation Planning, Environmental Impact Analysis and Decision Making (Director's Order #12) also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, such as reducing the intensity of an impact from major to moderate or minor. Any reduction in intensity of

impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by §106 is similarly reduced. Cultural resources are non-renewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. If actions are determined to have an adverse effect under §106 and may be mitigated, the effect remains adverse.

4.2.1 Archeological Resources

Guiding Regulations and Policies

Director's Order (DO) #28A supplements DO #28: "Cultural Resources Management". The authority to issue this Director's Order is found in 16 USC 1 through 4 (the National Park Service Organic Act), in the delegations of authority contained in Part 245 of the Department of the Interior Manual (245 DM 1), and in the responsibilities set forth in Part 519 of the Department of the Interior Manual (519 DM 1 and 519 DM 2).

There are other statutes and implementing regulations that authorize and guide the NPS’s management of archeological resources on NPS lands, and NPS archeological assistance to other public agencies and organizations and individuals.

Methodology and Intensity Thresholds

Only the actual physical material of cultural resources can answer certain important research questions about human history. Archeological resources have the potential to answer, in whole or in part, such questions. An archeological resource is eligible for the National Register of Historic Places, if it meets one or more of the following criteria:

- It is associated with events that have made a significant contribution to the broad patterns of our history;
- It is associated with the lives of persons significant in our past;
- It embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possess high artistic value, or represents a significant and distinguishable entity whose components may lack individual distinction; or
- It has yielded, or may be likely to yield, information important in prehistory or history.

In addition, the archeological resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association (National Register Bulletin, Guidelines for Evaluating and Registering Archeological Properties).

For purposes of analyzing impacts on archeological resources either listed in or eligible to be listed in the National Register, the intensity of impacts are defined as follows:

Impact Intensity	Impact Description
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be <i>no adverse effect</i> .
Minor	The disturbance of a site(s) results in little, if any, loss of integrity. The determination of effect for §106 would be <i>no adverse effect</i> .

Moderate	The disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be <i>adverse effect</i> . A memorandum of agreement is executed among the National Park Service and applicable state 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.
Major	The disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be <i>adverse effect</i> . Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

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### 4.2.1.1 Impacts of Alternative A to Archeological Resources

#### Impact Analysis

Under Alternative A, No Action, the NPS would continue current management practices. The Park would continue to rely on the 1974 Master Plan, 1988 Fishing Bridge Development Concept Plan EIS, and 1993 Lake Area and Bridge Bay Development Concept Plan EA for planning guidance in the Lake Area. Portions of these plans have already been implemented. This alternative analyzes the remaining projects from past plans that have not yet been completed, in order to adequately represent future development that has been approved in previous compliance documents. The project area has been surveyed and known sites recorded. Projects that have the potential to impact surface and subsurface archeological resources include those that involved ground disturbance and excavation, including building removal and relocation, building expansion, pathways, utilities, etc. Projects in the following locations have the potential to affect known archeological resources: Fishing Bridge, Lake Hotel, Lakeshore, and Bridge Bay.

Proposed projects and maintenance or repair activities under the No Action alternative have the potential to impact unknown archeological resources. If such resources are discovered, the work would cease until park staff have consulted with the State Historic Preservation Officer and the Advisory Council on Historic Preservation (§36 CFR 800.13, *Post-review Discoveries*). In the unlikely event that human remains are discovered, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed. Alternative A would result in negligible to minor adverse impacts to archeological resources.

#### Cumulative Impacts

Cumulative impacts on archeological resources are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in the Greater Yellowstone Area. There has been a complex inter-layering of human influences in the study area. Humans have used this site for approximately 12,000 years. Any disturbances that may have been caused by early cultures on the archeological resources of the culture that came before is part of the archeological record and not considered an adverse effect; however there is no evidence to date that this has occurred. Visitors and the NPS have consistently inflicted change to the facilities, thus impacting at some level archaeological resources during the last 140 years, causing adverse impacts. Early roads, power lines, buildings, walkways, and buried utilities have been built right through archeological resources. Maintenance and repair of these facilities, especially by heavy equipment, has caused further damage. In addition, as time goes on, surface archaeological resources could be subject to damage from vandalism, visitor access, and natural processes such as erosion and weathering. Data loss and minor degradation of site integrity could occur for archaeological

resources currently located in areas frequented by park visitors, in areas vulnerable to natural erosion processes or affected by past park development.

### **Conclusion**

Under Alternative A, archaeological resources that are vulnerable to deterioration will be monitored by the NPS in accordance with EO 13287. Current management practices would continue, and the NPS would continue to protect the integrity of archaeological resources. At such time over the next twenty years that these projects are under implementation, the park would enter into consultation to strive to reach a determination of no adverse effect in order to protect these resources, many of which are already disturbed. Alternative A could result in minor, short- and long-term adverse impacts to archaeological resources.

#### **4.2.1.2 Impacts of Alternative B to Archeological Resources**

### **Impact Analysis**

Under Alternative B the potential exists for construction and/or maintenance activities to impact archeological resources. The project area has been surveyed and known sites recorded. Projects that have the potential to impact surface and subsurface archeological resources include those that involved ground disturbance and excavation, including building removal and relocation, building expansion, pathways, utilities, etc. Projects in the following locations have the potential to affect known archeological resources: Fishing Bridge, Lake Hotel, Lakeshore, and Bridge Bay. At such time over the next twenty years that these projects are under implementation, the park would enter into consultation to strive to reach a determination of no adverse effect in order to protect these resources, many of which are already disturbed.

Construction activities would not be permitted in locations where archeological resources are known to be present without mitigation measures in place. If such resources are discovered during construction, the work would cease until park staff have consulted with the state historic preservation officer and the Advisory Council on Historic Preservation (§36 CFR 800.13, *Post-review Discoveries*). In the event that human remains are discovered, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed, including advance planning. The waterline project in the Fishing Bridge area has potential to impact archaeological resources; however, subsurface inventories have reduced the potential impacts. Consultation with the WYSHPO is ongoing for this project. Alternative B would result in negligible to minor adverse impacts to archeological resources.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.2.1.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to archeological resources.

### **Conclusion**

Under Alternative B, implementation of pre-construction mitigation measures would reduce the potential to affect archeological resources. At such time over the next twenty years that these projects are under implementation, the park would enter into consultation to strive to reach a determination of no adverse effect in order to protect these resources, many of which are already disturbed. Archaeological resources that are vulnerable to deterioration will be monitored by the NPS in accordance with EO 13287. Current management practices would continue and the NPS

would continue to protect the integrity of archaeological resources. Alternative B could result in minor, short- and long-term adverse impacts to archaeological resources.

#### **4.2.1.3 Impacts of Alternative C to Archeological Resources**

##### **Impact Analysis**

Under Alternative C the potential exists for construction and/or maintenance activities to impact archeological resources. The project area has been surveyed and known sites recorded. Projects that have the potential to impact surface and subsurface archeological resources include those that involved ground disturbance and excavation, including building removal and relocation, building expansion, pathways, utilities, etc. Projects in the following locations have the potential to affect known archeological resources: Fishing Bridge, Lake Hotel, Lakeshore, and Bridge Bay. At such time over the next twenty years that these projects are under implementation, the park would enter into consultation to strive to reach a determination of no adverse effect in order to protect these resources, many of which are already disturbed.

Construction activities would not be permitted in locations where archeological resources are known to be present without mitigation measures in place. If such resources are discovered during construction, the work would cease until park staff have consulted with the State Historic Preservation Officer and the Advisory Council on Historic Preservation (§36 CFR 800.13, *Post-review Discoveries*). In the event that human remains are discovered, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed, including advance planning. The waterline project in the Fishing Bridge area has potential to impact archaeological resources; however, subsurface inventories have reduced the potential impacts. Consultation with the WYSHPO is ongoing for this project. Alternative C would result in negligible to minor adverse impacts to archeological resources.

##### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.2.1.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to archeological resources.

##### **Conclusion**

Under Alternative C, implementation of pre-construction mitigation measures would reduce the potential to affect archeological resources. . At such time over the next twenty years that these projects are under implementation, the park would enter into consultation to strive to reach a determination of no adverse effect in order to protect these resources, many of which are already disturbed. Archaeological resources that are vulnerable to deterioration will be monitored by the NPS in accordance with EO 13287. Current management practices would continue and the NPS would continue to protect the integrity of archaeological resources. Alternative C could result in minor, short- and long-term adverse impacts to archaeological resources.

#### **4.2.2 Ethnographic Resources**

##### **Guiding Regulations and Policies**

The National Park Service defines ethnographic resources as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence or other significance in the cultural system of a group traditionally associated with it.” Consultation and

preservation of ethnographic resources is mandated by NPS Management Policies, E.O. 13007 on American Indian Sacred Sites, National Historic Preservation Act, Programmatic Memorandum of Agreement Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995), E.O. 11593, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007 on American Indian Sacred Sites, and the Presidential Memorandum of April 29, 1994 on Government-to-Government Relations with Tribal Governments.

**Methodology and Intensity Thresholds**

Certain important questions about human culture and history can only be answered by gathering information about the cultural content and context of cultural resources. Questions about contemporary peoples or groups, their identity, and heritage have the potential to be addressed through ethnographic resources. As defined by the National Park Service, an ethnographic resource is a 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. For purposes of analyzing potential impacts to ethnographic resources, the intensity of impacts is defined below.

Impact Intensity	Impact Description
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be <i>no adverse effect</i> .
Minor	The disturbance of resources results in little, if any, loss of integrity. The determination of effect for §106 would be <i>no adverse effect</i> .
Moderate	The disturbance of resources results in loss of integrity. The determination of effect for §106 would be <i>adverse effect</i> . A memorandum of agreement is executed among the National Park Service and applicable state 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.
Major	The disturbance of resources results in loss of integrity. The determination of effect for §106 would be <i>adverse effect</i> . Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

**4.2.2.1 Impacts of Alternative A to Ethnographic Resources**

**Impact Analysis**

Under Alternative A, No Action, the NPS would continue current management practices. The Park would continue to rely on the 1974 Master Plan, 1988 Fishing Bridge Development Concept Plan EIS, and 1993 Lake Area and Bridge Bay Development Concept Plan EA for planning guidance in the Lake Area. Portions of these plans have already been implemented. This alternative analyzes the remaining projects from past plans that have not yet been completed, in order to adequately represent future development that has been approved in previous compliance documents. The No Action alternative will result in negligible to minor, long-term adverse impacts to ethnographic resources. Native American Tribes have long been associated with YNP and the Greater Yellowstone Area. Native American often passed through the park for hunting and foraging, migration, or for religious or other cultural endeavors. Yellowstone Lake has been documented as important in oral histories from Native Americans. The Tribes have indicated that ethnographic resources occur throughout the Greater Yellowstone Area, including the study area. Ethnographic

resource information may be sensitive. For more information on these resources, contact Yellowstone's Branch of Cultural Resources. It is unlikely that significant ethnographic resources will be impacted by Alternative A. Resource access that meets law and policy for Yellowstone National Park would not be curtailed under the No Action alternative. Yellowstone National Park generally supports traditional access, through laws and regulations.

### **Cumulative Impacts**

Cumulative impacts on ethnographic resources are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in the Greater Yellowstone Area. Native American Indian, including contemporary, access to the park has changed over time. Access has changed broadly from intensive use and management of areas in and surrounding the park by Native Americans to a period of time where Native Americans were discouraged from using and sometimes even visiting the park, to a period of more openness toward restoring historic relationships with the park. For instance, the park supports access and now has a fee waiver for Native Americans historically associated with the park. Alternative A would continue to contribute negligible to minor adverse effects from ongoing visitor use that interfered with Native American access to ethnographic resources.

### **Conclusion**

Alternative A, when combined with past, present, and reasonably foreseeable future actions would result in negligible to minor, long-term adverse impacts to ethnographic resources.

## **4.2.2.2 Impacts of Alternative B to Ethnographic Resources**

### **Impact Analysis**

For the same reasons as noted above under Alternative A, there would be negligible to minor impacts to known ethnographic resources as a result of the implementation of Alternative B. Yellowstone Lake has been identified in the ethnographic inventories as significant to native people. The Preferred Alternative will not affect the Lake Area as an ethnographic resource.

### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.2.2.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to ethnographic resources.

### **Conclusion**

Alternative B, when combined with past, present, and reasonably foreseeable future actions would result in negligible to minor, short- and long-term adverse impacts to ethnographic resources.

## **4.2.2.3 Impacts of Alternative C to Ethnographic Resources**

### **Impact Analysis**

For the same reasons as noted above under Alternative B, there would be negligible to minor impacts to known ethnographic resources as a result of the implementation of Alternative C. Yellowstone Lake has been identified in the ethnographic inventories as significant to native people. The Preferred Alternative will not affect the Lake Area as an ethnographic resource.

### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.2.2.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to ethnographic resources.

### Conclusion

Alternative C, when combined with past, present, and reasonably foreseeable future actions would result in negligible to minor, short- and long-term adverse impacts to ethnographic resources.

### 4.2.3 Historic Structures

#### Guiding Regulations and Policies

In accordance with the Advisory Council on Historic Preservation's regulations implementing §106 of the NHPA (36 CFR Part 800, Protection of Historic Properties), impacts to historic properties including cultural landscapes for this project were identified and evaluated by (1) determining the area of potential effect (APE); (2) identifying cultural resources present in the area of potential effect that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

#### Methodology and Intensity Thresholds

A historic site, structure, or building is eligible for the National Register of Historic Places if it meets one or more of the following criteria A through D:

- a) It is associated with events that have made a significant contribution to the broad patterns of our history;
- b) It is associated with the lives of persons significant in our past;
- c) It embodies the distinctive characteristics of a type, period, or method of construction; or represents the work of a master; or possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction;
- d) It has yielded, or may be likely to yield, information important in prehistory or history.

A historic building or structure must also possess integrity of location, design, setting, materials, workmanship, feeling, and association.

Section 106 (§106) consultation (as described in the NHPA of 1966, as amended) with the Wyoming SHPO will occur for a proposed project. The Advisory Council on Historic Preservation is invited to participate if a proposed project is considered a major undertaking.

Federal law and NPS management policies require full consideration of historical and architectural values whenever a project may affect historic properties. Additionally, the NPS "must to the maximum extent possible, undertake such planning and action as may be necessary to minimize harm to any National Historic Landmark that may be directly and adversely affected by an undertaking" (36 CFR 800.10).

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must be made for affected historic properties and cultural landscape that are eligible for or listed on the National Register of Historic Places. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that would qualify it for

inclusion in the National Register (e.g., diminishing the integrity of the resource’s location, design, setting, materials, workmanship, feeling, or association). *Adverse effects* also include reasonably foreseeable effects caused by the Preferred Alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CFR Part 800.5, Assessment of Adverse Effects). A determination of *no adverse effect* means there would be an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places. The CEQ regulations and the National Park Service’s Conservation Planning, Environmental Impact Analysis and Decision-Making (Director’s Order 12, NPS 1992) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g., reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by §106 is similarly reduced. Although adverse effects under §106 may be mitigated, the effect remains adverse.

The area of potential effect (APE) is the entire planning boundary (Figure 1-2) which stretches along the lakeshore from Bridge Bay marina to the Fishing Bridge location. The historic zones, encompass those portions of the historic district that would change according to the comprehensive plan.

Analyses of the potential intensity of impacts on historic resources were derived from a review of the List of Classified Structures, researching park records to determine the potential eligibility of historic resources, on-site investigations to determine proximity to historic resources, and through personal communications with park staff. The intensity of impacts to historic structures is defined as follows:

Impact Intensity	Impact Description
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be <i>no adverse effect</i> .
Minor	Impact results in little, if any, loss of integrity. The determination of effect for §106 would be <i>no adverse effect</i> .
Moderate	Impact results in a loss of integrity. For purposes of §106, the determination of effect would be <i>adverse effect</i> . A memorandum of agreement (MOA) would be 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.
Major	Impact results in loss of integrity. The determination of effect for §106 would be <i>adverse effect</i> . 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). In addition to the above, a major effect on historic structures would be achieved with removal of 50% of a historic district or an adverse effect determination on a National Historic Landmark.

4.2.3.1 Impacts of Alternative A to Historic Structures

Impact Analysis

Under Alternative A, No Action, the NPS would continue current management practices. The Park would continue to rely on the 1974 Master Plan, 1988 Fishing Bridge Development Concept Plan EIS, and 1993 Lake Area and Bridge Bay Development Concept Plan EA for planning guidance in the Lake Area. Portions of these plans have already been implemented. This alternative analyzes the remaining projects from past plans that have not yet been completed, in order to adequately represent future development that has been approved in previous compliance documents. Under the No Action alternative, the following projects would effect historic properties:

**Fishing Bridge Location:** Of the remaining historic structures that convey historic associations, the following structures would be removed:

- Remove Fishing Bridge Auto Repair Shop (HS-5104)
- Remove Fishing Bridge Service Station (HS-5501)
- Remove remaining five Fishing Bridge Tourist cabins (HS-7143, HS-7144, HS-7140, HS-7139, HS-7141)
- Remove Fishing Bridge Ranger Station (currently used as warming hut) –HS-0301

**Lake Hotel Location**

- Consolidate 96 Lake Hotel guest cottages into motel-style buildings (HS-7058 through HS-7137)
- Rehabilitate and adaptively reuse building next to Hotel boiler room (HS-4313)
- Redesign circulation in hotel cottage area and rehabilitate areas where cabins were removed

**Lake Lodge Location**

- Consolidate 22 Lake Lodge cabins into motel-type buildings (HS -7021 through HS-7057)
- Remove Seagull Dorm (HS-7006)
- Remove employee pub (HS-4053)

**Lakeshore Location**

- Rehabilitate and adaptively use Lake Service Station (HS-4021)
- Construct new entrance road to front of Lake Hotel (HS-4300), including new intersection for hospital, service station, and post office; direct hotel guests to front of hotel for registry
- Relocate lakeshore roadway away from shoreline at ranger station (HS-0191)
- Create separate pedestrian trail along Grand Loop Road (48YE0520) near the general store
- Create living history exhibit at Hatchery (HS-0726) to interpret park's role in fisheries management
- Remove newer boathouse (HS-0734)
- Construct parking for additional 5 cars at ranger station(HS-0191)

**Bridge Bay Location (potentially eligible)**

- Expand boat repair shop
- Expand marina and camper concession service store to provide additional sales space

Due to the large number of historic structures to be removed in this alternative, there would be a long term and direct major impact, which would correspond to an “adverse effect” for §106 purposes. Additionally, the removal of the Lake Hotel cottages would alter the context of this property, and therefore constitute an adverse visual effect to the potential National Historic

Landmark. In order for the impact intensity to be reduced to a moderate impact, a memorandum of agreement (MOA) would be executed among the National Park Service and the Wyoming State Historic Preservation Officer and 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 may reduce the intensity of impact under NEPA from major to moderate. Mitigation measures resulting from consultation could include such items as conservation measures to stabilize the site, structure, or building; Historic American Building Survey (HABS) level photography and/or as-built construction drawings; large-scale, in-kind replacement of historic fabric or use of simulated materials to replicate historic fabric; reuse of portions of the historic structure or building; and/or design of the new structure or building to preserve elements of form and function of the historic structure or building.

### Cumulative Impacts

Cumulative impacts on historic resources are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Ongoing projects throughout the park that alter the character of historic districts include:

- Past projects: Within the APE, many historic properties have been removed due to the importance of this area as grizzly bear habitat, including the Fishing Bridge campground and nearly all of the Fishing Bridge tourist cabins. Elsewhere in Yellowstone National Park, more recent past projects include the loss of U-Plan Dormitory (HS-2314) within the Old Faithful Historic District.
- New construction: Visitor Education Center and relocation of the Photo Shop (HS-2780) at the Old Faithful Historic District; Law and Justice Center within the Mammoth Hot Springs Historic District; Visitor Education Center at the Canyon Village Historic District. These projects were considered a *no adverse effect*, or minor impact.
- Future construction: additional entrance station kiosks at the North Entrance Road Historic District. These projects would be considered a *no adverse effect*, or minor impact.

Alternative A, in conjunction with these past, present, and reasonably foreseeable projects would result in long-term, direct, and moderate adverse impacts to historic structures.

### Conclusion

Alternative A would diminish the overall integrity of historic resources and result in substantial, long-term adverse impacts to historic structures.

### 4.2.3.2 Impacts of Alternative B to Historic Structures

#### Impact Analysis

Under Alternative B, a comprehensive plan would guide future development through the establishment planning zones and prescriptions, which limit the location, type, and amount of growth within each location. The plan would also assign design standards for each location, which guide future projects to be compatible with adjacent historic features and patterns and follow the Secretary of the Interior Standards for the Treatment of Historic Properties.

Alternative B withdraws some of the actions proposed under previously approved plans (No Action Alternative A); thus avoiding adverse effect for many historic resources. Under Alternative B, the following projects would affect historic properties, or change the direction of previous plans that effected historic properties:

#### Fishing Bridge Location

- Retain and expand Fishing Bridge Auto Repair Station (HS-5104)
- Retain and rehabilitate Fishing Bridge Service Station (HS-5501)
- Retain and rehabilitate Fishing Bridge Boy's Dorm for seismic stabilization (HS-5101)
- Retain remaining cabins (HS-7143, HS-7144, HS-7140, HS-7139, HS-7141)
- Widen East Entrance Road Historic District (48YE0829) between RV Park and Bridge to allow for turning lane into RV Park
- Retain and rehabilitate Fishing Bridge warming hut (ranger station HS-030)
- Replace water lines throughout Fishing Bridge location (including through site of museum NHL HS-0302)
- Improve pedestrian connection between General Store and Museum across East Entrance Road Historic District (48YE0829)

#### Lake Hotel Location

- Retain hotel cottages in current configuration (HS-7058 through HS-7137)
- Construct breezeway between Lake Hotel (HS-4300) and boiler room
- Provide seismic stabilization for Lake Hotel (HS-4300)
- Construct maintenance building for concessions use behind Lake Hotel (HS-4300)
- Retain winterkeeper's residence (HS-4313)
- Develop entry structure adjacent to rear of Lake Hotel (HS-4300) to define entrance

#### Lake Lodge Location

- Move Lodge cabins (6 western and 15 pioneer cabins) away from Lodge Creek to alternative location (those that are approximately 100 yards from Lodge Creek)
- Remove Seagull Dorm (HS-7006)
- Retain and rehabilitate Pub facility (HS-4053)
- Maintain fencing between cabin area and Lodge Creek
- Retain Lodge Cabin road in current location
- Formalize pedestrian walkway for employees between concessions administrative area to Lake Lodge area
- Provide night lighting for pedestrian pathways within developed area that meets Night Lighting Standards

#### Lakeshore Location

- Rehabilitate and adaptively use Lake service station (HS-4021)
- Convert current Grand Loop Road Historic District (48YE0520) to pedestrian-only traffic between Lake Hotel (HS-4300) and Lake General Store (HS-4020), no parking in front of hotel, create pedestrian/bike pathway along lakeshore, historic bus access to porte cochere
- Enlarge pedestrian viewing platform in front of Hotel (HS-4300)
- Rehabilitate Lake Ranger Station (HS-0191) offices for year-round occupancy with public space
- Construct new road behind ranger station (HS-0191) to allow one-way circulation in day-use area
- Construct/improve parking between ranger station (HS-0191) and general store (HS-4020)

- Adaptive use of hatchery (HS-0726) for visitor use
- Construct lift station to enhance adaptive use of hatchery (HS-0726)
- Enhance picnic area near hatchery (with seasonal closures)
- Retain both boathouses (HS-0734 and HS-4314)

Bridge Bay Location (potentially eligible)

- Construct shower/laundry facility near marina
- Relocate fuel pump and fuel storage at marina

The current location of the Lake Lodge cabins is not historic, and their proposed relocation and consolidation to the west keeps them within the district and also within the context of the Lake Lodge; however, this project would still constitute an *adverse effect* under §106. The repurposing of Fish Hatchery and Lake Service Station may constitute an *adverse effect*, although appropriate uses and rehabilitation designs with on-going consultation with SHPO may follow the Secretary of the Interior Standards to avoid an adverse effect, reducing the impact to a *no adverse effect*, or moderate impact. Similarly, new structures and alterations to existing historic properties, if designed correctly and in on-going communication with the WYSHPO and ACHP, could result in a no adverse effect. Changes to the Grand Loop Road in front of the potentially NHL eligible Lake Hotel would also require careful coordination with SHPO and ACHP. Due to the removal of the Seagull Dorm (HS-7006), Alternative B would have adverse effects to historic properties. In order for the impact intensity of this building removals to be reduced to a moderate impact, a memorandum of agreement (MOA) would be executed among the National Park Service and applicable state or tribal historic preservation officer and 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 may reduce the intensity of impact under NEPA from major to moderate. Mitigation measures resulting from consultation could include such items as conservation measures to stabilize the site, structure, or building; Historic American Building Survey (HABS) level photography and/or as-built construction drawings; large-scale, in-kind replacement of historic fabric or use of simulated materials to replicate historic fabric; reuse of portions of the historic structure or building; and/or design of the new structure or building to preserve elements of form and function of the historic structure or building. Alternative B also contains design standards associated with the plan which provide mitigating measures in all locations of the plan.

### Cumulative Impacts

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.2.3.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects, would result in moderate, long-term adverse impacts to historic structures.

### Conclusion

Under Alternative B adverse effects to historic structures would occur. Consultation with the Wyoming SHPO has been initiated and a programmatic agreement or a memorandum of agreement will be completed. With a programmatic agreement or memorandum of agreement in place, this action would result in moderate, short- and long-term adverse impacts to historic structures.

### 4.2.3.3 Impacts of Alternative C to Historic Structures

#### Impact Analysis

Like Alternative B, under Alternative C, a comprehensive plan would guide future development through the establishment planning zones and prescriptions, which limit the location, type, and amount of growth within each location. The plan would also assign design standards for each location, which guide future projects to be compatible with adjacent historic features and patterns and follow the Secretary of the Interior Standards for the Treatment of Historic Properties.

Similar to Alternative B, Alternative C withdraws some of the actions proposed under previously approved plans (No Action Alternative A); thus avoiding adverse effect for many historic resources. Under Alternative C, the following projects would affect historic properties, or change the direction of previous plans that effected historic properties:

#### Fishing Bridge Location

- Retain and expand Fishing Bridge Auto Repair Station (HS-5104)
- Retain and rehabilitate Fishing Bridge Service Station (HS-5501)
- Retain and rehabilitate Fishing Bridge Boy's Dorm for seismic stabilization (HS-5101)
- Retain remaining cabins (HS-7143, HS-7144, HS-7140, HS-7139, HS-7141)
- Retain and rehabilitate Fishing Bridge warming hut (ranger station HS-030)
- Replace water lines throughout Fishing Bridge location (including through site of museum NHL HS-0302)
- Add a third lane to Grand Loop Road through Fishing Bridge location
- Improve pedestrian connection between General Store and Museum across East Entrance Road Historic District (48YE0829)

#### Lake Hotel Location

- Retain hotel cabins in current configuration (HS-7058 through HS-7137)
- Develop entry structure adjacent to rear of Lake Hotel (HS-4300) to define entrance
- Remove winterkeeper's residence (HS-4313) and replace in concession's admin area

#### Lake Lodge Location

- Maintain Lake Lodge cabins in current location
- Retain and adaptively reuse Seagull Dorm (HS-7006)
- Retain and rehabilitate Pub facility (HS-4053) for adaptive reuse
- Maintain seasonal closure and fencing between cabin area and Lodge Creek
- Retain Lodge Cabin road in current location
- Formalize pedestrian walkway for employees between Concessions Administrative Area to Lake Lodge area
- Provide night lighting for pedestrian pathways within developed area that meets Night Lighting Standards
- Remove personnel office building (HS-7005) behind Lake Lodge

#### Lakeshore Location

- Rehabilitate and adaptively use Lake service station (HS-4021)
- Convert current Grand Loop Road Historic District (48YE0520) to one-way vehicular traffic between Lake Hotel (HS-4300) and Lake General Store (HS-4020), no parking in front of hotel, create pedestrian/bike pathway along lakeshore
- Enlarge pedestrian viewing platform (partially covered) in front of Hotel (HS-4300)

- Rehabilitate Lake Ranger Station (HS-0191) offices public and administrative use during summer months
- Enhance picnic area near Hatchery structure (with seasonal closures to protect grizzly bears)
- Construct floating pier near hatchery to allow additional use and views of Lake
- Retain and rehabilitate both boathouses for visitor use (HS-0734 and HS-4314)

Bridge Bay Location (potentially eligible)

- Construct shower/laundry facility near marina
- Relocate fuel pump and fuel storage at marina

The repurposing of Lake Service Station, both boathouses, and Lake Lodge Pub may constitute an adverse effect, although this impact may be reduced to a no adverse effect if appropriate uses and rehabilitation designs follow the Secretary of the Interior Standards using on-going consultation with SHPO. Similarly, new structures and alterations to existing historic properties, if designed correctly and in on-going communication with the WYSHPO and ACHP, could result in a no adverse effect. Changes to the Grand Loop Road in front of the potentially NHL eligible Lake Hotel would require careful coordination with WYSHPO and ACHP. Due to the removal of the Lake Hotel winterkeeper's residence (HS-4313) and the Lake Lodge personnel office building (HS-7005), Alternative C would have adverse effects to historic properties. In order for the impact intensity of these building removals to be reduced to a moderate impact, a memorandum of agreement (MOA) or programmatic agreement (PA) would be executed among the National Park Service and the Wyoming State Historic Preservation Officer and 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 may reduce the intensity of impact under NEPA from major to moderate. Mitigation measures resulting from consultation could include such items as conservation measures to stabilize the site, structure, or building; Historic American Building Survey (HABS) level photography and/or as-built construction drawings; large-scale, in-kind replacement of historic fabric or use of simulated materials to replicate historic fabric; reuse of portions of the historic structure or building; and/or design of the new structure or building to preserve elements of form and function of the historic structure or building.

### **Cumulative Impacts**

The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.2.3.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in moderate, long-term adverse impacts to historic resources.

### **Conclusion**

Under Alternative C adverse effects to historic structures would occur. Consultation with the Wyoming SHPO has been initiated and a programmatic agreement or a memorandum of agreement will be completed. With a programmatic agreement or memorandum of agreement in place, this action would result in moderate, short- and long-term adverse impacts to historic structures.

### **4.2.4 Cultural Landscapes**

#### **Guiding Regulations and Policies**

In accordance with the Advisory Council on Historic Preservation's regulations implementing §106 of the NHPA (36 CFR Part 800, Protection of Historic Properties), impacts to historic properties

including cultural landscapes for this project were identified and evaluated by (1) determining the area of potential effect (APE); (2) identifying cultural resources present in the area of potential effect that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

### Methodology and Intensity Thresholds

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must be made for affected historic properties and cultural landscape that are eligible for or listed on the National Register of Historic Places. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that would qualify it for inclusion in the National Register (e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). *Adverse effects* also include reasonably foreseeable effects caused by the Preferred Alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CFR Part 800.5, Assessment of Adverse Effects). A determination of *no adverse effect* means there would be an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places. The CEQ regulations and the National Park Service's Conservation Planning, Environmental Impact Analysis and Decision-Making (Director's Order 12, NPS 1992) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g., reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by §106 is similarly reduced. Although adverse effects under §106 may be mitigated, the effect remains adverse.

Information on potentially eligible cultural landscapes within the planning boundary in the Lake, Fishing Bridge, and Fish Hatchery historic districts area was obtained through an on-going Cultural Landscape Inventory (CLI). The intensity of impacts to potentially eligible cultural landscapes is defined as follows:

Impact Intensity	Impact Description
Negligible	Impact(s) is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be <i>no adverse effect</i> .
Minor	Impact results in little, if any, loss of integrity. The determination of effect for §106 would be <i>no adverse effect</i> .
Moderate	Impact results in a loss of integrity. For purposes of §106, the determination of effect would be <i>adverse effect</i> . A memorandum of agreement (MOA) would be 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.
Major	Impact results in loss of integrity. The determination of effect for §106 would be <i>adverse effect</i> . Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b). In addition to the above, a major effect on historic structures would be achieved with removal of 50% of a historic district or an adverse effect.

#### 4.2.4.1 Impacts of Alternative A to Cultural Landscapes

##### Impact Analysis

Under Alternative A, No Action, the NPS would continue current management practices. The Park would continue to rely on the 1974 Master Plan, 1988 Fishing Bridge Development Concept Plan EIS, and 1993 Lake Area and Bridge Bay Development Concept Plan EA for planning guidance in the Lake Area. Portions of these plans have already been implemented. This alternative analyzes the remaining projects from past plans that have not yet been completed, in order to adequately represent future development that has been approved in previous compliance documents. Under the No Action alternative, the following projects would effect potentially eligible cultural landscapes:

**Fishing Bridge Location:** Of the surviving historic structures that convey historic associations, the following structures would be removed:

- Remove Fishing Bridge Auto Repair Shop (HS-5104)
- Remove Fishing Bridge Service Station (HS-5501)
- Remove remaining five Fishing Bridge Tourist cabins (HS-7143, HS-7144, HS-7140, HS-7139, HS-7141)
- Remove Fishing Bridge Ranger Station (currently used as warming hut) –HS-0301

##### Lake Hotel Location

- Consolidate 96 Lake Hotel guest cottages into motel-style buildings (HS-7058 through HS-7137)
- Redesign circulation in hotel cottage area and rehabilitate areas where cottages were removed

##### Lake Lodge Location

- Consolidate all Lake Lodge cabins into motel-type buildings (HS -7021 through HS-7057)
- Remove Seagull Dorm (HS-7006)
- Remove employee pub (HS-4053)

##### Lakeshore Location

- Construct new entrance road to front of Lake Hotel (HS-4300), including new intersection for hospital, service station, and post office; direct hotel guests to front of hotel for registry
- Relocate lakeshore roadway away from shoreline at ranger station (HS-0191)
- Create separate pedestrian trail along Grand Loop Road (48YE0520) near the general store
- Remove newer boathouse (HS-0734)
- Construct parking for additional 5 cars at ranger station(HS-0191)

##### Bridge Bay Location (potentially eligible)

- Add new laundry and shower facility to camper services building
- Construct new residence near ranger station

Due to the large number of historic structures to be removed in this alternative, there would be a long term and direct major impact to the cultural landscape, which would correspond to an *adverse*

*effect* for §106 purposes. Additionally, the removal of the Lake Hotel cabins, construction on larger motel units, and redesign of the circulation would alter the setting of this property, and therefore constitute an adverse visual effect to the potential National Historic Landmark. In order for the impact intensity to be reduced to a moderate impact, a memorandum of agreement (MOA) would be executed among the National Park Service and applicable state or tribal historic preservation officer and 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 may reduce the intensity of impact under NEPA from major to moderate.

### **Cumulative Impacts**

Cumulative impacts on potentially eligible cultural landscapes are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Ongoing projects throughout the park that alter the character of historic districts include:

- Past projects: Within the APE, many historic properties have been removed due to the importance of this area as grizzly bear habitat, including the Fishing Bridge campgrounds and nearly all of the Fishing Bridge tourist cabins. Elsewhere in Yellowstone National Park, more recent past projects include the loss of U-Plan Dormitory (HS-2314) within the Old Faithful Historic District.
- New construction: Visitor Education Center and relocation of the Photo Shop (HS-2780) at the Old Faithful Historic District; Law and Justice Center within the Mammoth Hot Springs Historic District; Visitor Education Center at the Canyon Village Historic District and various on-going rehabilitation projects. These projects were considered a *no adverse effect*, or minor impact.
- Future construction: the Norris-to-Golden Gate Road project, additional entrance station kiosks at the North Entrance Road Historic District, and the relocation of Haynes Photo shop (HS-2780) at Old Faithful Historic District. These projects would be considered a *no adverse effect*, or minor impact.

Alternative A, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, long-term adverse impacts to potentially eligible cultural landscapes.

### **Conclusion**

Moderate, short- and long-term adverse impacts to cultural resources would result from the selection of the Alternative A. The determination of effect for §106 would be *adverse effect*.

#### **4.2.4.2 Impacts of Alternative B to Cultural Landscapes**

##### **Impact Analysis**

Under Alternative B, a comprehensive plan would guide future development through the establishment planning zones and prescriptions, which limit the location, type, and amount of growth within each location. The plan would also assign design standards for each location, which guide future projects to be compatible with adjacent historic features and patterns and follow the Secretary of the Interior Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.

Alternative B withdraws some of the actions proposed under previously approved plans (No Action Alternative A); thus avoiding adverse effect for many historic resources. Under Alternative B, the

following projects would affect potentially eligible cultural landscapes, or change the direction of previous plans that affected potentially eligible cultural landscapes:

#### Fishing Bridge Location

- Retain and expand Fishing Bridge Auto Repair Station (HS-5104)
- Retain and rehabilitate Fishing Bridge Service Station (HS-5501)
- Retain and rehabilitate Fishing Bridge Boy's Dorm for seismic stabilization (HS-5101)
- Retain remaining cabins (HS-7143, HS-7144, HS-7140, HS-7139, HS-7141)
- Widen East Entrance Road Historic District (48YE0829) between RV Park and Bridge to allow for turning lane into RV park
- Retain and rehabilitate Fishing Bridge warming hut (ranger station HS-030)
- Replace water lines throughout Fishing Bridge location (including through site of museum NHL HS-0302)
- Improve pedestrian connection between General Store and Museum across East Entrance Road Historic District (48YE0829)

#### Lake Hotel Location

- Retain hotel cottages in current configuration(HS-7058 through HS-7137)
- Construct maintenance building for concessions use behind Lake Hotel(HS-4300)
- Retain winterkeeper's residence (HS-4313)
- Develop entry adjacent to rear of Lake Hotel (HS-4300) to define entrance to structure

#### Lake Lodge Location

- Move Lodge cabins (6 western and 15 pioneer cabins) away from Lodge Creek to alternative location (those that are approximately 100 yards from Lodge Creek)
- Remove Seagull Dorm (HS-7006)
- Retain and rehabilitate Pub facility(HS-4053)
- Maintain fencing between cabin area and Lodge Creek
- Retain Lodge Cabin road in current location
- Formalize pedestrian walkway for employees between Concessions Administrative Area to Lake Lodge area
- Provide night lighting for pedestrian pathways within developed area that meets Night Lighting Standards

#### Lakeshore Location

- Convert current Grand Loop Road Historic District (48YE0520) to pedestrian-only traffic between Lake Hotel (HS-4300) and Lake General Store (HS-4020), no parking in front of hotel, create pedestrian/bike pathway along lakeshore, historic bus access to porte cochere
- Enlarge pedestrian viewing platform in front of hotel (HS-4300)
- Construct new road behind ranger station (HS-0191) to allow one-way circulation in day-use area
- Construct/improve parking between ranger station(HS-0191) and general store (HS-4020)
- Enhance picnic area near hatchery (with seasonal closures)
- Retain both boathouses (HS-0734 and HS-4314)

Bridge Bay Location (potentially eligible)

- Construct shower/laundry facility near marina
- Relocate fuel pump and fuel storage at marina

Alignment of the proposed waterline replacement has the potential to adversely affect walkways, stone walls, terraces, and other potentially eligible cultural landscape features and patterns. However, damage to historic fabric as a result of trenching for underground utilities may be mitigated through adjustments in trench alignments and excavating underneath features in a manner that would not damage them. The relocation and or removal of historic structures would adversely affect the cultural landscape. The current location of the Lake Lodge cabins is not historic, and their relocation and consolidation to the west keeps them within the district and also within the context of the Lake Lodge; however, this project would still constitute an *adverse effect* under §106. Clustering them in closer proximity to the Lake Lodge and using on-going consultation with SHPO may reduce this impact intensity to a *no adverse effect*, or moderate impact. New structures and alterations to existing historic properties, if designed correctly and in on-going communication with the WYSHPO and ACHP, could result in a no adverse effect. Since the presence of the Grand Loop Road has provided the framework for subsequent development of the village, it is an essential physical feature within the cultural landscape. Changes to it in front of the potentially NHL eligible Lake Hotel would require careful coordination with SHPO and ACHP. Due to the removal of Seagull Dorm (HS-7006), Alternative B would have adverse effects to historic properties. In order for the impact intensity of this building removal to be reduced to a moderate impact, a memorandum of agreement (MOA) would be executed among the National Park Service and applicable state or tribal historic preservation officer and 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 may reduce the intensity of impact under NEPA from major to moderate.

### Cumulative Impacts

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.2.4.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in moderate, short- and long-term adverse impacts to potentially eligible cultural landscapes.

### Conclusion

Under Alternative B adverse effects to potentially eligible cultural landscapes would occur. Consultation with the Wyoming SHPO has been initiated and a programmatic agreement or a memorandum of agreement will be completed. With a programmatic agreement or memorandum of agreement in place, this action would result in moderate, short- and long-term adverse impacts to potentially eligible cultural landscapes.

### 4.2.4.3 Impacts of Alternative C to Cultural Landscapes

#### Impact Analysis

Like Alternative B, under Alternative C, a comprehensive plan would guide future development through the establishment planning zones and prescriptions, which limit the location, type, and amount of growth within each location. The plan would also assign design standards for each location, which guide future projects to be compatible with adjacent historic features and patterns and follow the Secretary of the Interior Standards for the Treatment of Historic Properties.

Similar to Alternative B, Alternative C withdraws some of the actions proposed under previously approved plans (No Action Alternative A); thus avoiding adverse effect for many historic resources. Under Alternative C, the following projects would affect historic properties, or change the direction of previous plans that effected historic properties:

#### Fishing Bridge Location

- Retain and expand Fishing Bridge Auto Repair Station (HS-5104)
- Retain and rehabilitate Fishing Bridge Service Station (HS-5501)
- Retain and rehabilitate Fishing Bridge Boy's Dorm for seismic stabilization (HS-5101)
- Retain remaining cabins (HS-7143, HS-7144, HS-7140, HS-7139, HS-7141)
- Retain and rehabilitate Fishing Bridge warming hut (ranger station HS-030)
- Replace water lines throughout Fishing Bridge location (including through site of museum NHL HS-0302)
- Improve pedestrian connection between General Store and Museum across East Entrance Road Historic District (48YE0829)
- Widen East Entrance Road to include a turning lane.

#### Lake Hotel Location

- Retain hotel cottages in current configuration (HS-7058 through HS-7137)
- Develop entry adjacent to rear of Lake Hotel (HS-4300) to define entrance to structure
- Remove winterkeeper's cabin (HS-4313) and replace in concession's administrative area

#### Lake Lodge Location

- Maintain Lake Lodge cabins in current location
- Retain and adaptively reuse Seagull Dorm (HS-7006)
- Retain and rehabilitate Pub facility (HS-4053) for adaptive reuse
- Maintain seasonal closure and fencing between cabin area and Lodge Creek
- Retain Lodge Cabin road in current location
- Formalize pedestrian walkway for employees between concessions administrative area to Lake Lodge area
- Provide night lighting for pedestrian pathways within developed area that meets Night Lighting Standards
- Remove personnel office building (HS-7005) behind Lake Lodge

#### Lakeshore Location

- Construct multiplex housing to replace transit homes in fisheries area
- Rehabilitate and adaptively use Lake Service Station (HS-4021)
- Convert current Grand Loop Road Historic District (48YE0520) to one-way vehicular traffic between Lake Hotel (HS-4300) and Lake General Store (HS-4020), no parking in front of hotel, create pedestrian/bike pathway along lakeshore
- Enlarge pedestrian viewing platform (partially covered) in front of Hotel (HS-4300)
- Rehabilitate Lake Ranger Station (HS-0191) offices public and administrative use during summer months
- Enhance picnic area near hatchery (with seasonal closures to protect grizzly bears)
- Construct floating pier near hatchery to allow additional use and views of Lake

- Retain and rehabilitate both boathouses for visitor use (HS-0734 and HS-4314)

Bridge Bay Location (potentially eligible)

- Construct shower/laundry facility near marina
- Relocate fuel pump and fuel storage at marina

Alignment of the proposed waterline replacement has the potential to adversely affect walkways, stone walls, terraces, and other potentially eligible cultural landscape features and patterns. However, damage to historic fabric as a result of trenching for underground utilities may be mitigated through adjustments in trench alignments and excavating underneath features in a manner that would not damage them. The relocation and or removal of historic structures would adversely affect the cultural landscape. New structures and alterations to existing historic properties, if designed correctly and in on-going communication with the WYSHPO and ACHP, could result in a no adverse effect. Since the presence of the Grand Loop Road has provided the framework for subsequent development of the village, it is an essential physical feature within the cultural landscape. Changes to it in front of the potentially NHL eligible Lake Hotel would require careful coordination with SHPO and ACHP. The views between the hotel and the lake would be impeded by the proposed partial covering of the viewing platform and would constitute an adverse effect; however, this may be mitigated through appropriate designs using on-going consultation with SHPO. Due to the removal of the winterkeeper's cabin (HS-4313) and the Lake Lodge personnel office building (HS-7005), Alternative C would have adverse effects to historic properties. In order for the impact intensity of these building removals to be reduced to a moderate impact, a memorandum of agreement (MOA) would be executed among the National Park Service and applicable state or tribal historic preservation officer and 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 may reduce the intensity of impact under NEPA from major to moderate.

### Cumulative Impacts

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.2.4.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in moderate, short- and long-term adverse impacts to potentially eligible cultural landscapes.

### Conclusion

Under Alternative C adverse effects to potentially eligible cultural landscapes would occur. Consultation with the Wyoming SHPO has been initiated and a programmatic agreement or a memorandum of agreement will be completed. With a programmatic agreement or memorandum of agreement in place, this action would result in moderate, short- and long-term adverse impacts to potentially eligible cultural landscapes.

## 4.3 SOCIAL, ECONOMIC, AND VISITOR RESOURCES

### 4.3.1 Visitor Use and Experience

#### Guiding Regulations and Policies

Section 1.4.3 of the *NPS Management Policies 2006* state that enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks.

Section 7 of the 2006 Management Policies states “National parks are among the most remarkable places in America for recreation, learning, and inspiration,” Section 8.2 of 2006 Management Policies states, “Management controls and conditions must be established for all park uses to ensure that park resources and values are preserved and protected for the future”. DO 42 states that “the NPS will seek to provide the highest level of accessibility that is reasonable, and not simply provide the minimum level that is required by law”.

### Methodology and Intensity Thresholds

Analyses of the potential intensity of impacts on visitor use and experience were derived from available information on visitor use of Yellowstone Park and the Lake Area, including statistics kept by the Visitor Services Office in Yellowstone. The intensity of impacts on visitor use and experience are defined as follows:

Impact Intensity	Impact Description
Negligible	Management actions would result in impacts that would be barely detectable, or would occasionally affect the experience of few visitors in the applicable setting.
Minor	Management actions would result in impacts that would be slight but detectable; could be perceived as negative by visitors or would inhibit visitor experience. Impacts would negatively affect the experience of some visitors in the applicable setting.
Moderate	Management actions would result in impacts that would be readily apparent and perceived as somewhat negative. Impacts would negatively affect the experience of many visitors in the applicable setting.
Major	Management actions would result in impacts that would be highly negative, affecting the experience of a majority of visitors in the applicable setting.

#### 4.3.3.1 Impacts of Alternative A to Visitor Use and Experience

##### Impact Analysis

The visitor experience would be affected by noise, dust, and fumes from construction equipment in the project area during construction. Visitors would be restricted from parts of the project areas for safety reasons during the period of construction. Construction activities would result in a minor, short-term, adverse effect on the visitor experience. Once construction is complete, the function of the buildings, roadways, and facilities of the park and its accessibility to all visitors would be improved, and provide a minor, long-term, beneficial effect. Alternative A would provide the following long-term benefits to visitors:

- Improved pedestrian and biking facilities:
  - Pedestrian path improvements, including wayfinding improvements, separate pathway along lakeshore in front of general store, and seasonal hiking/biking path from Bridge Bay to Fishing Bridge.
- Expanded and/or improved visitor facilities:
  - Hatchery and service station converted to visitor use
  - Increased availability of showers and/or laundry facilities in Bridge Bay Campground, with vegetation planted between sites for separation and improved amphitheater
  - Expanded boat repair, marina store provides additional visitor convenience
  - Increased and redesigned parking for the Lake Hotel, ranger station, and general store
  - Visitor services would be consolidated in the lake developed area

- Construct auto repair shop and service station at Lake Village provides a convenience not currently available
  - Relocate post office to already-disturbed site near entrance of Lake developed area, where it is more easily located and accessed.
- Mitigation of conflicts due to employee facilities within visitor-use areas:
  - Employee facilities such as housing, employee pub , trailers , etc. would be consolidated away from visitor use areas
- Improved visitor circulation systems:
  - Road improvements, including new vehicle turnaround at end of Lodge road, redesigned circulation in hotel cabin area as a loop, and new entrance road to front of Lake Hotel
  - Dredging of marina entry/exit allows safe passage for vessels
- Restored natural and historic areas throughout the project area

The removal of some visitor facilities in the Fishing Bridge location would have local, long-term adverse impacts. These facilities include the warming hut, which provides a safe respite for winter visitors, the auto repair shop, which is mostly utilized by visitors in the adjacent RV campground. Although the consolidation of the Lake Hotel cottages and Lodge cabins into motel-style buildings mitigates grizzly bear concerns, visitors have expressed a preference for individual cabins/cottages for their ambience and affordability.

The construction effort for Alternative A would have local, short- and long-term adverse transportation impacts. The intensity and nature of the construction activity would vary over the construction period, and the range of adverse impacts to traffic flow and safety conditions would similarly vary. Adverse construction-related transportation impacts would primarily relate to temporary delays on the Grand Loop road. Construction activities would generate varying numbers of vehicle trips (depending on the type of work) to accommodate construction workers, trucks, and equipment. Less intensive construction efforts at the project site (e.g., revegetation and restoration efforts) would require fewer workers and few truck trips, and would have local, short-term, minor, adverse impacts to traffic flow and traffic safety conditions. Mitigation measures (e.g., implementation of a traffic control plan, with advance warning signs, and flaggers to direct traffic) would be employed to reduce transportation effects (though the measures would not change the magnitude of the adverse effects). Therefore, the effect of construction activities in the Lake Area would be minor, but vary in intensity depending on the construction activity and the traffic volumes on area roads used by construction-related vehicles. Road relocation and/or construction and the parking lot expansion at the Lake Hotel would provide a beneficial effect to visitors. Construction of a walking path between the hotel and the general store would also have a beneficial effect on visitor use and experience. Demolishing historic structures and consolidating visitor lodging around the Lake Hotel and Lodge may have a moderate, adverse effect on visitor experience.

### **Cumulative Impacts**

Cumulative impacts on visitor use and experience are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Visitation to Yellowstone has generally increased throughout the park's history and peaked at 3.6 million in 2010. The NPS expects the upward trend to continue. The vast majority of visitors stay on or near the roadways of Yellowstone, spending an average of about 1.5 days in Yellowstone. Past activities considered in this analysis include fire management actions e.g., prescribed and wild fires, human use, aircraft over-flights, and construction projects. These actions

have caused adverse impacts including increased noise, decreased visibility from smoke, traffic delays from construction, and overall aesthetics. Beneficial impacts have also resulted from these activities, including improved access and quality of experiences throughout the park. In the future, there are no plans that are likely to significantly alter recreational opportunities. When added to other past, present, and reasonably foreseeable future actions in the park, Alternative A would result in minor, adverse short-term impacts to park visitor use and experience.

### **Conclusion**

Alternative A would have moderate, adverse effects both during and after construction. Beneficial effects would also occur, mainly with the vehicle and pedestrian-related projects. Overall, the impact would be minor and adverse.

### **4.3.3.2 Impacts of Alternative B to Visitor Use and Experience**

#### **Impact Analysis**

The visitor experience would be affected by noise, dust, and fumes from construction equipment in the project area during construction. Visitors would be restricted from parts of the project areas for safety reasons during the period of construction. Construction activities would result in a minor, short-term, adverse effect on the visitor experience. Once construction is complete, the function of the buildings, roadways, and facilities of the park and its accessibility to all visitors would be improved, and provide a minor, long-term, beneficial effect. Alternative B would provide the following benefits to visitors:

- Improved pedestrian and biking facilities:
  - Road improvements including new road behind ranger station mitigates pedestrian/vehicle conflicts along narrow area in front of ranger station
  - Pedestrian connections between facilities at Fishing Bridge and Lake Village
  - Increased viewing areas for the Lake Area such as improved viewing platform in front of Lake Hotel
  - Enhanced experience along the lakeshore for pedestrians with seating and viewing opportunities with potential for seasonal vehicle-free pedestrian area
  - Provide night lighting for pedestrian pathways within developed area that meets Night Lighting Standards
- Improved visitor orientation facilities:
  - Visitor orientation kiosk at entry to Lake Village
  - Improved entry at the back of the Lake Hotel
- Expanded and/or improved visitor facilities:
  - Enhanced picnic area at lakeshore near hatchery
  - Hatchery and Lake Service Station converted to visitor-use and public space added to ranger station
  - Increased availability of lodging in Lake Lodge location
  - Increased availability of showers and/or laundry facilities in Bridge Bay Campground
  - Availability of electrical hookups at loops A-D at Bridge Bay Campground
  - Increased parking area for the ranger station and general store
  - Size increase of individual sites at Fishing Bridge RV Park
  - Improved/renovated visitor facilities at Fishing Bridge including the winter warming hut, camper services, service station, and auto repair station
- Mitigation of conflicts due to employee facilities within visitor-use areas:

- Consolidation of employee housing away from visitor lodging at Lake Lodge
- Improved visitor circulation systems:
  - Dredging of marina entry/exit allows safe passage for vessels
  - Easier ingress/egress of RVs at Fishing Bridge RV Park with addition of turn lane
- Restored natural and historic areas throughout the project area

Projects that would have a long-term adverse impact to visitor experience include the construction of a maintenance building for concessions use behind Lake Hotel and retaining the employee pub facility where it conflicts with existing visitor lodging during employee parties.

The construction effort for Alternative B would have local, short- and long-term adverse transportation impacts. The intensity and nature of the construction activity would vary over the construction period, and the range of adverse impacts to traffic flow and safety conditions would similarly vary. Adverse construction-related transportation impacts would primarily relate to temporary delays on the Grand Loop road. Construction activities would generate varying numbers of vehicle trips (depending on the type of work) to accommodate construction workers, trucks, and equipment. Less intensive construction efforts at the project site (e.g., revegetation and restoration efforts) would require fewer workers and few truck trips, and would have local, short-term, minor, adverse impacts to traffic flow and traffic safety conditions. Mitigation measures (e.g., implementation of a traffic control plan, with advance warning signs, and flaggers to direct traffic) would be employed to reduce transportation effects (though the measures would not change the magnitude of the adverse effects). Therefore, the effect of construction activities in the Lake Area would be minor, but vary in intensity depending on the construction activity and the traffic volumes on area roads used by construction-related vehicles. Conversion of the road in front of the Lake Hotel to pedestrian only would benefit visitors who walk between the hotel and the general store.

### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.1.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long term adverse impacts and moderate, short- and long-term beneficial impacts to visitor use and experience.

### **Conclusion**

While there would be temporary, minor adverse effects due to construction the long-term effects would be moderate and beneficial. Overall, the effects would be minor and beneficial.

### **4.3.3.3 Impacts of Alternative C to Visitor Use and Experience**

#### **Impact Analysis**

The visitor experience would be affected by noise, dust, and fumes from construction equipment in the project area during construction. Visitors would be restricted from parts of the project areas for safety reasons during the period of construction. Construction activities would result in a minor, short-term, adverse effect on the visitor experience. Once construction is complete, the function of the buildings, roadways, and facilities of the park and its accessibility to all visitors would be improved, and provide a minor, long-term, beneficial effect. Alternative C would provide the following long-term benefits to visitors:

- Improved pedestrian and biking facilities:

- Road improvements such as converting lakeshore road to one-way with no lakeshore parking mitigates pedestrian/vehicle conflicts along narrow road along lakeshore
  - Improved pedestrian connections between facilities at Fishing Bridge and Lake Hotel
  - Enhanced opportunities for walking, seating, and viewing along the lakeshore
  - Provide lighted pathways (that meet Dark Sky standards)
- Improved visitor orientation facilities:
  - Visitor orientation kiosk at entry to Lake Village
  - Improved entry design at back of Lake Hotel
- Expanded and/or improved visitor facilities:
  - Hatchery, both boathouses, and Lake Service Station converted to visitor use, and public space added to Lake ranger station
  - Enhanced picnic area at Hatchery
  - Construct floating pier near hatchery
  - Increased availability of showers and/or laundry facilities in Bridge Bay Campground
  - Availability of electrical hookups at Loops A-D at Bridge Bay Campground
  - Increased parking area for the ranger station and general store
  - Size increase of individual sites at Fishing Bridge RV Park
  - Improved/renovated visitor facilities at Fishing Bridge including the winter warming hut, camper services, service station, and auto repair shop
  - Retain Lake Lodge cabins in place
- Improved visitor circulation systems:
  - Dredging of marina entry/exit allows safe passage for vessels
  - Easier ingress/egress of RVs at Fishing Bridge RV park using traffic control devices
- Mitigation of conflicts due to employee facilities within visitor-use areas:
  - Relocate noisy employee pub function out of visitor lodging area and repurpose Lake Lodge pub building.
  - Consolidation of employee housing away from visitor lodging at Lake Lodge
- Restored natural and historic areas throughout the project area

The construction effort for Alternative C would have local, short- and long-term adverse transportation impacts. The intensity and nature of the construction activity would vary over the construction period, and the range of adverse impacts to traffic flow and safety conditions would similarly vary. Adverse construction-related transportation impacts would primarily relate to temporary delays on the Grand Loop road. Construction activities would generate varying numbers of vehicle trips (depending on the type of work) to accommodate construction workers, trucks, and equipment. Less intensive construction efforts at the project site (e.g., revegetation and restoration efforts) would require fewer workers and few truck trips, and would have local, short-term, minor, adverse impacts to traffic flow and traffic safety conditions. Mitigation measures (e.g., implementation of a traffic control plan, with advance warning signs, and flaggers to direct traffic) would be employed to reduce transportation effects (though the measures would not change the magnitude of the adverse effects). Therefore, the effect of construction activities in the Lake Area would be minor, but vary in intensity depending on the construction activity and the traffic volumes on area roads used by construction-related vehicles. Conversion of the road in front of the Lake Hotel to one-way with a pedestrian lane would benefit visitors who walk between the hotel and the general store.

## Cumulative Impacts

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.1.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short-term adverse impacts and long-term beneficial impacts to visitor use and experience.

### **Conclusion**

While there would be temporary, minor adverse effects due to construction the long-term effects would be moderate and beneficial. Overall, the effects would be minor and beneficial.

### **4.3.2 Scenic Resources**

#### **Guiding Regulations and Policies**

##### **National Park Service Management Policies 2006, *Section 4.10 - Lightscape Management***

The Service will preserve, to the greatest extent possible, the natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light. The stars, planets, and earth's moon that are visible during clear nights influence humans and many other species of animals, such as birds that navigate by the stars or prey animals that reduce their activities during moonlit nights. Improper outdoor lighting can impede the view and visitor enjoyment of a natural dark night sky. Recognizing the roles that light and dark periods and darkness play in natural resource processes and the evolution of species, the Service will protect natural darkness and other components of the natural lightscape in parks. To prevent the loss of dark conditions and of natural night skies, the Service will minimize light that emanates from park facilities, and also seek the cooperation of park visitors, neighbors, and local government agencies to prevent or minimize the intrusion of artificial light into the night scene of the ecosystems of parks. The Service will not use artificial lighting in areas where the presence of the artificial lighting will disrupt a park's dark-dependent natural resource components. The Service will:

- Restrict the use of artificial lighting in parks to those areas where security, basic human safety, and specific cultural resource requirements must be met;
- Use minimal-impact lighting techniques;
- Shield the use of artificial lighting where necessary to prevent the disruption of the night sky, natural cave processes, physiological processes of living organisms, and similar natural processes.

The decision about whether or not to install artificial lighting in particular circumstances is left to the discretion of the superintendent and is made through the planning process.

##### ***Section 9.1.3.1 - Construction Sites***

Construction sites will be limited to the smallest feasible area. The selection of construction sites will consider opportunities for taking advantage of natural sources of lighting, heating, and cooling to maximize energy conservation. Ground disturbance and site management will be carefully controlled to prevent undue damage to vegetation, soils, and archeological resources and to minimize air, water, soil, and noise pollution. Protective fencing and barricades will be provided for safety and to preserve natural and cultural resources. Effective storm water management measures specific to the site will be implemented, and appropriate erosion and sedimentation control measures will be in place at all times. Solid, volatile, and hazardous wastes will be avoided when possible. When they cannot be avoided, they will be properly stored, transported, and disposed of in compliance with federal, state, and local laws and regulations. All materials will be recycled whenever possible. A review and approval of any "hot work" (e.g., welding, use of open flame,

grinding) will be done to ensure fire safety at the construction site. Visual intrusions will be kept to a minimum. Construction equipment will be in satisfactory condition; i.e., it will be equipped with required safety components and not be leaking hazardous liquids or emitting hazardous or undesirable fumes above allowable legal limits. Care will be exercised to ensure that construction equipment and all construction materials imported into the park are free of undesirable species. The cost of restoring areas impacted by construction will be considered part of the cost of construction, and funding for restoration will be included in construction budgets.

**Methodology and Intensity Thresholds**

Analyses of the potential intensity of visual quality impacts were derived from available information regarding desired views in the Lake Area and park staff’s records and past observations of the effects to those desired views (visual quality) from development, visitor use, and area operations, including construction activities. Analyses of the potential intensity of lightscape impacts were derived from available information regarding night lighting and its impact on the dark night sky and on nighttime desired visual quality. Park staff’s records and past observations of the effects of construction activities on lightscapes supplemented the analysis.

The desired visual quality for the Lake Area is: “Maintaining the overall visual impression of small, rustic developments in a natural setting”. The intensity of impacts to visual quality, including lightscapes, is defined as follows:

Impact Intensity	Impact Description
Negligible	Changes to the visual quality of the landscape, including nighttime quality, would be barely detectable or changes would be short-term, small and localized.
Minor	Changes to the visual quality of the landscape, including nighttime quality would be short-term or long-term small and localized to an area in the park. The change is noticeable but does not negatively affect the character of the site or its relationship to or dominance in the surrounding natural setting.
Moderate	Changes to the visual quality of the landscape, including nighttime quality, would be long term and obvious in many areas of the park. There could be an effect of an area to other areas. Effects would noticeably change the impression of the immediate site and the character of the overall setting.
Major	Changes to the visual quality of the landscape, including nighttime quality, would be significant and occur parkwide. Changes would be long term, considerable, and widespread, with negative changes considered obtrusive at the parkwide level. Obvious differences would change the character and overall impression of the area, its association with and dominance within the surrounding natural setting.

**4.3.2.1 Impacts of Alternative A to Scenic Resources**

**Impact Analysis**

Under Alternative A, construction would create a temporary adverse impact to scenic resources. The short-term visual effects would include disturbed land, construction equipment, and development activities. Contractors would be required to maintain an organized construction site and to minimize adverse visual impacts on park visitors and residents. Construction would cause visual disruptions around the project sites but would not impact critical view sheds. In the long-term, construction of the service station complex and two dorms across from the Lake Hotel may create an adverse impact to scenic resources. Remediation of social trails that trample vegetative

screens would have a minor, beneficial effect on scenic resources. The views associated with historic structures are analyzed in *Cultural Landscapes*, section 4.2.4.

### **Cumulative Impacts**

Cumulative impacts on scenic resources are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Important views of the Lake Area include Yellowstone Lake, the Lake Hotel and Lodge, Fishing Bridge, and views from the shoreline. In the future, there are no plans that are likely to significantly alter the viewshed.

Construction projects in the central part of Yellowstone and in the Lake Area would continue to occur and could have minor impacts to scenic resources. The National Park Service fully recognizes the importance of preserving Yellowstone's scenic views and dark nighttime skies. Current visitor support operations have a minor effect on the visual quality of the area; continued operation of visitor facilities would be expected to have a similar, minor cumulative effect. New, more historically appropriate lighting fixtures that are designed to protect Yellowstone's nighttime skies were installed in the Lake Area in 2006 as part of a special grant to the park, thus enhancing the area's nighttime lighting.

### **Conclusion**

In the short-term, the proposed action would have temporary, minor, adverse effects, but in the long-term the effects would be minor and beneficial. Overall, the effects would be negligible.

## **4.3.2.2 Impacts of Alternative B to Scenic Resources**

### **Impact Analysis**

Construction of the proposed projects would create a temporary adverse impact to scenic resources. The short-term visual effects would include disturbed land, construction equipment, and development activities. Contractors would be required to maintain an organized construction site and to minimize adverse visual impacts on park visitors and residents. Construction would cause visual disruptions around the project sites but would not impact critical view sheds. In the long-term, site restoration behind the Fishing Bridge General Store and remediation of social trails that trample vegetative screens would have a minor, beneficial effect on scenic resources. The views associated with historic structures are analyzed in *Cultural Landscapes*, section 4.2.4. Some projects improve the natural scenery by blending existing facilities into the landscape. These include rehabilitating the hospital and post office structure to conform to design standards, and using darker colors on the transfer station.

### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.2.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to scenic resources.

### **Conclusion**

In the short-term, the proposed action would have temporary, minor, adverse effects, but in the long-term the effects would be minor and beneficial. Overall, the effects would be negligible.

#### 4.3.2.3 Impacts of Alternative C to Scenic Resources

##### Impact Analysis

Construction of the proposed projects would create a temporary adverse impact to scenic resources. The short-term visual effects would include disturbed land, construction equipment, and development activities. Contractors would be required to maintain an organized construction site and to minimize adverse visual impacts on park visitors and residents. Construction would cause visual disruptions around the project sites but would not impact critical view sheds. In the long-term, site restoration behind the Fishing Bridge General Store and remediation of social trails that trample vegetative screens would have a minor, beneficial effect on scenic resources. The views associated with historic structures are analyzed in *Cultural Landscapes*, section 4.2.4. Similar to Alternative B, some projects improve the natural scenery by blending existing facilities into the landscape. These include rehabilitating the hospital and post office structure to conform to design standards, and using darker colors on the transfer station. Alternative C proposes a renovated viewing platform overlooking the lake in front of the Lake Hotel. The current viewing platform does not have a covering. This structure would have to be carefully designed to be outside this important critical viewshed.

##### Cumulative Impacts

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.2.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to scenic resources.

##### Conclusion

In the short-term, the proposed action would have temporary, minor, adverse effects, but in the long-term the effects would be minor and beneficial. Overall, the effects would be negligible.

#### 4.3.3 Natural Soundscapes

##### Guiding Regulations and Policies

###### National Park Service 2006 Policies

The 2006 National Park Service Management Policies delineate its Soundscape Management Policies. These policies are designed in accordance with the Organic Act of 1916 and strive to manage National Parks in a way that will preserve them for the use of future generations. The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. Some natural sounds in the natural soundscape are also part of the biological or other physical resource components of the park. Examples of such natural sounds include:

- Sounds produced by birds, frogs, or katydids to define territories or aid in attracting mates;
- Sounds produced by bats to locate prey or navigate;
- Sounds received by mice or deer to detect and avoid predators or other danger;
- Sounds produced by physical processes, such as wind in the trees, claps of thunder, or geyser eruptions.

NPS will restore to the natural condition wherever possible those park soundscapes that have become degraded by unnatural sounds (noise), and will protect natural soundscapes from

unacceptable impacts. Using appropriate management planning, superintendents will identify what levels and types of unnatural sound constitute acceptable impacts on park natural soundscapes.

The frequencies, magnitudes, and durations of acceptable levels of unnatural sound will vary throughout a park, being generally greater in developed areas. In, and adjacent to parks, NPS will monitor human activities that generate noise that adversely affect park soundscapes, including noise caused by mechanical or electronic devices. NPS will take action to prevent or minimize all noise that through frequency, magnitude, or duration adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified through monitoring as being acceptable to or appropriate for visitor uses at the sites being monitored.

**Directors Order 47 – Soundscape Preservation and Noise Management**

Directors Orders are one of several types of written guidance created for the proper management of national parks. The key directive from Director’s Order 47 is that where natural soundscape conditions are currently not impacted by inappropriate noise sources, the objective must be to maintain those conditions. Where the soundscape is found to be degraded, the objective is to facilitate and promote progress toward the restoration of the natural soundscape.

36 CFR § 2.12 specifically prohibits operating motorized equipment or machinery (e.g., electric generating plants, motor vehicles, or motorized toys) or audio devices (e.g., radio, television set, tape deck or musical instrument) in a manner that exceeds a noise level of 60 dBA at 50 feet.

**Methodology and Intensity Thresholds**

Analyses of the potential intensity of soundscape impacts were derived from available information on levels in the Lake Area and park staff knowledge and observations of both visitor and employee use, and construction activities. The intensity of impacts to natural soundscapes is defined as follows:

Impact Intensity	Impact Description
Negligible	Impacts to the natural soundscapes would be barely detectable or changes would be short-term, slight and localized.
Minor	Impacts to the natural soundscapes would be short-term or long-term, and localized. The change would be noticeable but would not negatively affect the character of the site or its relationship to or dominance in the surrounding natural setting.
Moderate	Impacts to the natural soundscape would be long-term and obvious. Effects would noticeably change the impression of the immediate site and the character of the overall setting.
Major	Changes to the soundscape would be significant. Changes would be long-term, considerable, and widespread, with negative changes considered obtrusive. Obvious differences would change the character and overall impression of the area and its association with and dominance within the surrounding natural setting.

**4.1.7.1 Impacts of Alternative A to Natural Soundscapes**

**Impact Analysis**

Construction activities associated with Alternative A include construction of new buildings, laying of concrete, road construction, and grading. The effect of construction noise would depend upon the type of construction activity, the distance between construction activities and the nearest noise sensitive uses, and the existing noise levels at those uses. Typical noise levels generated by different

types of standard construction equipment at 50ft (dBA, Leq) are described below in Table 4-1 (FTA, 2006).

**Table 4-1, Standard Construction Equipment  
Noise Levels 50 Ft From Source (dBA, Leq)**

Backhoe	80
Pile Driver (impact)	101
Compactor	82
Pumps	76
Dozers	85
Scrapers	89
Generators	81
Shovel	82
Jack Hammer	88
Truck	88
Paver	89

Construction will occur throughout the Lake Area, including both visitor use and administrative areas. Consolidation and construction of maintenance facilities in the administrative area is at least 1/3 mile from visitor facilities. However, building renovations, Lake Hotel and Lake Lodge cabin consolidation, construction of the service station complex with two dorms, construction of the Teal Dorm replacement, road construction, and parking lot expansion would have greater soundscape impacts. Seasonal access restrictions also require construction to be concurrent with peak visitor season (June to October). Noise from construction activity varies with the types of equipment used and the duration of use. During operation, heavy equipment and other construction activities generate noise levels ranging typically from 70 to 90 dBA at a distance of 50 ft (15.2 m). During facilities construction, use of heavy equipment commonly occurs sporadically throughout the daytime hours. Generally, heavy equipment would generate the highest noise levels throughout the construction phase, but would be temporary in nature, and would diminish the farther sensitive noise receptors are from the construction site. Although some heavy equipment would be used throughout the construction process, the noisiest heavy equipment would be associated with site preparation up to and including installation of foundations. The types of equipment necessary for site preparation would be graders, pavers, dump trucks, and concrete mixers and their use would tail off as construction of the structures begin. Use of heavy equipment also depends on the construction schedule, and would not be permanent. A compressed schedule versus a long-term schedule would likely use more pieces of heavy equipment for longer daily periods raising noise levels, but the duration would be shorter. Impacts from construction would be minor, short-term and adverse.

Noise from park operations is and will continue to be minimal. Due to the developed nature of the project sites any operational noise impacts would be negligible.

### **Cumulative Impacts**

Cumulative impacts on natural soundscapes are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Past construction projects in the area have had a temporary adverse impact on natural soundscapes. Increased visitation of Yellowstone National Park and the Lake Area has increased traffic-related noise. The past, current, and proposed future use of oversnow vehicles during the winter months has an adverse effect on the natural soundscapes. Alternative A, in conjunction with

these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to natural soundscapes.

### **Conclusion**

Alternative A would result in minor, short- and long-term adverse impacts to natural soundscapes.

#### **4.1.7.2 Impacts of Alternative B to Natural Soundscapes**

### **Impact Analysis**

Construction activities associated with Alternative B include construction of new buildings, laying of concrete, road construction, and grading. The effect of construction noise would depend upon the type of construction activity, the distance between construction activities and the nearest noise sensitive uses, and the existing noise levels at those uses. Typical noise levels are listed in Alternative A.

Construction will occur throughout the Lake Area. However, some activities will be occurring farther from visitor areas than others. For example, consolidation and construction of maintenance facilities in the administrative area is at least 1/3 mile from visitor facilities. However, building renovations, RV park renovation, water main replacement, construction of the Teal Dorm replacement, lodge cabin relocation, Fishing Bridge road widening, and parking lot expansion would have greater soundscape impacts. Seasonal access restrictions also require construction to be concurrent with peak visitor season (June to October). Noise from construction activity varies with the types of equipment used and the duration of use. During operation, heavy equipment and other construction activities generate noise levels ranging typically from 70 to 90 dBA at a distance of 50 ft (15.2 m). During facilities construction, use of heavy equipment commonly occurs sporadically throughout the daytime hours. Generally, heavy equipment would generate the highest noise levels throughout the construction phase, but would be temporary in nature, and would diminish the farther sensitive noise receptors are from the construction site. Although some heavy equipment would be used throughout the construction process, the noisiest heavy equipment would be associated with site preparation up to and including installation of foundations. The types of equipment necessary for site preparation would be graders, pavers, dump trucks, and concrete mixers and their use would tail off as construction of the structures begin. Use of heavy equipment also depends on the construction schedule, and would not be permanent. A compressed schedule versus a long-term schedule would likely use more pieces of heavy equipment for longer daily periods raising noise levels, but the duration would be shorter. Impacts from construction would be minor, short-term and adverse.

Noise from park operations is and will continue to be minimal. Due to the developed nature of the project sites any operational noise impacts would be negligible.

### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.3.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to natural soundscapes.

### **Conclusion**

Alternative B would have minor, short-term adverse impacts to natural soundscapes.

#### **4.1.7.3 Impacts of Alternative C to Natural Soundscapes**

##### **Impact Analysis**

Construction activities associated with Alternative C include construction of new buildings, laying of concrete, road demolition and construction, and grading. The effect of construction noise would depend upon the type of construction activity, the distance between construction activities and the nearest noise sensitive uses, and the existing noise levels at those uses. Typical noise levels are listed in Alternative A.

Construction will occur throughout the Lake Area. However, some activities will be occurring farther from visitor areas than others. For example, consolidation and construction of maintenance facilities in the administrative area is at least 1/3 mile from visitor facilities. However, building renovations, RV park renovation, water main replacement, construction of the Teal Dorm replacement, warehouse construction, Fishing Bridge road widening, and construction of a floating pier would have greater soundscape impacts. Seasonal access restrictions also require construction to be concurrent with peak visitor season (June to October). Noise from construction activity varies with the types of equipment used and the duration of use. During operation, heavy equipment and other construction activities generate noise levels ranging typically from 70 to 90 dBA at a distance of 50 ft (15.2 m). During facilities construction, use of heavy equipment commonly occurs sporadically throughout the daytime hours. Generally, heavy equipment would generate the highest noise levels throughout the construction phase, but would be temporary in nature, and would diminish the farther sensitive noise receptors are from the construction site. Although some heavy equipment would be used throughout the construction process, the noisiest heavy equipment would be associated with site preparation up to and including installation of foundations. The types of equipment necessary for site preparation would be graders, pavers, dump trucks, and concrete mixers and their use would tail off as construction of the structures begin. Use of heavy equipment also depends on the construction schedule, and would not be permanent. A compressed schedule versus a long-term schedule would likely use more pieces of heavy equipment for longer daily periods raising noise levels, but the duration would be shorter. Impacts from construction would be minor, short-term and adverse.

Noise from park operations is and will continue to be minimal. Due to the urban nature of the project sites any operational noise impacts would be negligible.

##### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.3.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to natural soundscapes.

##### **Conclusion**

Alternative C would have minor, short-term adverse impacts to natural soundscapes.

#### **4.3.4 Human Health and Safety**

##### **Guiding Regulations and Policies**

The National Park Service is concerned about the safety for visitors and employees and will work to enhance visitor and employee safety (NPS 2006).

The *NPS Management Policies* state that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. The policies also state, “While recognizing that there are limitations on its capability to totally eliminate all hazards, the National Park Service and its concessioners, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees” (sec. 8.2.5.1). Further, the NPS will strive to protect human life and provide for injury-free visits (sec. 8.2.5).

### Methodology and Intensity Thresholds

The intensity of impacts to human health and safety are as follows:

Impact Intensity	Impact Description
Negligible	The impact to visitor and park staff safety would not be measurable or perceptible.
Minor	The impact to visitor and park staff safety would be measurable and perceptible and would involve a large number of individuals in a localized area of the park. Automobile accidents rates could increase in a localized area.
Moderate	The impact to visitor and park staff safety would be measurable and perceptible and would involve a large number of individuals in many areas of the park. Automobile accidents rates could increase at several locations.
Major	The impact to visitor and park staff safety would be substantial and parkwide in occurrence. Accident rates in areas usually limited to low accident potential would be expected to substantially increase in the short and long-term and impacts to the safety of individuals would be readily apparent throughout the park.

#### 4.3.1.1 Impacts of Alternative A to Human Health and Safety

##### Impact Analysis

Alternative A would improve vehicular and pedestrian circulation. The vehicle/pedestrian conflict at the lake shore would be mitigated with this alternative; however the conflicts in the Fishing Bridge area would not be addressed. Traffic congestion around the Fishing Bridge area from the RV Park, general store, and service station would continue. During construction, there is potential for construction-related accidents, as during any construction project.

##### Construction Safety

During construction activities, a health and safety program would be implemented by the construction contractors, based on industry standards for accident prevention. At a minimum, the construction health and safety program would comply with federal and local health and safety regulations. Elements of the safety program would include:

- Responsibilities of construction workers and subcontractors
- Job site rules and regulations
- Emergency response procedures
- Safety inspections and audits
- Location of medical services and first aid
- Safety meetings, employee training, and hazard communications
- Personal protective equipment
- Standard construction procedures
- Accident investigation and reporting.

Proposed projects that improve visitor safety include improvements to the fire station in the administrative location, mitigating visitor-bear interactions through the consolidation of Lake Hotel cottages and Lake Lodge cabins into motel-type buildings located approximately 100 yards from Lodge Creek, installation of a larger buried water distribution line at Bridge Bay to ensure adequate fire protection. Removal of the Fishing Bridge warming hut would have a long-term adverse impact on visitor safety.

Because a health and safety program would be implemented for construction activities and the public would be excluded from entering construction areas, potential construction impacts on public health and safety would not result in any greater safety risk. Therefore, impacts to public health and safety related to construction activities would be negligible.

### **Cumulative Impacts**

Cumulative impacts on human health and safety are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Throughout YNP there are areas of increased risk to health and human safety from on-going park maintenance and construction activities in areas of visitor use. In addition, Yellowstone National Park is a wilderness park with a portion of the mission dedicated to providing enjoyment value to visitors. There are many inherent health and safety challenges for humans that pursue their recreational interests, especially in backcountry locations. Every year geothermal features scald a few people that get too close and contact the extremely hot water. The weather can turn cold, creating conditions for hypothermia and frostbite, and the high elevation can cause dehydration for those who fail to consume enough fluids. Some wildlife species can bite, gore, and trample people that approach too closely within the comfort zone of individual animals. While these same risks are present for employees, orientation to and familiarity with safety risks generally make employees more aware and cautious about health and safety needs. The cumulative impacts to health and human safety would be minor and adverse.

### **Conclusion**

Alternative A would result in short-term, negligible, adverse effects from construction activity, but this activity would not impact health and safety. However, some hazards on the road will continue. Alternative A would make the Lake Area safer for pedestrians and vehicle occupants and result in a minor, long-term beneficial effect.

#### **4.3.1.2 Impacts of Alternative B to Human Health and Safety**

##### **Impact Analysis**

Alternative B would improve vehicular and pedestrian circulation. Due to a proposed lakeshore road design that would allow for seasonal vehicle-free pedestrian area between the hotel and the ranger station, the vehicle/pedestrian conflict at the lake shore would be remedied with this alternative. Traffic congestion and vehicle/pedestrian conflicts in the Fishing Bridge area would be mitigated with the addition of a turn lane and pedestrian crossings. Visibility problems in the parking lot would be reduced with the designation of RV parking spots away from the majority of pedestrian traffic. A new emergency services building would improve response to visitor safety. Adequate night lighting would be added in the Lodge cabin area. Lodge cabins would be consolidated away from Lodge Creek and would mitigate human-bear interactions. During construction, there is potential for construction-related accidents, as during any construction project. The vehicle/pedestrian conflict at the lake shore would be remedied with this alternative. Traffic congestion and vehicle/pedestrian conflicts in the Fishing Bridge area would be mitigated

with the addition of a turn lane and pedestrian crossings. Visibility problems in the parking lot would be reduced with the designation of RV parking spots away from the majority of pedestrian traffic. During construction, there is potential for construction-related accidents, as during any construction project.

#### Construction Safety

During construction activities, a health and safety program would be implemented by the construction contractors, based on industry standards for accident prevention. At a minimum, the construction health and safety program would comply with federal and local health and safety regulations. Elements of the safety program would include:

- Responsibilities of construction workers and subcontractors
- Job site rules and regulations
- Emergency response procedures
- Safety inspections and audits
- Location of medical services and first aid
- Safety meetings, employee training, and hazard communications
- Personal protective equipment
- Standard construction procedures
- Accident investigation and reporting.

Because a health and safety program would be implemented for construction activities and the public would be excluded from entering construction areas, potential construction impacts on public health and safety would not result in any greater safety risk. Therefore, impacts to public health and safety related to construction activities would be negligible.

#### Cumulative Impacts

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.4.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to human health and safety.

#### Conclusion

Alternative B would result in short-term, negligible, adverse effects from construction activity, but this activity would not impact health and safety. The Preferred Alternative would make the Lake Area safer for pedestrians and vehicle occupants and result in a minor, long-term beneficial effect.

#### 4.3.1.3 Impacts of Alternative C to Human Health and Safety

##### Impact Analysis

Alternative C would improve vehicular and pedestrian circulation. The vehicle/pedestrian conflict at the lakeshore would be remedied with this alternative. Traffic congestion and vehicle/pedestrian conflicts in the Fishing Bridge location would be mitigated with the addition of a turn lane and pedestrian crossings. Visibility problems in the parking lot would be reduced with the designation of RV parking spots away from the majority of pedestrian traffic. During construction, there is potential for construction-related accidents, as during any construction project.

#### Construction Safety

During construction activities, a health and safety program would be implemented by the construction contractors, based on industry standards for accident prevention. At a minimum, the construction health and safety program would comply with federal and local health and safety regulations. Elements of the safety program would include:

- Responsibilities of construction workers and subcontractors
- Job site rules and regulations
- Emergency response procedures
- Safety inspections and audits
- Location of medical services and first aid
- Safety meetings, employee training, and hazard communications
- Personal protective equipment
- Standard construction procedures
- Accident investigation and reporting.

Because a health and safety program would be implemented for construction activities and the public would be excluded from entering construction areas, potential construction impacts on public health and safety would not result in any greater safety risk. Therefore, impacts to public health and safety related to construction activities would be negligible.

### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.4.1). Alternative C, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to human health and safety.

### **Conclusion**

Alternative C would result in short-term, negligible, adverse effects from construction activity, but this activity would not impact health and safety. Alternative C would make the Lake Area safer for pedestrians and vehicle occupants and result in a minor, long-term beneficial effect.

### 4.3.5 Park Operations

#### Guiding Regulations and Policies

Management Policies do not contain a specific chapter on park operations; however, virtually every action or proposal that is evaluated in this NEPA process has either a direct or indirect effect on park operations. There are also a number of director's orders that pertain to park operations as well.

#### Methodology and Intensity Thresholds

NPS Management Policies 2006 states: The National Park Service will provide visitor and administrative facilities that are necessary, appropriate, and consistent with the conservation of park resources and values. Facilities will be harmonious with park resources, compatible with natural processes, esthetically pleasing, function, and energy and water efficient, cost effective, universally designed, and as welcoming as possible to all segments of the population. NPS facilities and operation will demonstrate environmental leadership by incorporating sustainable practices to the maximum extent practicable in planning, design, siting, construction, and maintenance. The impact intensities for park operations are defined as follows:

Impact Intensity	Impact Description
Negligible	Impacts would not occur or would not be detectable.
Minor	Impacts would be slight, short-term and localized, but would not have a measurable effect to park operations.
Moderate	Impacts would be measurable, potentially long-term, and would measurably improve or degrade park operations.
Major	Impacts would be long-term, and significantly improve or degrade park operations.

#### 4.3.4.1 Impacts of Alternative A to Park Operations

##### Impact Analysis

Alternative A would result in changes in existing conditions of the park operations and facilities that would protect and repair the natural and cultural resources and promote public safety through design. Activities associated with park management and operations (e.g., education and interpretation, maintenance, and enforcement) would experience no long-term change due to the implementation of Alternative A. A minor impact on park management might occur in the short-term due to oversight of the projects that would be required as a result of implementation of this alternative. Personnel from the park would be required to coordinate permitting of the project, oversee and contribute to decisions associated with project design, respond to any public inquiries associated with the project, and oversee construction of any of the action alternatives. Since this requirement would be limited to the time-frame of the project and such a project falls under the normal duties of park staff, the impact to park management as a whole would be expected to be short-term and minor.

This alternative will improve the park operations and facilities that will preserve the historic character of the park, protect and restore the natural resources, and provide a more accessible facility. Redesign of the parking areas and circulation improvements will minimize human-vehicle conflicts. Parking capacity will be increased and concessioner and visitor lodging will be improved. The new dormitories will be outside of the historic district and redesigned with more space for employees and a more organized arrangement of facilities.

All education and interpretation activities currently provided and conducted by NPS would be expected to continue as currently practiced within the Lake Area. The proposed action would have no effect on education and interpretation.

Under this alternative the water main replacement in the Fishing Bridge area would not occur and significant water leakage and spot repairs would continue. Fire protection for structures during winter would remain inadequate.

### **Cumulative Impacts**

Cumulative impacts on park operations are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. A major source of impacts to the operations and facilities is the continued use of this site in its existing condition by visitors and staff. The water and sewer systems are in continual need of repair/replacement, mainly due to the age of the utility systems. Past activities considered in this analysis include park operations by interpretation, maintenance, administration, visitor protection, and resource management personnel. Impacts to park operations, including all associated needs for employing staff to conduct these actions (administrative, housing, vehicles, etc), would continue in the current condition. Additional burdens on park operations typically include fire management actions, e.g., prescribed and wild fires, human use, emergency services, and construction projects. Beneficial impacts have also resulted from these activities, including improved access and quality of housing and other facilities. When added to other past, present, and reasonably foreseeable future actions in the park, Alternative A would have direct, short-term, negligible to minor adverse impacts.

### **Conclusion**

Selection of the No Action alternative would result in moderate, short- and long-term adverse impacts to park operations.

#### **4.3.4.2 Impacts of Alternative B to Park Operations**

##### **Impact Analysis**

Alternative B would result in changes in existing conditions of the park operations and facilities that would protect and repair the natural and cultural resources and promote public safety through design. Activities associated with park management and operations (e.g., education and interpretation, maintenance, and enforcement) would experience no long-term change due to the implementation of Alternative B. A minor impact on park management might occur in the short-term due to oversight of the projects that would be required as a result of implementation of this alternative. Personnel from the park would be required to coordinate permitting of the project, oversee and contribute to decisions associated with project design, respond to any public inquiries associated with the project, and oversee construction of any of the action alternatives. Since this requirement would be limited to the time-frame of the project and such a project falls under the normal duties of park staff, the impact to park management as a whole would be expected to be short-term and minor.

This alternative will improve the park operations and facilities that will preserve the historic character of the park, protect and restore the natural resources, and provide a more accessible facility. Redesign of the parking areas and circulation improvements will minimize human-vehicle conflicts. Parking capacity will be increased and concessioner and visitor lodging will be improved. The new dormitories will be outside of the historic district and redesigned with more space for

employees and a more organized arrangement of facilities. Replacement of the water main in the Fishing Bridge area would have minor, beneficial effects to park operations.

All education and interpretation activities currently provided and conducted by NPS would be expected to continue as currently practiced within the Lake Area. The proposed action would have no effect on education and interpretation.

#### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.5.1). Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to park operations.

#### **Conclusion**

Overall, Alternative B would result in minor, short-term adverse and beneficial impacts to park operations.

#### **4.3.4.3 Impacts of Alternative C to Park Operations**

##### **Impact Analysis**

Alternative C would result in changes in existing conditions of the park operations and facilities that would protect and repair the natural and cultural resources and promote public safety through design. Activities associated with park management and operations (e.g., education and interpretation, maintenance, and enforcement) would experience no long-term change due to the implementation of Alternative C. A minor impact on park management might occur in the short-term due to oversight of the projects that would be required as a result of implementation of this alternative. Personnel from the park would be required to coordinate permitting of the project, oversee and contribute to decisions associated with project design, respond to any public inquiries associated with the project, and oversee construction of any of the action alternatives. Since this requirement would be limited to the time-frame of the project and such a project falls under the normal duties of park staff, the impact to park management as a whole would be expected to be short-term and minor.

This alternative will improve the park operations and facilities that will preserve the historic character of the park, protect and restore the natural resources, and provide a more accessible facility. Redesign of the parking areas and circulation improvements will minimize human-vehicle conflicts. Parking capacity will be increased and concessioner and visitor lodging will be improved. The new dormitories will be outside of the historic district and redesigned with more space for employees and a more organized arrangement of facilities. Replacement of the water main in the Fishing Bridge area would have minor, beneficial effects to park operations.

All education and interpretation activities currently provided and conducted by NPS would be expected to continue as currently practiced within the Lake Area. The proposed action would have no effect on education and interpretation.

#### **Cumulative Impacts**

The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A (Section 4.3.5.1). Alternative C, in conjunction with

these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to park operations.

### Conclusion

Overall, Alternative C would result in minor, short- and long-term adverse and beneficial impacts to park operations.

## 4.4 MITIGATION MEASURES FOR ALL ACTION ALTERNATIVES

The three planning components, (1) buildable planning zones, (2) planning prescriptions, and (3) design standards, are tools that preserve and protect fundamental resources and values and visitor experience while guiding future changes in development. Therefore, these planning components act as mitigation measures to minimize impacts to resources.

To further mitigate impacts that can potentially result during project implementation the following mitigation measures would be implemented for all alternatives:

- Workers and supervisors would be informed about relevant park regulations and the importance of taking appropriate measures to minimize impacts to park resources.
- Workers and supervisors would be informed about special status species. If one of these species is discovered in a project area, contract provisions would require diversion of construction activities from the location until park staff can assess the situation.
- Construction activities would not be permitted in locations where archeological or paleontological resources are known to be present without the presence of an archeological monitor. If such resources are discovered during construction, the work would cease until park staff have consulted with the state historic preservation officer and the Advisory Council on Historic Preservation (§36 CFR 800.13, *Post-review Discoveries*). In the unlikely event that human remains are discovered, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.
- Contractors and subcontractors would be informed of the penalties for illegally collecting artifacts or intentionally damaging paleontological materials, archeological sites, or historic properties.
- All wetlands would be avoided to the extent possible.
- Temporary impacts, such as soil and vegetation disturbance and the possibility of soil erosion, associated with construction activities would occur. In an effort to avoid introduction of exotic plant species, no hay bales would be used. Hay often contains seed of undesirable or harmful alien plant species. Therefore, on a case-by-case basis the following materials could be used for any necessary erosion control dams: wood bark mulch, straw, sand bags, coir logs, and silt fences. Wood bark mulch would be used to reduce surface erosion, help retain soil moisture and promote seed generation of native plants. Standard erosion control measures such as silt fences and/or sand bags would be used to minimize any potential soil erosion where appropriate.
- The minimum area needed for an approved construction activity would be delineated by construction tape, snow fencing, or similar material. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the identified construction zone.
- Silt fencing fabric would be inspected weekly or after every major storm. Accumulated sediments would be removed when the fabric is estimated to be approximately 50% full. Silt

removal would be accomplished in such a way as to avoid introduction of fine particle materials into any wetlands or flowing water bodies.

- Equipment would not be serviced or refueled near streams; storage and refueling or construction parking and staging areas, would be at least 150 feet (46 m) from streams or riparian areas. Fuel would be stored in fuel trucks or aboveground storage tanks, and all fuel storage would be in staging areas.
- Staging and stockpiling areas would be located in previously disturbed sites, away from visitor use areas to the extent possible, and returned to pre-construction conditions following construction.
- If necessary, dust generated by construction activity would be controlled by spraying water from an approved source on the site.
- Contractors would regularly monitor and check construction equipment to identify and repair any petrochemical leaks.
- To reduce noise and emissions, construction equipment would not be permitted to idle for extended periods and construction workers would not be permitted to broadcast portable audio devices through speakers. The use of jake brakes would be minimized when transporting materials in large trucks.
- The timing of construction activities may be altered to minimize impacts on park visitors, wildlife, or fisheries activities.
- All disturbed areas would be restored shortly after construction activities are completed.
- The Park Vegetation Guidelines including topsoil salvaging would be implemented in construction projects.
- A Park Wetland Specialist would be consulted when a project in or near wetlands is considered.
- A Park Resource Operations or Nonnative Plant Specialist would be consulted when a project involves ground disturbance activities.
- Revegetation and recontouring would be designed to minimize visual intrusions while replicating as nearly as possible pre-construction conditions.
- Revegetation efforts would strive to replicate the natural spacing, abundance, and diversity of the native plant community.
- Weed control methods would be implemented to prevent the introduction of non-native species. Material sources (e.g., sand, gravel, rock, mulch, etc.) would come from a park approved weed free material source pit or area.