Environmental Assessment
October 2002

Wildland-Urban Interface Fuels Management

Yellowstone

National Park· Wyoming

Environmental Assessment

Wildland-Urban Interface
Fuels Management

YELLOWSTONE NATIONAL PARK
WYOMING

Summary

This wildland-urban interface fuels management environmental assessment evaluates a fire management action at Yellowstone National Park that would treat wildland fuel accumulations and provide better defensible space around structures in the event of a wildfire. The park is located primarily in northwest Wyoming in Park and Teton counties, but is also within Montana's Park and Gallatin counties, and Idaho's Fremont County. The park is administered by the National Park Service and includes 2,221,772 acres.

The preferred alternative would thin the forest so that the edges of all remaining tree crowns would be generally 20 feet apart in 3 developed frontcountry areas and around 31 backcountry sites within the park. The three frontcountry treatment areas, the Lake Utility area, East Entrance, and Northeast Entrance areas, cover approximately 119.4 acres. The backcountry sites (30 patrol cabins) would each be treated over an area ranging from 4 to 15 acres, plus treatments around the 18.5-acre Bechler developed area. The preferred alternative would thin areas bounded by a 400-foot perimeter from the edge of the outside buildings in each development. The treatments would lessen the likelihood of a crown fire and would increase firefighters' ability to gain control of a wildfire and provide increased protection to human life and property.

The alternative of continue current management/no action (Alternative A) and the preferred alternative (Alternative B) were evaluated in this environmental assessment. Fuel reduction activities associated with the preferred alternative would include the use of mechanized and hand tools to implement the previously described thinning, saplings would be thinned to a level that would support the new forest density, and some ground fuels would be removed. The resulting debris would be scattered, piled and burned on-site, or hauled off-site. No broadcast prescribed burning across the landscape would be used.

None of the alternatives would have major adverse environmental consequences. In the key area of fire control, the preferred alternative (Alternative B), which is also identified in this document as the environmentally preferred alternative, would be beneficial and better meet the goals of the wildland-urban interface project compared to Alternative A.

Public Comment

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

Superintendent
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PURPOSE AND NEED

PURPOSE

The purpose of implementing wildland-urban interface fuels management at Yellowstone National Park is to protect and preserve developments, park infrastructure, and cultural resources of the park for the enjoyment of present and future generations. Wildland-urban interface fuels management is also intended to protect human life and property, both public and private, within and adjacent to National Park Service (NPS) lands.

To help in achieving these long-term goals, the National Park Service has implemented a comprehensive fire management program. Actions within this program include, but are not limited to, fuel reduction and wildland fire suppression.

This environmental assessment addresses the proposed action to reduce wildland fuel loads in Yellowstone National Park at the interface of wildlands with developed areas. This action would create buffer zones, referred to throughout this document as treatment areas, with low fuels availability between the park wildlands and developments inside the park. Within the treatment areas, there would be a reduced probability that a wildfire, if ignited, would burn uncontrolled or destroy the structure(s) in the treatment area. In addition, the reduced volumes of fuel in the treatment areas would likely reduce the intensity of a fire that originated outside of a treatment area and could increase firefighters' ability to gain control of a wildfire.

NEED

During much of the 20th century, total fire suppression on public lands was viewed as the most appropriate method to prevent widespread, catastrophic wildland fires. Fire suppression efforts were attempted in Yellowstone as early as 1877 by the U.S. Army. These early suppression efforts were effective in the sagebrush steppe and grassland areas of the park, but were of limited effectiveness in the forested areas. Increased use of aircraft and smokejumpers in the early 1950s and into modern times brought much more effective detection and the ability to get men to a fire while it was small, improving the chance of wildfire suppression (Despain 1990). However, as land managers gained knowledge and experience, it became obvious that complete exclusion of fire was not the best technique to promote ecosystem health. Following prescribed burning experience in the Everglades in the 1950s, the National Park Service began to change its fire suppression and prescribed burning policies in 1968 to accept a more natural role of fire in park ecosystems. Lightning-caused fires were allowed to burn under specified conditions in Sequoia-Kings Canyon National Parks that year, followed by seven other parks between 1968-72 (including Yellowstone in 1972) (Department of Interior 1989). Because the time between successive fires on a specific area (the fire return interval) in most of Yellowstone's forests is between 200 and 400 years, fire suppression efforts have not yet caused a significant departure from natural conditions in the forests (Despain 1990).

Following intense fire seasons in 1988 (which included the major greater Yellowstone area fires) and 1994, fire management policies for public lands were reviewed and

updated. Reductions of fuel loads were planned to facilitate the control of wildfire following human- or nature-induced ignitions. A 1989 report by the Fire Management Policy Review Team recommended that "Current fire management plans must be strengthened by clearly identifying areas that need protection from fire, such as developments within or adjacent to wilderness and park boundaries. Fire management plans should also include actions that are to be taken, such as hazard fuel reduction or installing fuel breaks, to protect such developments or areas (Department of Interior 1989).

Another severe fire season occurred in the year 2000, when nearly 7 million acres burned nationwide. This was more than twice the 10-year average. The numbers, sizes, and severities of the fires were the result of drought conditions, weather patterns, and large numbers of lightning strikes.

Yellowstone National Park has experienced 1,900 fires in the last 60 years (NPS 1992). These fires burned 908,052 acres. Fifty fires burned 793,800 acres in Yellowstone National Park in 1988, the most active fire season in recorded history (NPS 1992). Activities occurring under the current fire management plan protect structures in the park using suppression. However, hazardous fuels continue to accumulate around structures and developed areas. The management activities proposed in this assessment would reduce fuels in areas of the wildland-urban interface in a manner that is not addressed in the current fire management plan.

Current federal policy reinforces the protection of human life, including the safety of both firefighters and the public, as an overriding principle in wildland fire management. Other guiding principles include protecting the natural functioning of ecological systems and safeguarding cultural and natural resources (NPS 2000c).

Brief Description of the Wildland-Urban Interface Program

A contributing factor to the amount of damage resulting from wildland fires has been the growth of communities in areas adjacent to national parks and other public lands. Developments in these areas put human life, homes, and other property at risk. Wildland-urban interface projects are intended to reduce the fire hazard in areas where wildlands adjoin developed areas.

The National Park Service is implementing wildland-urban interface fuels management activities under the authorities and programs of the 2001 Interior Appropriations Act (H.R. 4578) and the President’s Fire Initiative (known as the National Fire Plan).

- The 2001 U.S. Department of Interior appropriations bill provided funds to the National Park Service to “accelerate treatments, efforts, and collaborative projects with non-federal partners in the wildland-urban interface.”

- The National Fire Plan provides increased funding and direction to address wildland fire management needs that have been recognized as a result of the past decade of increasingly severe fire seasons.

The National Park Service will be undertaking numerous fuels management projects at units throughout the country. Fuels management will be accomplished within park service units by such methods as mechanical thinning, prescribed fire and, in some park units, herbicide treatments (neither prescribed burning nor herbicides are proposed for use under the wildland-urban interface project in Yellowstone National Park).

The process for selecting the best approach must integrate public input, interagency cooperation, and fire management expertise. The selection process presented in this environmental assessment is based on professional expertise and sound scientific information, and is consistent with NPS authority and management practices.

Prior to the implementation of specific fuels management projects, the proposed actions and their alternatives must be evaluated in environmental assessments. These evaluations will be technically and legally defensible and in full compliance with the requirements of:

- The National Environmental Policy Act of 1969 (NEPA), as amended.
- The Council of Environmental Quality's (1978) "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act," published in 40 *Code of Federal Regulations* (*CFR*) 1500-1508.
- *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision-Making* (NPS 2001a).
- Section 106 of the National Historic Preservation Act.
- The Advisory Council on Historic Preservation's Section 106 Regulations, *Protection of Historic Properties,* (36 *CFR* 800).
- *Director's Order #18, Wildland Fire Management* (NPS 1998).
- *Director's Order #28, Cultural Resource Management Guideline* (NPS 1997).
- *Director's Order #41, Wilderness Preservation and Management* (NPS 1999a).

Fire Management at Yellowstone National Park

The park has a long association with free-burning fire and its present forests have grown up in the wake of large fires. Not all fires were natural; some were human induced and were associated with historic Native American fire practices, mining, logging, and general settlement of the area. The historic record demonstrates the capability of the region to support large, occasional fires. The evidence supports the premise that fire in some form has had a continual presence in the park. It is not possible to determine the full character of the presettlement fire regime, though the settlement era produced an unusually intense period of burning. The 20th century record indicates a period of intense burning followed by a period of fire exclusion.

Organized fire suppression in the park began about 1929, which reduced the frequency and size of fires. Large fires have burned at average intervals of 25-60 years on the low

elevation grasslands of the northern range (Houston 1982), at intervals of 250-400 years in the conifer forests (Romme 1982), and less frequently in the alpine areas.

A park fire management plan was prepared in 1992 (NPS 1992). The park identified two management zones within the park; a prescribed natural fire zone and a suppression zone. The wildland-urban interface treatment areas discussed in this assessment all occur in the suppression zone.

Within Yellowstone National Park, a sound, science-based fire management program is essential for the restoration and maintenance of diverse and sustainable ecosystems. This includes reducing fuels around developed areas, park infrastructure, and structures, and in some cases, near the park boundary, to protect these developments from wildfire.

The proposed wildland-urban interface projects are consistent with the actions identified in the park's fire management plan and would be part of implementing the plan. The entire fire management plan (NPS 1992) is incorporated by reference.

DESCRIPTION OF THE PARK AND GEOGRAPHIC LOCATION

Yellowstone National Park is located primarily in the northwest corner of Wyoming, with portions extending into southwestern Montana and southeastern Idaho. The park lies within Wyoming's Teton and Park counties, Montana's Park and Gallatin counties, and Idaho's Fremont county. The gateway communities of West Yellowstone, Gardiner, Cooke City, and Silver Gate, Montana and Cody and Jackson Wyoming are adjacent to the park (NPS 1991b).

Yellowstone National Park, encompassing 2,221,772 acres (3,472 square miles) occupies a large mountainous plateau in the northern Rocky Mountains. Elevations range from 5,200 feet to over 11,000 feet with an average of 8,000 feet above sea level. The park is characterized by several broad, forested volcanic plateaus surrounded by the Absaroka Mountain Range on the East, the Gallatin Mountain Range on the north, and the Red Mountains on the south. Lakes such as Yellowstone, Shoshone, Lewis, and Heart are prominent features in the park as are the Yellowstone, Snake, Lewis, Madison, Gibbon, Firehole, Gardner, and Lamar rivers (NPS 1991b).

There are two major climatic types within Yellowstone National Park, valley and mountain. The valley type is common to large valleys and central plateaus and is similar to that of the Great Plains with peak precipitation falling as rain in May and June. The mountain type occurs along the Continental Divide and at higher elevations throughout the park. The mountain climate is characterized by precipitation falling predominantly during the winter months as snow (NPS 1991b).

Yellowstone contains the world's largest and most active geothermal areas. These areas were among the principal reasons for the park's establishment. Approximately 120 thermal areas in 9 major basins have been identified. These areas include geyser, hot springs, mud pots, and fumaroles (NPS 1991b).

The park is home to a diverse community of wildlife and provides unique opportunities to view remarkable and relatively rare species such as the bison, gray wolf, and black and

grizzly bears. A more comprehensive list of some of the wildlife species that may be found in Yellowstone National Park is presented in Table 8 in the Wildlife section of this document.

DESCRIPTION OF THE PROJECT AREA

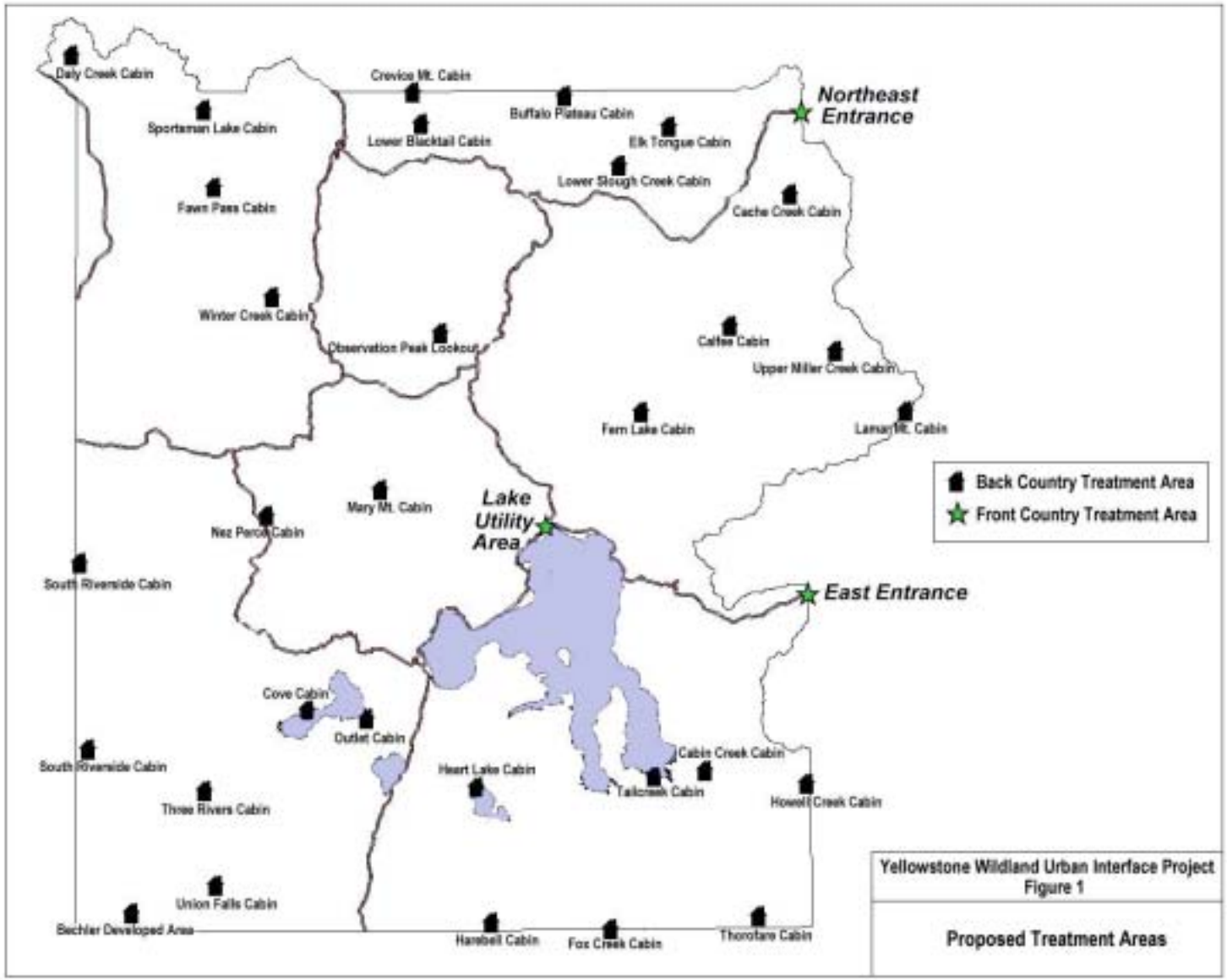
The fuels reduction treatments would be implemented in three developed frontcountry areas (areas associated with development and easily accessed by visitors) and at 31 backcountry sites (locations away from roads and developments, and in relatively remote areas of the park) (including the Bechler developed area) within the park. The three frontcountry treatment areas, the Lake Utility, East Entrance, and Northeast Entrance areas, encompass approximately 119.4 acres, much of which are developed with structures and roads. The backcountry sites would each be treated over an area ranging from 4 to 15 acres, depending on the amount of adjacent forest and number of structures present, plus 18.5 acres to be treated in the Bechler developed area. The total acreage proposed for treatment in the backcountry is about 304.5 acres, resulting in a total proposed treatment area of 423.9 acres. This represents about 0.02 percent of Yellowstone National Park's total acreage. Table 1 below presents a list of the proposed treatment sites and their respective acreages. Figure 1, following Table 1, shows the approximate locations of the proposed treatment sites in the park. Refer to Appendix E for aerial photographs of each of the sites with the proposed treatment areas delineated on each site photograph.

Table 1: Proposed Treatment Areas

Treatment Area	Size (Acres)
BACKCOUNTRY CABINS	
Buffalo Lake	8.0
Buffalo Plateau	8.1
Cabin Creek	5.2
Cache Creek	14.9
Calfee Creek	13.0
Cove Cabin	9.9
Crevice Cabin	15.7
Daly Creek	9.9
Elk Tongue	4.7
Fawn Pass	9.3
Fern Lake	9.4
Fox Creek	12.1
Harebell	14.7
Heart Lake	4.6
Howell Creek	5.8
Lamar Mountain	6.5
Lower Blacktail	12.8
Lower Slough Creek	7.1

Table 1: Proposed Treatment Areas (Continued)

Treatment Area	Size (Acres)
Mary Mountain	14.0
Nez Perce	10.8
Observation Peak	11.5
Outlet Cabin	9.5
South Riverside	7.2
Sportsman Lake	11.5
Three River Junction	5.2
Thorofare	8.3
Trail Creek	8.3
Union Falls	9.9
Upper Miller Creek	11.5
Winter Creek	6.6
Subtotal	286
DEVELOPED AREA	
Bechler	18.5
Subtotal	18.5
FRONTCOUNTRY DEVELOPED AREAS	
East Entrance	28.4
Lake Utility Area	67.0
Northeast Entrance	24.0
Subtotal	119.4
Total	**423.9**


Daly Creek Cabin
Crevice Mt. Cabin
Buffalo Plateau Cabin
Northeast Entrance
Sportsman Lake Cabin
Lower Blacktail Cabin
Elk Tongue Cabin
Lower Slough Creek Cabin
Fawn Pass Cabin
Cache Creek Cabin
Winter Creek Cabin
Observation Peak Lookout
Calfee Cabin
Upper Miller Creek Cabin
Fern Lake Cabin
Lamar Mt. Cabin
Back Country Treatment Area
Front Country Treatment Area
Mary Mt. Cabin
Lake Utility Area
Nez Perce Cabin
South Riverside Cabin
East Entrance
Cove Cabin
Outlet Cabin
South Riverside Cabin
Heart Lake Cabin
Cabin Creek Cabin
Talkmeek Cabin
Howell Creek Cabin
Three Rivers Cabin
Union Falls Cabin
Bechler Developed Area
Hambell Cabin
Fox Creek Cabin
Thorofare Cabin
Yellowstone Wildland Urban Interface Project
Figure 1
Proposed Treatment Areas

SUMMARY DEFINING WHY THE PARK WAS ESTABLISHED

The Act of March 1, 1872 established Yellowstone National Park as the world's first national park and laid the basic framework for the unique land-use policy embodied within the present national park system. Yellowstone was "dedicated and set apart as a public park or pleasuring ground for the benefit and enjoyment of the people, and…for the preservation, from injury or spoliation of all timber, mineral deposits, natural curiosities or wonders…and their retention in their natural condition." Later legislation further provided for the protection of birds and mammals, prohibited hunting, regulated fishing, and added lands that contain petrified tree deposits and wildlife winter range. The commanding features that initially attracted interest and led to the reservation of Yellowstone as a national park were geological: the geothermal phenomena, the Grand Canyon of the Yellowstone River, the fossil forests, and the size and elevation of Yellowstone Lake. Subsequent legislation and executive orders since establishment of the park have recognized the need to preserve cultural resources, including historic and archeological sites.

PROJECT'S RELATIONSHIP TO OTHER PLANS

The proposed action would provide fuels reduction at the interface between park wildlands and developments and structures within the park as part of a larger program by federal land management agencies to protect human life, property, and designated resources.

This wildland-urban interface fuels management project would be consistent with the Yellowstone National Park master plan (NPS 1974), wildland fire management plan (NPS 1992), resource management plan (NPS 1995), and statement for management (NPS 1991a). Specifically they state the park's objectives for wildland fire management as follows:

- Protect human life, property and designated resources;
- Allow fire to play an ecological role in the park to the greatest extent possible using appropriate management techniques;
- Maintain an active fire prevention program.

Federal, state, and private lands border Yellowstone National Park. The park is adjacent to five national forests: Gallatin, Custer, Shoshone, Bridger-Teton, and Targhee. Park units near the southern border of Yellowstone National Park include Grand Teton National Park and John D. Rockefeller Jr., Parkway. The Royal Teton Ranch, located north of the park, is the largest private landowner near the park boundary. Federal lands surrounding the park maintain an active fire management plan that includes prescribed fire for ecosystem enhancement and fuels management (USFS 2000). Specific fuel management and fire prevention/suppression plans of private landowners are not known. The actions proposed in this fuels reduction plan would further increase fire protection and public health and safety provided by these other ongoing plans.

Yellowstone National Park staff work cooperatively with the numerous federal, state, and local agencies to manage and suppress wildland fires for the protection of public health and safety (refer to NPS 1992). In addition, Yellowstone National Park functions as a cooperative member of the Greater Yellowstone Coordinating Committee that has a defined role in fire management within the Greater Yellowstone Area. To further improve interagency cooperation and fire management planning, a contingency plan has been developed for the Greater Yellowstone Area (GYA Preparedness Plan) to ensure timely recognition of approaching critical fire situations and to establish a process for making prompt decisions concerning priorities and actions necessary to resolve these situations.

Park staff educate the public of the park's fire management program and the importance of fire in Yellowstone's ecosystem through the use of pamphlets and interpretive presentations. The public is informed of fire activity in the park through news media and updates on the park's internet website.

In addition, other projects and plans within Yellowstone National Park may contribute to effects on resources in the park in combination with the proposed management activities. In response to the threat that exotic vegetation poses to the park's flora and fauna, the park has established an aggressive program to prevent, eradicate, and control the spread of exotic vegetation (Olliff *et al.* 2001). This program is guided by the park's Exotic Vegetation Management Plan (NPS 1986) and incorporates an element of education and to a degree, monitoring. No management plans are in place to restore native plant species to the park. However, several proposals to explore native restoration to reclaim disturbed areas in various places in the park have been submitted (R. Renkin, NPS Vegetation Management Specialist, pers. comm., March 2002).

IMPACT TOPICS

Impact topics were used to focus the evaluation of the potential consequences of the proposed action and no action alternative. Impact topics were identified based on legislative requirements, topics specified in *Director's Order #12 and Handbook* (NPS 2001a), and park-specific resource information. The impact topics for fuels management at Yellowstone National Park are presented in Table 2. In cases where an impact topic was dismissed, the rationale for this action is included in the table footnote.

GOALS

One of the risks of managing wildlands is wildfire. Highly volatile fuel can ignite easily and readily transmit fire across the landscape. Fuel reduction can reduce the risk posed by wildfire to people, property, and other resources. Park managers therefore must develop strategies to limit the risk of fire migrating to developed areas.

A variety of management techniques are available for use on NPS lands. Methods used in the wildland-urban interface on NPS lands, including Yellowstone National Park, are designed to meet the goals shown in Table 3, with protection of human health and safety being the highest priority. Table 3 also summarizes how well each alternative meets the project goals, based on the information presented in the "Affected Environment and Environmental Consequences" section.

Table 2: Impact Topics for the Yellowstone National Park Wildland-Urban Interface Fuels Management Environmental Assessment

Impact Topic	Retain or Dismiss [a/]	Relevant Regulations or Policies
Biological and physical resources		
Air quality	Retain	Federal Clean Air Act (CAA), CAA Amendments of 1990 (CAAA), NPS *Management Policies 2001*,and Utah Administrative Code, Title 307
Ecologically critical areas or other unique natural resources	Retain (as Geothermal Resource)	Wild and Scenic Rivers Act, 36 CFR 62 criteria for national natural landmarks, NPS *Management Policies 2001*
Endangered or threatened species and critical habitats	Retain	Endangered Species Act; NPS *Management Policies 2001*
Prime and unique agricultural lands	Dismiss	Council on Environmental Quality 1980 memorandum on prime and unique farmlands
Soils	Retain	NPS *Management Policies 2001*
Vegetation	Retain	NPS *Management Policies 2001*
Water quality and hydrology	Retain	Clean Water Act, Executive Order 12088, NPS *Management Policies 2001*
Wetlands and floodplains	Retain	Executive Order 11988, Executive Order 11990, Rivers and Harbors Act, Clean Water Act, NPS *Management Policies 2001*
Wilderness	Retain	Director's Order 41; NPS *Management Policies 2001*
Wildlife	Retain	NPS *Management Policies 2001*
Cultural resources	Retain	Section 106 of the National Historic Preservation Act; 36 CFR 800; National Environmental Policy Act; Executive Order 13007; Director's Order 28; NPS *Management Policies 2001*
Socioeconomic considerations		
Conflicts with land use plans, policies, or controls	Dismiss	NPS *Management Policies 2001*
Economics	Retain	40 CFR 1500 Regulations for Implementing NEPA
Energy requirements and conservation potential	Dismiss	NPS *Management Policies 2001*
Environmental justice	Dismiss	Executive Order 12898
Indian trust resources	Dismiss	Department of the Interior Secretarial Order No. 3206, Secretarial Order No. 3175
Natural or depletable resource requirements and conservation potential	Dismiss	NPS *Management Policies 2001*
Park operations	Retain	NPS *Management Policies 2001*
Public health and safety	Retain	NPS *Management Policies 2001*
Sustainability and long-term management	Dismiss	National Environmental Policy Act, 40 CFR 1500 Regulations for Implementing NEPA, NPS *Management Policies 2001*
Visitor use and experience	Retain	Organic Act; NPS *Management Policies 2001*

[a]/ Rationale for dismissal:

Prime and unique agricultural lands: Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. Lands within Yellowstone National Park are not available for farming and, therefore, do not meet the criteria for prime and unique agricultural lands.

Conflicts with land use plans, policies, or controls: Refer to the section " Project's Relationship to Other Plans" for a discussion of the absence of conflicts with other plans.

Energy requirements and conservation potential: Refer to the impact topic "Sustainability and long-term management" for the rationale for dismissal.

Environmental justice: Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires that all federal agencies address the effects of policies on minorities and low-income populations and communities. None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency's Draft Environmental Justice Guidance (July 1996).

Indian trust resources: Indian trust assets are owned by Native Americans but held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial Order No. 3206, "American Indian Tribal Rites, Federal – Tribal Trust Responsibilities, and the Endangered Species Act," and Secretarial Order No. 3175, "Departmental Responsibilities for Indian Trust Resources." The Bureau of Indian Affairs (BIA) and the National Park Service have formed a joint agency, the National Interagency Fire Center (http://www.fire.nps.gov/bia), to handle wildfire management on Indian trust lands based on fire management plans approved by the Indian landowner. According to NPS personnel, Indian trust assets do not occur within Yellowstone National Park.

Natural or depletable resource requirements and conservation potential: Refer to the impact topic "Sustainability and long-term management" for the rationale for dismissal.

Sustainability and long-term management: Sustainability is the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short- and long-term environmental impacts of development and other activities through resource conservation, recycling, waste minimization, and the use of energy-efficient and ecologically responsible materials and techniques.

Project actions would not compete with, dominate park features, or interfere with natural processes, such as the seasonal migration of wildlife or hydrologic activity associated with wetlands.

The NPS *Guiding Principles of Sustainable Design* (1993) directs NPS management philosophy. It provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used in the design and management of visitor facilities that emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. Sustainability principles have been developed and are followed for interpretation, natural resources, cultural resources, site design, building design, energy management, water supply, waste prevention, and facility maintenance and operations. The National Park Service also reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources.

Table 3: Goals, and the Ability of the Alternatives to Meet Them

Goal	Alternative A: Continue Current Management/No Action	Alternative B: Preferred Alternative
Protect human life, property, and designated resources, both natural and cultural	Structures within the park would continue to be subjected to potential wildfires, endangering both life and property. The infrequency and suppression of natural fires and the continued buildup of fuels would increase the potential for wildfire that would adversely affect natural and cultural resources.	Implementation of the preferred alternative would reduce fuel loads and the risk of fires migrating destroying structures in the park. This would meet the goal of protecting human life and property, and protect natural and cultural resources.
Ensure firefighter and public safety	Although standard fire protection safety measures would be followed to ensure firefighter and public safety, the potential for a wildfire would continue to exist, and the heavy fuel loads would increase the difficulty of controlling a wildfire, potentially endangering both firefighters and public safety.	This alternative would reduce fuel loads around selected developments, thus decreasing the potential for wildfires in those areas. By reducing the potential for wildfires, and making them easier to control, the danger to firefighters and the public would be lessened.
Restore and maintain resources and their processes	Because of the infrequency and suppression of wildfires, fuels buildup would continue around developments and the increased potential for the destruction of historic and cultural resources would remain.	Mechanical thinning practices around the selected developments would enhance the ability of firefighters to control a wildfire and protect the historic and cultural resources in those developments.
Safeguard cultural and historical resources for future generations	Fuels would continue to build up, increasing the potential for wildfire. Because cultural and historical resources are non-renewable and a large-scale wildfire would have long-term effects, the current management approach would not meet the goal.	Reduced fuel loads would result in a long-term benefit to these resources by making them less vulnerable to future fires.

Table 3: Goals, and the Ability of the Alternatives to Meet Them (Continued)

Goal	Alternative A: Continue Current Management/No Action	Alternative B: Preferred Alternative
Use cost-effective, environmentally sensitive techniques to reduce wildfire risk	The current fire management plan calls for the suppression of wildfire around developments without reducing fuel loads prior to a fire event. As a result, suppression has a higher risk to firefighters and at a higher cost in terms of time and money.	Mechanical thinning provides an immediate, cost effective, and environmentally sensitive method for reducing the risk of wildfire in the treatment areas.
Use minimum-impact suppression techniques to reduce or avoid effects of fire fighting on biotic systems, cultural or historic resources, and nearby communities	Management actions to reduce fuel loads at the wildland-urban interface are not occurring in the treatment areas. This leads to an increased potential for wildfire and the adverse effects of large-scale fire suppression. Therefore, this alternative is ineffective in meeting the goal of reducing or avoiding effects from fire fighting on resources and communities.	Wildfire prevention through fuels reduction is a minimum-impact suppression technique providing an effective method of reducing effects of fire fighting on resources and communities.
Stabilize and prevent degradation of natural and cultural resources that could be lost or irretrievably damaged by wildfire or large-scale fire suppression activities	Wildfires and associated large-scale suppression techniques could potentially occur with this alternative, which would prohibit the park from meeting this goal.	This alternative would lower the potential for wildfire and the need for large-scale fire suppression techniques around the treatment areas, thus reducing or preventing the degradation of natural and cultural resources.

SCOPING

National Park Service internal discussions led to identification of the main issues to be addressed in this environmental assessment. Protection of park resources and public health and safety are the primary objectives of the wildland-urban interface project.

On April 13, 2001 a letter was sent to 96 representatives of the park's affiliated tribes announcing the Spring 2001 general consultation. The option of discussing the hazardous fuels management project was included in the announcement. The annual meeting was held on April 25 and 26, 2001, with 16 representatives from eight tribes attending. The attendees did not choose to address the proposed action, nor were any comments received regarding the plan (R. Sucec, NPS Cultural Anthropologist, pers. comm., 2002).

The U.S. Fish and Wildlife Service was contacted regarding endangered and threatened species compliance for this project and replied with a letter that included the listed species in the park (see Appendix A).

The Montana State Historic Preservation Office was notified on August 15, 2001 regarding the proposed action near the Crevice Mountain Ranger Station. The agency agreed with the park's finding of National Register of Historic Places eligibility for the structure and several associated sites (see Appendix A).

The Wyoming Office of Federal Land Policy was also notified of the proposed actions. The response from the State Forester is included in the discussion below.

Public notice regarding the project was distributed by the park in a June 7, 2001 letter. Six letters were received in response to the public notice and reflected a range of concerns. The comments addressed in this environmental assessment and park responses are summarized below.

- An amphibian researcher was concerned about the potential impacts to a Columbia spotted frog population that might occur as a result of the proposed action in the Lake Utility treatment area. Suggestions were made to eliminate or limit tree removal, not skid or pile logs, leave existing woody debris, conduct activities after mid-October, and avoid moist swales and areas where water pools after snowmelt or rain showers in the frog's sensitive habitat. Impacts on grizzly bears, other wildlife, hydrology, and botanical diversity were also questioned.

  Response: The suggested mitigation measures would be adopted and implemented in the frog's sensitive habitat in the Lake Utility treatment area to minimize potential adverse effects to the Columbia spotted frog population. Potential effects to other wildlife, threatened and endangered species, vegetation and water quality and hydrology are addressed in this environmental assessment. For details, please see the appropriate sections in "Affected Environment and Environmental Consequences."

- Three letters addressed the possibility of windthrow in thinned lodgepole pine. The letters were authored by a coalition of environmental groups, the Wyoming State Forester, and a wildfire specialist/forester at the park. The suggestion was made to

perform thinning over a period of years, allowing the stand to develop wind firmness gradually.

Response: The 20-foot canopy separation is based on computer modeling that takes windthrow into account as one of the model variables. Secondly, there are open spaces around the cabins that have trees on the forest edge. These trees and those some distance into the forest, depending on orientation and other factors, also have windthrow resistance. While additional thinning would potentially increase the potential for windthrow, it would not be to the same extent as if the thinning were implemented in a continuous forest stand. Additionally, the "feathering" of vegetation (see the section Alternative B: Preferred Alternative, for more information about the treatments) with increasing distance from the structure(s) would reduce the potential for increased windthrow. And lastly, the wildland-urban interface project seeks to reduce fuel loads in an expeditious manner. The park would prefer to implement the proposed action as one project over a short time period, as opposed to incremental treatments over a period of years. This would meet the project objective of providing increased protection of public health and safety and park resources promptly.

- One letter questioned the goals, size of treatment areas, and potential impacts to soils. These topics are addressed in the "Purpose and Need" section and the "Soils" discussion in "Affected Environment and Environmental Consequences."

Other comments received include (some responses in parentheses):

- A request was made to consider "non-timber manipulation" means of structural protection in the full range of options. This option was dismissed because it did not provide for enhanced firefighter safety. Firefighters would still be required to monitor the effectiveness of other structural protection measures and be ready to use suppression tactics if necessary.

- The Sierra Club expressed concerns over effects to wildlife (addressed in the wildlife section), the visual impact of 20-foot crown spacing (addressed in Cultural Landscape discussion), erosion (see the soils section), and requested a cost-benefit analysis. A cost benefit analysis was not prepared because the relative costs of the alternatives were not considered in making decisions between alternatives in the EA. The goals of the proposed action, namely increasing firefighter safety and the protection of structures, many of which are historic resources, as well as essential elements to park operations, are not easily quantified. Although there are ways to estimate the value or cost of the proposed actions' benefits, by using risk assessment techniques and subjectively assigning costs to historic resource values, the benefits of increased firefighter safety and protection of irreplaceable historic structures far outweigh the cost of the fuel reduction treatments.

ALTERNATIVES CONSIDERED

Two alternatives described in this section were evaluated. They include the alternative of continue current management/no action and the preferred alternative. Fuel reduction activities associated with the preferred alternative include the use of mechanized (e.g., chain saws, power brushcutters) and hand tools to thin areas within a 400-foot perimeter from the edge of a structure in specified backcountry and frontcountry sites.

The actions identified in the preferred alternative are designed to meet the wildland-urban interface goal of risk reduction using methods that mimic natural fire processes and effects. The alternatives are summarized in Table 4 and described below.

Table 4: Alternative Descriptions

Alternative	Descriptions/Treatment	Acres to be Treated
A	**Continue current management/no action.**	**0**
B	**Preferred action.** Thin canopy within 400 feet of structure to an average 20-foot spacing between crowns. Remove vegetation within 30 feet of structure that is an obvious fire hazard. Most pole-sized saplings, seedlings, and dead and down woody material would be removed within 120 feet of structures. More pole-sized trees (between 4 and 6 inches in diameter) saplings (less than 4 inches in diameter), seedlings, and dead and down woody material would be left between the 120-400 foot perimeters and the amount of potential fuel remaining in the understory would increase with distance from the structure (or "feathering" the vegetative density)**.** Spare all limber pine, whitebark pine, aspen trees and seedlings, and Douglas-fir trees exceeding 16 inches diameter at breast height (DBH). Slash would either be used as firewood, hand piled and burned at the backcountry sites, or chipped in the frontcountry sites.	423.9

ALTERNATIVE A: CONTINUE CURRENT MANAGEMENT / NO ACTION

Continue current management/no action is the baseline condition against which proposed activities are compared. It is defined as continuing existing management practices into the future. Under the current fire management plan, no hazard fuels treatment can take place around the structures in the proposed treatment areas prior to the threat of wildfire.

The continue current management/no action alternative assumes that fuels in the treatment area would continue to build up. At some future time, an ignition from a natural or human-caused source could result in a wildland fire. Under most conditions, surface fires that would consume surface plant cover and portions of the understory and midstory would be expected. However, under drought conditions and/or high wind speeds, a running crownfire that would destroy the overstory could result.

The treatment areas addressed in this assessment include 31 backcountry sites and three frontcountry sites. Hazardous fuels reduction would not take place in these treatment areas under the no action alternative. Consequently, the no action alternative would not offer any advantages in the ability to control wildfires in the treatment areas compared to the action alternative.

Management of wildland fire activities at Yellowstone National Park must include all appropriate mitigation and best management practices as outlined in NPS *Management Policies 2001* (NPS 2000c), and are to be conducted in a manner that minimizes impacts to natural and cultural resources. During wildland fire suppression activities, protection of resources would include some or all of the following strategies that would minimize or offset potential adverse effects associated with the activities:

Natural Resources

- Water bars would be used to prevent erosion of disturbed soils;
- Fire lines would be kept to a minimum width necessary to allow backfiring or creation of a safe backline;
- Whenever possible, natural barriers would be used to avoid unnecessary fire line construction;
- If adequate water and pumps were available, wet lines would be used in lieu of hand line construction; and
- Rehabilitate all fire lines, camps, and other disturbances.

Cultural Resources

- Use protective tactics in areas identified by the Natural or Cultural Resource Management specialist as having cultural significance, either archeological, historical, landscape, or ethnographic;

- Locate and isolate sites that are vulnerable to fire or to human activities associated with the burns, and flag known sites and structures for avoidance;

- Treat sites with approved ground-applied and non-corrosive retardants;

- Exercise caution during aerial dumping of water or fire retardant to ensure sites and structures are not impacted;

- At sites vulnerable to fire, remove heavy fuels that cause long-duration heating;

- Educate fire treatment personnel about cultural resources in general and the need to protect any cultural resources encountered. This would include instructions for notifying appropriate personnel if human remains were discovered;

- Minimize ground disturbance, including construction of helispots, when possible;

- Fire control lines would not be permitted through cultural sites;

- Wrap important cultural structures, including culturally altered trees, with fire shelters;

- During rehabilitation of fire control lines or burned areas, care would be taken to avoid damage to cultural resources;

- Conduct post-fire cultural resources surveys to identify and evaluate newly discovered sites and/or document damage to known sites; and

- Develop a plan to ensure stabilization or information retrieval from cultural resources in burned areas.

ALTERNATIVE B: PREFERRED ALTERNATIVE

The preferred alternative would provide for reduction of fuel loads in three developed frontcountry areas and 31 backcountry areas. The three frontcountry treatment areas, the Lake Utility Area, East Entrance, and Northeast Entrance areas, cover approximately 119.4 acres. The backcountry sites (30 cabin sites) would each be treated over an area ranging from 4 to 15 acres, plus treatments in the 18.5-acre Bechler developed area. A list of the proposed backcountry and

frontcountry sites and their sizes is included previously in Table 1 in the Description of the Project Area section.

Mechanical fuel reduction of hazardous fuels would be used in treatment areas adjacent to structures that are at risk from a wildland fire. Mechanical fuel reduction in the treatment areas would be performed by park personnel and contractors using hand and power tools. The following are specific objectives of the fuel reduction treatments under the preferred alternative:

- Establish live canopy spacing within 400 feet of structure to an average of 20 foot spacing between crowns. Most pole-sized saplings, seedlings, and dead and down woody material would be removed within 120 feet of structures. More pole-size saplings, seedlings, and dead and down woody material would be left between the 120-400 foot perimeters and the amount of potential fuel not removed would increase with distance from the structure. The density of vegetation would be “feathered” in an irregular pattern and its density would increase progressively distant from the structure(s). Distance between tree canopies would be varied to accommodate the cultural landscape and viewshed wherever possible.

- Remove vegetation within 30 feet of the structure if it is an obvious fire hazard.

- Protect and maintain 100 percent limber pine, whitebark pine, aspen trees and seedlings, if these species are encountered in treatment areas.

- Protect and maintain Douglas-fir seed source trees that exceed 16-inches diameter at breast height (DBH).

- Implement the use of fire behavior modeling as a guide to fuels management.

Thinning of the live canopy would be accomplished using hand tools and chainsaws. The method of disposal/removal of mechanically thinned vegetation in the treatment areas would vary according to the amount of live canopy and woody material present prior to treatment. Possible disposal methods include salvaging cuttings for firewood, and hand piling and burning of slash. In addition, chipping would be considered at the three frontcountry treatment areas in order to alleviate possible impacts created by burn circles.

Best management practices and mitigation measures would be used to prevent, minimize, or offset potential adverse effects associated with fuel reduction and fire management activities. These practices and measures would be incorporated into the fuels management actions to ensure that major adverse effects would not occur. Mitigation measures and best management practices for the protection of specific resources would include:

Natural Resources

- Smoke management reporting procedures for burning in Wyoming and Montana would be followed for all fire operations;
- Employment of “Minimum Impact Suppression Tactics” when possible;
- Parking vehicles in specified areas and having crews walk or travel on horseback to the project sites to avoid resource damage;
- No off road vehicle use unless approved by the Superintendent;
- No heavy equipment use unless approved by the Superintendent;
- The Superintendent must approve chainsaw and pump use;
- Mechanized equipment would be in good operating condition so that exhaust emissions are kept to a minimum;
- Transportation of crews and equipment would take place on paved roads, when appropriate;
- Slash pile burning would be scheduled for periods when inversions would be unlikely to trap air;
- Burns would take place when visitation levels are low and prevailing winds would carry smoke away from structures;
- Burn piles would be free from dirt, as dry as possible, and small enough so smoke impacts can be managed;
- Ignition would be during periods of ideal ventilation and atmospheric instability resulting in optimal smoke dispersal;
- Meteorological conditions would be reevaluated on the day of the burn to ensure that conditions are favorable for smoke dispersion and air quality standards would not be threatened. If unfavorable conditions were indicated, the burn would be postponed;
- Using refueling stations with ground protection for refueling chainsaws to minimize chances of gasoline spills;
- Slash would not be moved from upland sites into or through wetlands;
- Slash would be kept out of open water;
- Equipment maintenance and fueling would not take place in wetlands;

- Prior to project implementation, park botanists would inventory unsurveyed areas for rare plants and wetlands and the park would identify mitigation measures as necessary to avoid or minimize impacts to those resources;

- When feasible, vegetation would be protected by implementing the treatments in the fall after most plants go to seed, when the soil is driest, or when the ground is frozen or snow-covered;

- Care would be taken to avoid bird nests during limbing and trimming activities;

- Seasonal restrictions on implementing treatments at certain backcountry sites to minimize potential effects to the gray wolf and grizzly bear would be complied with as noted in the attached biological assessment (Appendix C);

- Bald eagle perch trees at proposed treatment sites in certain riparian areas would not be removed as noted in the attached biological assessment (Appendix C); and

- Treatments at backcountry sites would “feather” the thinning, with less removal of material between 120-400 feet from the structures than in the 120 foot area around the structure to minimize potential effects to Canada lynx. Refer to the attached biological assessment (Appendix C) for more information.

- A July 3, 2001 letter to the park's planning office from the GYE Amphibian Survey and Monitoring Project suggested five mitigation measures in an area between the road to the water tower and the fenced springs at Lodge Creek. The letter identified this area as sensitive habitat for the Columbia spotted frog. The sensitive habitat is within the Lake Utility treatment area. The mitigation measures would be implemented in the sensitive habitat area and include eliminating or limiting tree removal, not skidding or piling logs in the area, leaving existing woody debris in the sensitive habitat, conducting activities in the sensitive habitat after mid-October, and avoiding moist swales and areas where water pools after snowmelt or rain showers.

Cultural Resources

- Prior to project implementation, an archeologist meeting the Secretary of the Interior’s standards would inventory unsurveyed areas for cultural resources, and the park would ensure compliance with Section 106 of the National Historic Preservation Act;

- Assure that protection and mitigation measures for known cultural resource sites, especially those vulnerable to fire and situated in or near the project area, are completed before a prescribed fire project is initiated;

- Carefully remove fuels near culturally altered trees, wickiups, historic buildings, and other cultural resources vulnerable to fire or post-fire impacts;
- Exercise care during thinning to avoid disturbing cultural resources, especially culturally altered trees;
- Remove fuels under the direction of a resource professional;
- Heavy fuels (stumps) that could not be removed from cultural sites would be cut flush with the ground and buried using sterile soils;
- Avoid ground-disturbing activities in areas containing cultural sites;
- Define work-limits in the vicinity of important cultural resources;
- Monitor fire management activities, and halt work if previously unknown resources are located;
- Protect and record newly discovered resources;
- Brief work crews about the need to protect any cultural resources encountered, and instruct them regarding the illegality of collecting artifacts on federal lands. This would include instructions for notifying appropriate personnel if human remains were discovered;
- Identify suitable slash disposal areas lacking cultural sites (both on-site and off-site);
- Vehicles would access the work areas via non-sensitive routes;
- No mechanized equipment would be used within archeological site boundaries;
- Avoid and protect culturally altered trees during selective thinning and limbing;
- No vegetation would be removed that would impact the viewshed adversely; and
- Previously unrecorded properties encountered during implementation of this plan would be documented, evaluated, and protected.

Health and Safety

- All fire management activities would consider safety of personnel and the public as the highest priority;

- No fire management operations would be initiated until all personnel involved receive a safety briefing describing known hazards and mitigating actions (lookout, communications, escape routes and safety zones), current fire season conditions and current and predicted fire weather and behavior; and

- Park neighbors, park visitors, and the local residents would be notified of all planned and unplanned fire management activities that have the potential to impact them.

ALTERNATIVES CONSIDERED BUT REJECTED

Two other alternatives were initially considered by the Yellowstone National Park staff but rejected during the initial evaluation process. These alternatives and the reasons they were dismissed from further consideration are described below.

The use of prescribed fire is an approved treatment method in the park's fire management plan; however, a prescribed burn would likely kill 75 to 100 percent of the mature trees in a lodgepole stand. Additionally, it could be difficult to safely manage a prescribed burn in the proposed treatment areas without prior mechanical fuel reduction treatments, and the mechanical fuel treatments would likely be all that is needed to achieve the goals of the proposed action. The use of prescribed fire was therefore dismissed from further analysis.

An alternative was also considered that involved the removal of all flammable vegetation within a 160-foot radius of the structure, as well as the removal of ladder fuels for an additional 100 feet. This alternative was dismissed from further analysis because the impacts to the viewshed were considered unacceptable by park staff.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

As stated in Section 2.7.D. of *Director's Order #12 and Handbook* (NPS 2001a), the environmentally preferred alternative is the alternative that will promote the policies expressed in the National Environmental Policy Act (Sec. 101 (b)). This includes alternatives that:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

- Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.

- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.

- Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.

- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.

- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

In the National Park Service, the no action alternative may also be considered in identifying the environmentally preferred alternative. Alternative A, continue current management/no action, represents the current management direction for Yellowstone National Park in conformance with the park's wildland fire management plan (NPS 1992). Alternative A would allow for the continued buildup of woody fuels in the treatment areas, with an accompanying risk of wildfire. This type of event would produce adverse effects to many of the resources discussed in this assessment.

Alternative B, the preferred alternative, would reduce the adverse effects to human safety and cultural resources associated with wildfire. In doing so, compared to the continue current management/no action alternative, Alternative B would:

- Reduce the risk to firefighter's health and safety and other undesirable consequences of wildfire.

- Provide better protection of historic and cultural resources.

Therefore, Alternative B would be environmentally preferable over the continue current management/no action alternative (Alternative A).

SUMMARY OF IMPACTS

Table 5 briefly summarizes the effects of each of the alternatives on the impact topics that were retained for analysis at Yellowstone National Park. Detailed information on the effects of the alternatives (including definitions of the impact intensity thresholds in Table 6) is provided in the "Affected Environment and Environmental Consequences" section.

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Table 5: Comparison of Impacts of Alternatives

Impact topics	Alternative A: Continue Current Management /No Action	Alternative B: Preferred Alternative
Air quality	A widespread fire would produce short-term, minor to moderate, regional, adverse effects to air quality. Indirect effects from these air emissions would include impaired visibility along roadways, reductions in recreational values at scenic vistas, and potential health effects to visitors and park staff.	Air quality effects would be direct and adverse, but short-term, localized, and range from negligible to minor. Cumulative effects would be beneficial because the preferred alternative reduces the potential production of large volumes of air pollutants from wildland fires. These benefits would more than offset the adverse effects to air quality that would be associated with implementation of the preferred alternative.
Endangered or threatened species and critical habitats	There would be no adverse effect on any endangered or threatened species, or to any species proposed for listing, or to any designated critical habitats, as a result of the no action alternative.	There would be no adverse effect on any endangered or threatened species, or to any species proposed for listing, or to any designated critical habitats, as a result of the proposed action. Mitigation measures to offset potential adverse effects are identified in the biological assessment.
Geothermal Resources	Thermal features may be adversely affected in the event of a wildfire from deposition of sediment from adjacent burned areas and increased water temperature. Impacts could range from negligible to moderate in the event of a wildfire.	Thinning activities associated with the preferred alternative would not affect geothermal features. Implementation of mitigation measures to avoid thermal features when disposing of debris would also reduce the potential impact on these resources.
Soils	In the absence of wildfire, Alternative A would have no effects on park soil resources. In the event of a wildfire, short-term, negligible to moderate, direct, localized adverse effects would result. Low-intensity wildfires would result in negligible to minor, long-term beneficial effects.	Alternative B would produce short-term, negligible to minor, localized, adverse effects on soils within the treatment areas. Potential adverse effects would be offset by the long-term, beneficial effects associated with the reduction in potential for wildfire.
Vegetation	Short-term adverse effects, ranging from negligible to moderate depending on the intensity and size of a fire, would occur in the event of a wildfire due to plant mortality. The long-term beneficial effects could be minor to moderate in those communities adapted to fire and in areas where favorable environmental conditions exist.	Negligible to minor, short-term, localized adverse effects on vegetation would occur due to mechanical thinning activities, slash-pile burning, the potential establishment of exotic plant species, and the potential for windthrow in thinned areas

Table 5: Comparison of Impacts of Alternatives

Impact topics	Alternative A: Continue Current Management /No Action	Alternative B: Preferred Alternative
Water quality and hydrology	In the event of a wildfire, short- and long-term adverse effects to water quality and hydrology could occur. There is potential for minor to moderate adverse effects from erosion and elevated nutrient levels depending on the magnitude of a wildfire event.	Thinning treatments would have local, short-term, negligible adverse effects on water quality and hydrology. With implementation of mitigation measures, burning debris in slash-piles would have no effect on water quality and hydrology.
Wetlands and floodplains	In the event of an uncontrolled wildfire, destruction of vegetation would increase run-off and sedimentation that would result in short- and long-term, negligible to moderate, direct and indirect, adverse effects to wetlands. Floodplains would not be affected.	With the implementation of mitigation measures to offset any potential adverse effects, fuels management activities associated with the preferred alternative would not affect wetlands or floodplains.
Wilderness	In the event of a wildfire, long-term adverse impacts to wilderness resources and values, would be no greater than minor in the proposed wildland-urban interface treatment areas. In the absence of fire, unnatural conditions would prevail in the treatment areas resulting in negligible adverse effects.	Implementation of the preferred alternative would result in negligible, short-term, local adverse effects on wilderness resources as a result of the presence of humans and fuels reduction equipment (i.e., motorized chainsaws and brushcutters). Long-term beneficial effects would occur as a result of the reduced potential for loss of structures integral to the park's mission and the reduction in suppression efforts that would be used to protect those structures in the event of a wildfire.
Wildlife	A short-term, direct, negligible to moderate adverse impact would occur to wildlife as a result of a wildfire, suppression, and habitat rehabilitation efforts. Long-term, minor beneficial effects would accrue as a result of the continued increase in downed wood and snags, providing wildlife habitat structural elements. However, this benefit would be offset by a greater fire risk and the increased fire intensities typically associated with larger fuel loads.	The adverse impacts to wildlife associated with Alternative B would be short-term, local, and negligible. Mitigation measures used to offset potential adverse effects to endangered and threatened species (refer to the biological assessment in Appendix C) would reduce the potential for adverse effects to other wildlife species as well.
Cultural resources	Direct impacts to historic and ethnographic sites would be long-term, adverse, and of minor to moderate intensity. Direct and indirect adverse impacts on archeological resources from fires and fire suppression activities would be minor to moderate and long-term. Viewshed changes resulting from fire or suppression activities (loss of trees and structures, burned vegetation and stumps, exposed soils in fire lines) could cause short- and long-term, minor to moderate adverse impacts.	Alternative B would have a long-term, minor to moderate beneficial impact on cultural resources by making them much less vulnerable to future fires. Through avoidance and other mitigating measures, damage to cultural resource sites from future fire or from suppression activities would be sharply reduced, resulting in moderate beneficial impacts over the long-term. With mitigating measures, only negligible to minor, direct and indirect short- and long-term adverse impacts to archeological, historic, ethnographic, and viewshed resources would be expected.

Table 5: Comparison of Impacts of Alternatives

Impact topics	Alternative A: Continue Current Management /No Action	Alternative B: Preferred Alternative
Economics	Implementation of the no action alternative would have negligible to minor effects of the local economy. The potential loss of structures would not be reduced. Given the size and location of the backcountry treatment areas, it is unlikely loss of these sites would have consequential economic effects. The loss of structures at the frontcountry areas could have a minor adverse effect on economic resources.	Economic effects of implementation of the preferred alternative would be negligible.
Park operations	The no action alternative would result in potential short and long-term, local, negligible to minor adverse effects on park operations. Structures in the project area would not benefit from the establishment of adjacent defensible space, leaving them vulnerable to damage by wildfire.	Alternative B would result in negligible, short-term, localized, adverse effects to park operations from treatment implementation. Long-term effects to park operations would be beneficial and minor, resulting from a reduced potential for wildfire to damage or destroy park structures and an increase in safety for firefighters.
Public health and safety	Alternative A would have a minor to moderate adverse affect on public health and safety in the short- and long-term in the event of a wildfire.	Short-term, direct, adverse effects to health and safety resulting from exposure of workers to hazardous equipment would be negligible with implementation of appropriate safety training. Long-term effects, namely those associated with reduced opportunity for uncontrolled wildfire, would be beneficial and minor to moderate.
Visitor use and experience	Alternative A would have a negligible adverse affect on the visitor use/experience in the short- and long-term in the event of a wildfire due to the limited number of visitors who use the park's backcountry. A fire at the frontcountry sites would potentially cause minor to moderate adverse effects on visitor use and experience.	Alternative B would have a negligible adverse affect on visitor use/experience in the short- and long-term due to the limited number of visitors who go to the backcountry sites, the dispersed locations of the backcountry treatment areas, the small size of the backcountry treatment areas, and the closure of treatment areas to visitors during treatment. Mitigation measures would be employed to offset adverse effects to visitors during implementation of the treatments at the frontcountry sites.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

REGULATIONS AND POLICIES

The regulations and policies associated with fuels management from the fire management plan (NPS 1992) are incorporated by reference to eliminate repetitive information. A list of regulations and policies relevant to the impact topics is provided in Table 2.

METHODOLOGY

For each impact topic, the analysis includes a brief description of the affected environment and an evaluation of effects. Because the cultural resource analysis, the cumulative analyses, and impairment determinations are somewhat unique, separate method descriptions are presented for these topics and analyses.

The impact analysis involved the following steps:

- Identify the area that could be affected.
- Compare the area of potential effect with the resources that are present.
- Identify the intensity (negligible, minor, moderate or major), context, duration (short- or long-term), and type (direct or indirect) of effect, both as a result of this action and from a cumulative effects perspective. Identify whether effects would be beneficial or adverse. The criteria used to define the intensity of impacts associated with the analyses are presented in Table 6.
- Identify mitigation measures that may be employed to offset or minimize potential adverse impacts.

The impact analyses were based on professional judgment using information provided by park staff, relevant references and technical literature citations, and subject matter experts.

Cultural Resource Analysis Method

Impacts to cultural resources are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality (CEQ 1978) that implement the National Environmental Policy Act. These impact analyses also are intended to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106

of the NHPA (36 CFR Part 800, Protection of Historic Properties), impacts to cultural resources were identified and evaluated by:

- Determining the area of potential effects;
- 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;
- Applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and
- Considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualify it for inclusion in the National Register. For example, this could include 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 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 is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

Council on Environmental Quality regulations (CEQ 1978) and *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a) 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, such as reducing the intensity of an impact from major to moderate or minor. Any resulting reduction in intensity of impact because of mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis for cultural resources. The summary is intended to meet the requirements of Section 106 and is an assessment of the effect of implementing the alternative on cultural resources, based on the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

Table 6: Wildland Urban Interface Project Impact Threshold Definitions

Impact Topic	Impact Threshold Definition			
	Negligible	**Minor**	**Moderate**	**Major**
Air quality	No changes would occur or changes in air quality would be below or at the level of detection, and if detected, would have effects that would be considered slight and short-term.	Changes in air quality would be measurable, although the changes would be small, short-term, and the effects would be localized. No air quality mitigation measures would be necessary.	Changes in air quality would be measurable, would have consequences, although the effect would be relatively local. Air quality mitigation measures would be necessary and the measures would likely be successful.	Changes in air quality would be measurable, would have substantial consequences, and be noticed regionally. Air quality mitigation measures would be necessary and the success of the measures could not be guaranteed.
Endangered or threatened species and critical habitats	No federally listed species would be affected or the alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population.	The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small and would be short-term.	An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect would have some long-term consequence to the individual, population, or habitat.	An individual or population of a listed species, or its critical habitat, would be noticeably affected with a long-term, vital consequence to the individual, population, or habitat.

Table 6: Wildland Urban Interface Project Impact Threshold Definitions

Impact Topic	Impact Threshold Definition			
	Negligible	**Minor**	**Moderate**	**Major**
Geothermal	Geothermal resources would not be affected or the effects to the resource would be below or at lower levels of detection. No long-term effects to geothermal resources would occur.	The effects to geothermal features would be detectable but small. Changes in the soil permeability near thermal features may result in slight, short-term changes in the temperature of the shallow ground water supplied to thermal features. Minimal amounts of sedimentation from adjacent areas may settle into thermal features. If mitigation was needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.	An action could represent a risk of altering the temperature of shallow ground water supplying thermal features which may persist over a longer time frame. Sedimentation into thermal features from treatments in adjacent areas would be apparent. Effects would be long-term but would not result in a change in the structure and function of the resource.	The effects to geothermal features would be readily measurable. Changes in the temperature of shallow ground water supplying thermal features and/or measurable amounts of sedimentation into features would result in changes to the character and function of the resources. Effects would be long-term.
Soils	Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and no long-term effects to soils would occur.	The effects to soils would be detectable, but likely short-term. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation was needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.	The effect on soil productivity or fertility would be readily apparent, long-term, and result in a change to the soil character over a relatively wide area.	The effect on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Table 6: Wildland Urban Interface Project Impact Threshold Definitions

Impact Topic	Impact Threshold Definition			
	Negligible	**Minor**	**Moderate**	**Major**
Vegetation	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 short-term and on a small scale.	The alternative would temporarily 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.	The alternative would affect some individual native plants and would also affect a sizeable segment of the species' population in the long-term and over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected.	The alternative would have a considerable long-term 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.
Water quality and hydrology	Neither water quality nor hydrology would be affected, or changes would be either non-detectable or if detected, would have effects that would be considered slight, local, and short-term.	Changes in water quality or hydrology would be measurable, although the changes would be small, likely short-term, and the effects would be localized. No mitigation measure associated with water quality or hydrology would be necessary.	Changes in water quality or hydrology would be measurable and long-term but would be relatively local. Mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed.	Changes in water quality or hydrology would be readily measurable, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures would be necessary and their success would not be guaranteed.
Wetlands and floodplains	Wetlands or floodplains would not be affected or the effects to the resource would be below or at the lower levels of detection. No long-term effects to wetlands or floodplains would occur and any detectable effects would be slight.	The effects to wetlands or floodplains would be detectable and relatively small in terms of area and the nature of the change. No long-term effects to wetlands or floodplains would occur.	The alternative would result in effects to wetlands or floodplains that would be readily apparent, including a long-term effect on wetland vegetation. Wetland or floodplain functions would not be affected in the long-term.	Effects to wetlands or floodplains would be observable over a relatively large area, would be long-term. The character of the wetland or floodplain would be changed so that the functions typically provided by the wetland or floodplain would be substantially changed.

Table 6: Wildland Urban Interface Project Impact Threshold Definitions

Impact Topic	Impact Threshold Definition			
	Negligible	**Minor**	**Moderate**	**Major**
Wilderness	A change in the wilderness character could occur, but it would be so small that it would not be of any measurable or perceptible consequence.	A change in the wilderness character and associated values would occur, but it would be small and, if measurable, would be highly localized.	A change in the wilderness character and associated values would occur. It would be measurable, but localized.	A noticeable change in the wilderness character and associated values would occur. It would be measurable, and would have a substantial or possibly permanent consequence.
Wildlife	Wildlife would not be affected or the effects would be at or below the level of detection, would be short-term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.	Effects to wildlife would be detectable, although the effects would likely be short-term, localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.	Effects to wildlife would be readily detectable, long-term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.	Effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Table 6: Wildland Urban Interface Project Impact Threshold Definitions

Impact Topic	Impact Threshold Definition			
	Negligible	**Minor**	**Moderate**	**Major**
Cultural resources	The impact is at the lowest levels of detection – barely perceptible and not measurable.	For archeological resources, the impact affects an archeological site(s) with modest data potential and no significant ties to a living community's cultural identity. The impact does not affect the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape.	For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community's cultural identity. For a National Register eligible or listed structure, district, or cultural landscape, the impact changes a character defining feature(s) of the resource but does not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized.	For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community's cultural identity. For a National Register eligible or listed structure, district, or cultural landscape, the impact changes a character defining feature(s) of the resource, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the National Register.
Economic effects	No effects would occur or the effects to socioeconomic conditions would be below or at the level of detection. The effect would be slight and no long-term effects to socioeconomic conditions would occur.	The effects to socioeconomic conditions would be detectable, although short-term. Any effects would be small and if mitigation is needed to offset potential adverse effects, it would be simple and successful.	The effects to socioeconomic conditions would be readily apparent and likely long-term. Any effects would result in changes to socioeconomic conditions on a local scale. If mitigation is needed to offset potential adverse effects, it could be extensive, but would likely be successful.	The effects to socioeconomic conditions would be readily apparent, long-term, and would cause substantial changes to socioeconomic conditions in the region. Mitigation measures to offset potential adverse effects would be extensive and their success could not be guaranteed.

Table 6: Wildland Urban Interface Project Impact Threshold Definitions

Impact Topic	Impact Threshold Definition			
	Negligible	**Minor**	**Moderate**	**Major**
Park operations	Park operations would not be affected or the effect would be at or below the lower levels of detection, and would not have an appreciable effect on park operations.	The effect would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations. If mitigation was needed to offset adverse effects, it would be relatively simple and would likely be successful.	The effects would be readily apparent, be long-term, and would result in a substantial change in park operations in a manner noticeable to staff and the public. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The effects would be readily apparent, long-term, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.
Public health and safety	Public health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on the public health or safety.	The effect would be detectable and short-term, but would not have an appreciable effect on public health and safety. If mitigation was needed, it would be relatively simple and would likely be successful.	The effects would be readily apparent and long-term, and would result in substantial, noticeable effects to public health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful.	The effects would be readily apparent and long-term, and would result in substantial, noticeable effects to public health and safety on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed.
Visitor use and experience	Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short-term. The visitor would not likely be aware of the effects associated with the alternative.	Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.	Changes in visitor use and/or experience would be readily apparent and have important long-term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

Cumulative Effects Analysis Method

The Council on Environmental Quality (CEQ 1978) regulations for implementing the National Environmental Policy Act require assessment of cumulative effects in the decision-making process for federal projects. Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects are considered for both the no-action and proposed action alternatives.

Cumulative effects were determined by combining the effects of the alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, ongoing, or reasonably foreseeable future actions at Yellowstone National Park and in the surrounding region. Other actions that have the potential to have a cumulative effect in conjunction with this wildland-urban interface project include:

- Other actions by the National Park Service to implement the Yellowstone National Park Fire Management Plan (NPS 1992).
- Any non-fire-related actions by the National Park Service in the park.
- Fire management and/or forest management actions by other federal agencies and local tribal governments.
- Resource development on both public and private lands in the vicinity, such as mining, timbering, and development of visitor facilities.
- Conversion of private lands outside the park to other uses, such as pasturage, agricultural production, transportation corridors, and urban development.

Impairment Analysis Method

National Park Service *Management Policies 2001* (NPS 2000c) requires analysis of potential effects to determine whether or not actions would impair park resources or values.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values.

These laws give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill

the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. Impairment may result from NPS activities in managing the park, from visitor activities, or from activities undertaken by concessionaires, contractors, and others operating in the park. An impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

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

- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or

- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

A determination on impairment is included in the impact analysis section for all impact topics relating to park resources and values.

AIR QUALITY

Affected Environment

The Clean Air Act, as amended, recognizes the need to protect visibility and air quality in national parks. By definition, national parks, including Yellowstone National Park, are mandatory Class I areas and are therefore given the highest level of air quality protection. In Class I airsheds, air quality is better than the National Ambient Air Quality Standards, and there is little allowance for deterioration of air quality. Monitoring stations are set up in different areas of the park to evaluate air quality conditions and compare them with federal and state standards. The Montana Department of Environmental Quality Monitoring and Data Management Bureau installed and regularly examines a carbon monoxide monitoring station on the northeast side of the west entrance of the park and a particulate sampling station outside of the park in the town of West Yellowstone. Wet acid deposition is monitored at Tower Falls, located in the north central area of the park, through the park's participation with the National Atmospheric Deposition Program. Yellowstone National Park also participates with the

Environmental Protection Agency in operating a site that provides atmospheric data and ground-level ozone through the program CASTNet, Clean Air Status and Trends Network. Lastly, the park participates in a collaborative visibility monitoring program known as the Interagency Monitoring of Protected Visual Environments (IMPROVE) program. The equipment for both the IMPROVE and CASTNet programs are located at Yellowstone Lake and measure atmospheric concentrations of aerosols, sulfates, nitrates, ammonium, sulfur dioxide, nitric acid, and ozone levels (NPS 2000b).

Results from the several monitoring stations throughout the park indicate that all park areas meet federal and state ambient air quality standards. Because there is little industrial activity and relatively low population in northwestern Wyoming, the overall regional air quality of the park is good. The major sources of air pollutants in the park are those emitted by vehicle emissions and smoke from fires (NPS 2000b).

The Clean Air Act provides that the federal land manager has an affirmative responsibility to protect air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts. During a wildfire event, high concentrations of carbon monoxide, other gases, and particulate matter can be released affecting air quality. These emissions have potential adverse health effects. In addition to health effects, wildfire smoke could affect visibility in the park. NPS fire management activities which result in the discharge of air pollutants are subject to, and must comply with, all applicable federal, state, interstate, and local air pollution control requirements. Smoke mitigation measures would be employed to minimize impacts to visibility and air quality within the park and surrounding areas.

Impacts of Alternative A, Continue Current Management/No Action

Alternative A, continue current management/no action, would produce a short-term reduction in the generation of particulate matter from fires because all fires not in wildland fire use zones would be suppressed. However, this alternative does not alter the quantities of fuel loads in the wildland-urban interface. As fuel loads increase over time, the risk of wildfire would increase. A widespread fire would produce short-term, adverse, minor to moderate, regional adverse effects to air quality as large quantities of pollutants, primarily particulates, were released to the atmosphere. Indirect adverse effects from these air emissions would include impaired visibility along roadways, reductions in recreational values at scenic vistas, and potential health effects to visitors and park staff.

Cumulative Effects. Growth within the park and in the towns around the park may result in minor to moderate air pollution increases over time. Fuels management actions in the surrounding national forests and Grand Teton National Park include the use of prescribed fire in ecosystem restoration.

Coincident fires in the adjoining public and private lands, along with the cumulative effects from other sources of air pollutants, could have minor to moderate, short-term, adverse cumulative effects on regional air quality.

Conclusion. A widespread fire would produce short-term, minor to moderate, regional, adverse effects to air quality. Indirect effects from these air emissions would include impaired visibility along roadways, reductions in recreational values at scenic vistas, and potential health effects to visitors and park staff.

Alternative A would not produce major adverse impacts on air resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of air resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

Alternative B, the preferred alternative, includes thinning and slash pile burning. Thinning would produce negligible, short-term, local, adverse effects to air quality from crew transport vehicle emissions and from travel over dirt roads. Thinning treatments using power tools (i.e., chainsaws, brush cutters) would have a negligible, short-term, local adverse effect on air quality as a result of combustion engine emissions. None of these emissions sources would have an appreciable or consequential adverse effect on local air quality.

The proposed action would create a zone within which firefighters may be able to gain control of a wildland fire and prevent it from spreading to developed areas. This would reduce smoke emissions associated with wildfire and would produce minor, short-term, beneficial effects to air quality compared to Alternative A. Indirect impacts to visibility and human health from the reduction in emissions from wildfires would also be minor, short-term, and beneficial.

Prior to implementing slash burning, a permit from the Wyoming Department of Environmental Quality (or the Montana Department of Environmental Quality for the three sites in Montana) would be obtained. All slash burning activities would be performed in treatment areas and would conform to state and national standards and meet stipulations in the burn permit. These highly controlled burns would only be conducted under conditions when there was minimal risk of fire escape. The use of mitigation techniques, in concert with the slash piles' limited fuel content, would produce negligible to minor, short-term, local, adverse effects to air quality. Adverse effects on visibility would be local, short-term, and minor if the observer were in close proximity to, and downwind of, the burning piles.

Cumulative Effects. Air quality effects from any of the alternatives would be short-term. Therefore, there would be little cumulative effect on air quality, either

locally or regionally. Cumulative effects of smoke from other sources, such as fireplace or campfire emissions could have minor adverse impacts during inversions. Development within the park and in surrounding towns and the use of recreational vehicles may result in minor to moderate local air pollution increases over time. However, if these external sources of air pollution were combined with a major wildfire in the park, the impacts, although short-term, could be moderately adverse to the regional airshed. Cumulative adverse effects to regional air quality could range from minor to moderate, depending on the timing and size of other emissions that would coincide with fire events in the park.

Fire management activities in the surrounding national forests and Grand Teton National Park include the use of prescribed fire to meet management goals. Burning of slash piles in the park, coincident with large-scale Forest Service activities, would contribute to adverse regional air quality effects. With planning, mitigation, and coordination between the park and other potential point sources in the area, the cumulative effects of slash pile burning on regional air quality would be adverse, short-term, and negligible.

Additionally, implementation of the preferred alternative would result in a beneficial effect to air quality in the long-term. These beneficial effects would result from the reduced potential for wildfire spread. The severe adverse effects on air quality, particularly to visibility, locally and regionally, that result from wildfire would be less likely after fuel loads were reduced.

The preferred alternative would represent an extremely small proportion of the cumulative adverse effect on air quality in the airshed because only a few piles of slash at one site would be burned at any given time.

Conclusion. During implementation of treatments, including slash pile burning, potential air quality effects would be direct and adverse, but short-term and localized. The resulting effects would be considered negligible to minor. Cumulative effects in comparison to Alternative A would be beneficial in the long-term because the preferred alternative reduces the potential production of large volumes of air pollutants from wildland fires. These benefits would more than offset the negligible to minor, short-term, adverse effects to air quality that would be associated with implementation of the preferred alternative.

Alternative B would not produce major adverse impacts on air resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of air resources or values as a result of the implementation of Alternative B.

ENDANGERED OR THREATENED SPECIES

Affected Environment

The federally listed or proposed species that potentially occur in Park and Teton counties, Wyoming and Park County, Montana, are presented in Table 7. No critical habitats for these species are currently designated within or adjacent to any of the project areas. The list of species was obtained from the U.S. Fish and Wildlife Service, Cheyenne, Wyoming Ecological Services office in response to a scoping letter sent out by the park. The U.S. Fish and Wildlife Service letter is included in Appendix A.

Table 7. Endangered, Threatened, Proposed Species in Park and Teton Counties, Wyoming and Park County, Montana

Common Name	Scientific Name	Status [a]
	BIRDS	
Bald eagle	*Haliaeetus leucocephalus*	T
Mountain plover	*Charadrius montanus*	P
Whooping crane	*Grus americana*	EXPn
	MAMMALS	
Black-footed ferret	*Mustela nigripes*	E
Canada lynx	*Lynx canadensis*	T
Gray wolf	*Canis lupus*	EXPn
Grizzly bear	*Ursus arctos horribilis*	T

[a/] E = federally endangered; T = federally threatened; P = proposed for federal listing as threatened; C = candidate for federal listing; EXPn = experimental, non-essential population (equivalent to threatened status in National Park System)

Impacts of All Alternatives

Implementation of either the no action or the preferred alternative may effect, but would not likely adversely affect any endangered or threatened species, species proposed for listing, or any designated critical habitats. The fuels management project would not jeopardize the continued existence of any of the listed or proposed species. These determinations are based on analyses of the proposed action prepared for the biological assessment that was submitted to the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service concurred with the “may affect, but not likely to adversely affect” determination in the biological

assessment. The biological assessment identified several mitigation measures to minimize the potential for adverse effects on listed species. These measures, proposed by National Park Service biologists and termed conservation measures by these species experts, include seasonal restrictions on treatments near wolf dens; seasonal restrictions on treatments in high quality grizzly bear habitat; leaving more saplings, seedlings, and down wood between the 120- and 400-foot perimeters around structures; and not flush-cutting, grinding, or removing stumps. The latter two measures would retain a higher structural density and diversity that would benefit the Canada lynx and its primary prey, the snowshoe hare.

Details of the proposed mitigation measures are presented in the biological assessment, which is included in Appendix C, along with the U.S. Fish and Wildlife Service's letter of concurrence.

GEOTHERMAL RESOURCES

Affected Environment

Yellowstone contains the world's largest and most active geothermal areas, a main reason for the establishment of the park. The park has more than 300 geysers and over 10,000 thermal features which includes hot springs, mud pots, and fumaroles. An underground reservoir of water, heated by molten magma, fuels the Greater Yellowstone Area's thermal features including those in the park.

Thermal areas sustain unique and diverse life and support various microbial organisms, mosses and grasses. These resources in turn support a range of other animals from insects to large ungulates such as bison and elk. Plant life in thermal areas often forms characteristic circular patterns with no vegetation in the hot center. Concentric patterns of vegetation reflect the upper temperature limits of different plants. Typically, mosses grow centrally and moving outward from the center grasses and then finally trees are the dominant lifeform (Brock 1994).

Thermal features may appear powerful, however, they are fragile systems. Geysers can be altered or destroyed if components of their structure, such as heat, water supply, plumbing system or seal that holds back the pressure in the case of geysers, are altered. Nature itself can destroy geysers. Changes in a thermal feature's water or heat source may cause a feature to die off. Thermal features may change or be destroyed as a result of their seals being breeched during an eruption, seismic activity, or natural processes such as landslides (Jones 1999).

Impacts of Alternative A, Continue Current Management/No Action

Continued build-up of hazardous fuels in the treatment areas under Alternative A may eventually lead to the occurrence of wildland fires encroaching within those areas. Because typically there is sparse vegetation present around thermal areas, there would be no direct effects of wildfire to the feature. However, indirect adverse effects could occur. Loss of vegetation as a result of wildfire and the eventual loss of root structure that retain soils, would result in reduced water infiltration rates which leads to increased runoff from the burned area. Deposition of sediment into thermal areas could result in alteration of the feature due to clogging or choking. The potential for this to occur is higher at those thermal features that are located down gradient of an intensely burned area.

Another effect of deforestation as a result of wildfire is decreased water retention by the soil that results in decreased infiltration of water into shallow groundwater. Infiltration of water during periods of precipitation results in a cooling effect of the shallow groundwater that feeds geothermal features. In a study conducted by researchers at the University of Montana, shallow ground water increases in temperature during winter when the ground is frozen and there is no infiltration of surface waters to cool it (N. Hinman, University of Montana geologist, pers. comm., 2002). Decreased water infiltration resulting from a loss of vegetation would decrease the amount of surface water mixing with the shallow groundwater which could cause the temperature of the groundwater to rise. A change in ground water temperature could affect the activity of a geothermal feature. Increased water temperature of a thermal feature may result in an increase in pressure causing activity changes in features that are normally less active.

Temperature is an important factor in determining the microbiotic community of thermal features. At temperatures above 60-62 degrees Celsius (°C) (140-144 degrees Fahrenheit [°F]), the only organisms present are prokaryotes. Photosynthetic bacteria can survive in water temperatures of 70-73 °C (158-163 °F), and at temperatures higher than that only non-photosynthetic bacteria can grow. Consequently, changes in the groundwater temperature may result in changes to the temperature of the thermal feature that may change the feature's microbiotic community and its function.

No research has been conducted to determine the intensity of effect to these features from wildfire. The level of the impact could range from negligible to moderate and would be dependent on the proximity of the feature to the burned area, the amount of sedimentation deposited, the changes in shallow ground water temperatures and the size of the thermal feature or area affected.

Cumulative Effects. The thermal features in Yellowstone National Park and in the surrounding areas are threatened by human activities. Damage to the surface of geothermal resources can occur from trampling by visitors and wildlife. Acts of

vandalism that add litter and other materials to thermal features tend to destabilize the physical function of these resources. Yellowstone's thermal features have been threatened or are currently being threatened by the potential for geothermal development in areas adjacent to the park. The boundaries of the underground aquifer which supplies the thermal features in the park are not well known, but are connected to recharge and discharge areas well beyond park borders. While geothermal development outside Yellowstone National Park is generally prohibited in adjacent lands in Montana, no similar protections exist in Wyoming or Idaho (Greater Yellowstone Coalition 2002). The drilling of geothermal wells may damage the subsurface hydrothermal systems by altering water supply and flow patterns (Jones 1999). Other types of subsurface development in areas adjacent to the park, such as oil and gas drilling, also pose a threat to protection of Yellowstone National Park's geothermal areas. In comparison to the potential risks to geothermal features in the park as a result of human activity, the cumulative adverse effects of the no action alternative in the event of a wildfire would be considered negligible to minor and long-term. The level of effect is dependent upon the location, intensity, and magnitude of a wildfire.

Conclusion. Thermal features may be adversely affected in the event of a wildfire from deposition of sediment from adjacent burned areas and increased water temperature, which may in turn affect the function, chemistry, and microbiotic communities of the feature. The level of effect is difficult to determine due to a lack of scientific information, however it would be dependent upon the size of the area burned, proximity of the burn to geothermal features, and the size of the features. Impacts could range from negligible to moderate in the event of a wildfire.

Alternative A would not produce major adverse impacts on geothermal resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of geothermal resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

Implementation of thinning activities under this alternative would not have any direct effects on thermal features in the treatment areas, however, indirect effects may be possible. There no known geothermal features in the proposed treatment areas and due to the inherent dangers and the sparse vegetation usually associated with thermal features, workers would avoid the areas near thermal features entirely. Thinning of vegetation in the treatment areas would expose small patches of soils, however it is not expected to result in appreciable amounts of sediment movement or reduce the amount of water infiltration into the

soils to adversely affect thermal features. Disposal of thinned material and slash pile burning would be accomplished away from thermal features resulting in no effect on these resources.

Cumulative Effects. The implementation of fire management programs outside of the park would reduce the potential for wildfire to occur and enhance the protection of geothermal resources in the region. Management activities under Alternative B, in conjunction with these other management programs, would add cumulatively to the protection of geothermal resources both parkwide and regionally. Implementation of this alternative would not add cumulatively to the adverse impacts from human activity as discussed above under Alternative A.

Conclusion. Thinning activities associated with the preferred alternative would not result in increased sedimentation or a reduction in water infiltration to the groundwater that would affect geothermal features. Implementation of mitigation measures to avoid thermal features when disposing of debris would also reduce the potential impact on these resources.

Alternative B would not produce major adverse impacts on geothermal resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of geothermal resources or values as a result of the implementation of Alternative B.

SOILS

Affected Environment

Four soil types have been identified in Yellowstone National Park. The two predominate soil types in the park are derived from two major parent materials, rhyolite and andesite. A third type, loess, evolved from glacial episodes and is found in the floodplains of area rivers. A fourth soil type makes up about 6 percent of the park and is derived from sedimentary rocks consisting of limestones, sandstones, and shales. Andesitic soils have the best moisture-holding capacity, with rhyolitic soils having a higher level of nutrients and better moisture-holding capacity. Lodgepole pine is generally associated with rhyolitic soils, while spruce and fir are typically associated with andesitic soils (NPS 1991b).

Impacts of Alternative A, Continue Current Management/No Action

In the event of a wildfire, soils would be affected by high temperatures and fire suppression activities in those areas outside wildland fire use. High intensity fire eliminates organic cover, decreases soil nutrients, and increases pH. Severe fire

temperatures may also kill mychorrizae and microbes responsible for nutrient cycling. Soil hydrology can be altered in a variety of ways, from increased infiltration to the formation of hydrophobic soils. Such alterations can lead to increased erosion (Anderson 1996). The direct adverse effects of wildfire on soils are generally short-term, minor to moderate and localized. The indirect adverse effects of accelerated erosion and increased sedimentation may persist for several years.

Firefighting activities could also have negligible to minor, direct, short-term adverse effects on soils. Firefighting could use heavy equipment, which would increase soil compaction. The construction of firebreaks would directly disturb the soil. However, effects in highly compacted soils, such as bulldozer tread marks, would be sufficiently reduced by natural processes to allow plant growth within three years (Blatt 2001). To assure recovery of soils, mitigation and rehabilitation actions following firefighting activities would be necessary.

Low-intensity wildfires that might occur under Alternative A could have short-term, negligible to minor, beneficial effects on soils. These effects could include increased availability of nutrients, enhanced water infiltration capability, and reduced incidence of forest pathogens (Bauder 2000).

Cumulative Effects. Fuel reduction treatments carried out on lands surrounding the park would increase protection of soil resources in the area and reduce the potential for an uncontrolled wildfire and the resultant large-scale fire suppression. The no action alternative would not contribute cumulatively to these beneficial effects.

Conclusion. In the absence of wildfire, Alternative A would have no effects on park soil resources. In the event of a wildfire, short-term, negligible to moderate, direct, localized adverse effects would result. The intensity of these effects would depend on the location and severity of the wildfire occurrence. Low-intensity wildfires would result in negligible to minor, long-term beneficial effects.

Alternative A would not produce major adverse impacts on soil resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of soil resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

Under Alternative B, 423.9 acres, or 0.02 percent of the park's acreage, would be treated and would have potentially affected soils. Management activities include thinning and limbing and slash-pile burning. Thinning and limbing activities would have negligible, short-term, localized, direct adverse effects on soils. Accessing

work sites and dragging of slash and downed timber would create negligible to minor, local soil disturbance and compaction. These adverse effects would be short term because the annual freeze-thaw process would reduce such soil compaction (Dunne & Leopold 1978).

The burning of slash piles could produce temperatures hot enough to kill soil microbes and volatilize nutrients immediately under the burn area (Anderson 1996). The adverse effects would be negligible because these areas would be quite small, and microbes and nutrients would be readily available from nearby soil. The nutrients in the ash could increase the fertility of the soils under the burns (Bauder 2000).

In steep areas, mitigation measures designed to minimize erosion, soil loss, and sedimentation would be implemented. These measures are presented in the "Alternatives" section of this document.

Long-term, minor beneficial effects to soils would occur in the treatment areas. Reduced potential of wildfire would protect soils from intense heat that destroys nutrients and disrupts nutrient cycling. Alternative B would provide increased benefits compared with the no action alternative.

Cumulative Effects. Fuel reduction actions associated with Alternative B could have minor, short-term, beneficial effects when considered in conjunction with fuel management actions on nearby lands. This would be the result of the reduced risk of large-scale wildfire spread, thereby protecting soil resources inside and outside the park.

Conclusion. Actions undertaken during implementation of Alternative B would produce short-term, negligible to minor, localized, adverse effects on soils within the treatment areas. Adverse effects would be offset by the long-term, beneficial effects associated with the reduction in potential for wildfire.

Alternative B would not produce major adverse impacts on soil resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of soil resources or values as a result of the implementation of Alternative B.

VEGETATION

Affected Environment

Yellowstone National Park contains diverse vegetation as a result of the extreme topographic relief, differing soils, varied slope and aspect, and range of microclimates. The park includes seven vegetation zones, ranging from desert to

alpine tundra. Approximately 1,200 to 1,300 plant species have been identified in the park, but most of the landscape is dominated by a few vegetative community types (Whipple 2001).

Lower elevations, between 5,000 and 7,000 feet, support grasslands, shrublands, and wet meadows. Species found in grasslands include bluebunch wheatgrass (*Agropyron spicatum*), Hood's phlox (*Phlox hoodii*), and rosy pussy-toes (*Antennaria rosea*). Shrublands generally consist of sagebrush (*Artemisia* spp.), rabbitbrush (*Chrysothamnus* spp.), yarrow (*Achillea* spp.), wild buckwheat (*Eriogonum* spp.), Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass, and junegrass (*Koeleria macrantha*). In wet meadows, willow (*Salix* spp.), cinquefoil (*Potentilla* spp.), American bistort (*Polygonum bistortoides*), tufted hairgrass (*Deschampsia caespitosa*), alpine timothy (*Phleum alpinum*) and a variety of sedges (*Carex* spp.) can be found (NPS 2000d).

Approximately 60 percent of the park is forested, with the majority dominated by lodgepole pine (*Pinus contorta*). This community is found in a variety of successional stages at elevations between 7,500 and 9,000 feet. Lodgepole communities cover about 1.4 million acres of parkland. In moist areas and on rich soils, Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) are found. At elevations ranging from 6,000 to 7,600 feet, Douglas-fir (*Pseudotsuga menziesii*) and aspen (*Populus tremuloides*) stands are common. Whitebark pine (*Pinus albicaulis*) is found above 8,400 feet, with alpine tundra above treeline at 9,400 feet (NPS 2000d).

About 160 of the plant species found in Yellowstone National Park are listed as species of special concern in the state of Wyoming (WNDD 2002). Two of the notable rare endemic species include Yellowstone sand verbena (*Abronia ammophila*), a member of a primarily tropical plant family (Nyctaginaceae, the four o'clock family) with very few species growing as far north as Yellowstone, and Ross' bentgrass (*Agrostis rossiae*), a species with an affinity for thermal areas that can be found growing in soils whose temperature one inch below the surface is 100º Fahrenheit (NPS 2001b). The plant species of concern that grow in Yellowstone National Park may be found on the Wyoming Natural Diversity Database internet site (WNDD 2002).

The number of documented exotic plants in the park has increased over the years to 187 species, representing about 15 percent of the vascular plant species in the park (Whipple 2001). Thirty of these plants are classified as noxious in Idaho, Wyoming and Montana. Park staff are implementing a comprehensive weed management program to control their presence (NPS 1986; Olliff *et al.* 2001).

Impacts of Alternative A, Continue Current Management/No Action

Under Alternative A, no fuel reduction would take place in the treatment areas and fuels would continue to build-up, thus increasing the potential for wildfire to occur within those areas.

Fires cause mosaic patterns by burning at different intensities at different places in different years. This mosaic results in vegetative stands at various successional levels. Herbaceous plants are the first to revegetate a burned area, followed by shrubs and then finally by trees.

Vegetation may take many years to recover to pre-fire levels following a wildfire and varies by species. Grasslands in the park following the 1988 fires had largely returned to their former levels within a few years of the fires (NPS 2001b). Sage brush however may take 20 to 30 years to return to pre-fire levels. Lodgepole pine seedlings grow slowly and may only be 20 feet tall 25 to 35 years after a stand-replacing fire (Fuller 1991). Long-term, local adverse effects of wildfires would include a high degree of individual plant mortality and the effects would range from negligible to moderate depending on the intensity and size of the burn.

The effect of fire on vegetative communities would be beneficial, as the plant communities have evolved with fire as a naturally recurring event. Plants in the Yellowstone ecosystem are adapted to fire in various ways and can benefit from wildfire. Plants such as prairie grasses produce more flowers, lodgepole pine disperse more seeds or more of their seeds germinate after a fire. Lodgepole pine grows fast after a fire making it difficult for other species to invade. Studies following the 1988 Yellowstone fires have shown that a large number of seeds from numerous plant species survived fires in the soils and highly diverse plant community covers burned areas (Despain 1990). Some species benefit from removal of shade-loving competitors and the reduction in insect pests and plant disease cohosts (Fuller 1991). Wildfires result in reduced competition and forest openings that support seedlings which benefits the whitebark pine (Keane 2001), an important food source for grizzly bears. In the event of a wildfire, the long-term effects could be minor to moderately beneficial, depending on the size of the area burned, in those communities adapted to fire and in areas where favorable environmental conditions exists such as those with sufficient nutrient and water availability.

Cumulative Effects. Adjoining public and private lands, as well as park resources, would receive no increased protection from wildfire under Alternative A and defensible space would not be enhanced around park structures. Implementation of this alternative would not contribute to any other plans or projects occurring inside or outside of the park to protect vegetative resources in the region.

Conclusion. Negligible adverse effects would occur in the event of a wildfire on a very local scale due to a loss of individual plants. However, the long-term beneficial effects to vegetative communities would be minor to moderate in those communities adapted to fire and in areas where favorable environmental conditions exist.

Alternative A would not produce major adverse impacts on vegetation resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of vegetation resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

Under Alternative B, fuels reduction activities would include thinning and limbing and slash pile burning. At each of the 30 backcountry patrol cabin sites, 4 to 15 acres would be mechanically treated, totaling 286 acres. An additional18.5 acres would be treated at the Bechler developed area. The total of the acreage to be treated at the frontcountry sites would be 119.4 acres. The overall area that would be treated is about 424 acres, which represents 0.02 percent of the total park area.

Mechanical thinning would result in the loss of targeted individual plants within the treatment area, producing short-term, local, adverse effects on vegetation in the treatment areas. Disturbance from the actions of work crews, removal of individuals trees, and thinning would produce highly localized, direct, negligible effects to plant populations. Although mechanical clearing equipment is designed to have negligible effects on non-target vegetation, some crushing of non-target plants in the treatment area may occur. The adverse impact would be short-term as the root structures of the vegetation would not be altered. Individual plants and treated communities would be expected to recover within one year. Given the small amount of area to be treated relative to the total park acreage, the proposed action would not have large-scale or parkwide effects on species populations or species diversity.

As noted in the list of mitigation measures presented following the description of the preferred alternative, park botanists would inventory previously unsurveyed treatment areas for rare plants and the park would implement mitigation measures as necessary to avoid impacting rare or species of concern plants.

The treatment would result in more open canopies around the structures. This could result in an increase in sun-loving plant species and a decrease in shade-tolerant species. This would only represent a minor adverse effect on vegetation primarily because of the small area to be treated. Additionally, opening the canopy could enhance the potential establishment of exotic species, which would require a greater effort to manage exotic vegetation. Again, the area affected would be relatively small and the effect would be minimal in the backcountry

cabin areas where exotic seed sources and vectors would be limited. Thus, the increased potential for exotic species establishment would represent a minor, local adverse effect at the frontcountry treatment areas, and a negligible, local adverse effect at the backcountry treatment sites. The continued implementation of the exotic species management plan would be used to minimize this effect.

Another potential effect of opening the forest canopy would be the increased likelihood of windthrow, or the exposure and blowdown of trees that were previously protected by a denser population of trees surrounding them. This effect would be locally adverse but negligible. Construction of the structures in the treatment areas has exposed trees to windthow in the initial clearing of sites in closed forest environments. These edge trees have through the years become wind resistant. In addition, the “feathering” of vegetation with increasing distance from the structure(s) would reduce the potential for increased windthrow in the treatment areas.

Dispersal of thinned material or wood chips would not be expected to have detectable effects on vegetative communities. Material would not be placed in a manner that would compromise processes in these communities.

Burning of slash-piles would produce negligible adverse effects to nearby vegetation. Vegetation beneath the piles would be killed, and heat could damage individual plants adjacent to the burn site. These adverse effects would be negligible, highly localized and short-term. Short-term beneficial effects of slash pile burning would be indirect and negligible as nutrients are released into the soil (Anderson 1996).

Cumulative Effects. Implementation of Alternative B would provide additional protection for firefighters and structures at the expense of some individual plants and trees, but the proposed action would not affect vegetation in a substantial manner, either adversely or beneficially, when considered in concert with other plans and projects in the park.

The park’s cooperation in area-wide fire management plans provides protection of resources inside and outside of the park. This protection extends to vegetation, however, in light of the fire's value to the vegetative communities in Yellowstone National Park, protection of vegetation from fire may represent an adverse cumulative effect, from a long-term community and ecological perspective. The contribution of the proposed action to the overall effect of other plans and projects would be negligible, because of the small area that would be treated and the likelihood that treated areas would still be subject to fire at some point in the long-term, although a future fire may not be as intense in the treatment areas.

The proposed action may require additional effort to manage (i.e., remove or eradicate) exotic vegetation, but Alternative B's cumulative effect on vegetation would be negligible with implementation of the park’s exotic vegetation management plan.

Conclusion. Negligible to minor, short-term, localized adverse effects on vegetation would occur due to mechanical thinning activities, slash-pile burning, the potential establishment of exotic plant species, and the potential for windthrow in thinned areas.

Alternative B would not produce major adverse impacts on vegetation resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of vegetation resources or values as a result of the implementation of Alternative B.

WATER QUALITY AND HYDROLOGY

Affected Environment

Yellowstone National Park encompasses a 3,500 square-mile watershed that provides the surrounding area with high quality water. Streams and lakes in Yellowstone are designated as Class I, Outstanding Resource Waters, by the state of Wyoming. Existing water quality must be maintained in Class I waters. The water resources within Yellowstone cover 112,000 acres. More than 150 lakes compose an area of approximately 108,000 acres. Yellowstone Lake, the largest body of water above 7,500 feet elevation in North America, occupies 139 square miles. Other major lakes include Shoshone, Lewis, and Heart Lakes.

More than 220 named and hundreds of unnamed streams form over 2,650 miles of flowing water in the park (NPS 2000b). River systems in the park include the Gardner, Lamar, Yellowstone, Madison, Firehole, Gibbon, and Lewis Rivers. The hydrology of streams and rivers in the park is driven by snowmelt with peak discharge occurring in the spring. Discharge then declines gradually over summer and returns to near base flow by late fall.

Impacts of Alternative A, Continue Current Management/No Action

Alternative A would allow fuel accumulation within the treatment areas that may eventually lead to the occurrence of wildland fires in treatment areas. Studies have suggested that severe physical and chemical post-fire effects in smaller streams occur shortly (1-2 years) after fires (Swanston 1991, Minshall and Brock 1991). The short-term effects of vegetation and soil disturbing events such as wildfire which reduces water infiltration rates or removes excessive amount of vegetative cover can increase runoff and sediment from storm events (Christensen et al. 1989).

Loss of forest canopy resulting in reduced shading following a fire can increase stream and lake temperatures for many years (Helvey et al. 1976). In severely

burned watersheds, pronounced hydrological effects such as channel downcutting or displacement can produce long-term effects. After a wildfire, the chemistry of groundwater or surface runoff may be altered (Tiedemann et al. 1979). Changes in water chemistry can include increased nitrate concentrations (Minshall and Robinson 1992), reduction in phosphate concentration, and variable patterns in other compounds such as major cations or anions (Stottlemyer 1987). Increased nutrient availability after a fire can increase aquatic plant abundance, which may result in changes in the aquatic invertebrate and vertebrate communities (Christensen et al. 1989; Minshall et al. 1989).

In the event of a wildfire, short-term effects on water quality and hydrology may range from minor to moderate. These effects are dependent on the intensity of the fire and the size of the area affected. Intermediate and long-term adverse effects to park streams and lakes would be minor. The adverse effects of wildfire on water quality and hydrology would lessen over time as the vegetation adjacent to or upslope of the affected water bodies recovered (Minshall et al. 1989).

Cumulative Effects. Water quality in the park is affected by the presence of trails and roads along stream channels and roads leading to lakes. Visitor use is resulting in negative affects to water quality as a result of damage to riparian vegetation and accelerated stream bank erosion. Water quality degradation is most common where visitor facilities such as campgrounds and trails are located close to water bodies. The adverse affect on water quality of the no action alternative in the event of a wildfire combined with the affects of roads, trails and visitor use would be minor to moderate depending on the size and intensity of a wildfire.

Conclusion. In the event of a wildfire, short- and long-term adverse effects to water quality and hydrology could occur. There is potential for minor to moderate adverse effects from erosion and elevated nutrient levels depending on the magnitude of a wildfire event.

Alternative A would not produce major adverse impacts on water quality or hydrologic resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of water quality or hydrologic resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

Fuel reduction in the treatment areas would result in the removal of individual trees to achieve canopy spacing objectives and removal of varying percentages of hazardous fuels within 400 feet of the structures. This would expose small patches of soils. Storm events following this mechanical treatment would result in

short-term, limited downstream increases in sediment, turbidity, and possibly nutrient loading in areas occurring on steep slopes or where soils were disturbed. Thinning activities would have short-term, local, negligible adverse effects on water quality. Over the long term, the re-establishment of native trees and plants would stabilize soils and improve water quality as turbidity decreases.

Slash pile burning would have no effect on water quality and hydrology with implementation of appropriate mitigation measures described previously in the "Alternatives" section.

Cumulative Effects. The majority of influences on park waters are from management activities, visitor use, or atmospheric influences (NPS 2001b). Air pollutants and the presence of roads and trails along stream channels and lakes have adversely affected water quality. Visitor use adversely affects water quality as a result of damage to riparian vegetation and accelerated stream bank erosion. Water quality degradation is most common where visitor facilities such as campgrounds are located close to streams. Mechanical thinning activities under the proposed action would contribute negligibly to the cumulative adverse effects on water quality and hydrology that already exist due visitor use and the presence of roads and trails along streams and lakes.

Conclusion. Thinning treatments would have local, short-term, negligible adverse effects on water quality and hydrology. With implementation of mitigation measures, burning debris in slash-piles would have no effect on water quality and hydrology.

Alternative B would not produce major adverse impacts on water quality or hydrologic resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of water quality or hydrologic resources or values as a result of the implementation of Alternative B.

WETLANDS AND FLOODPLAINS

Affected Environment

Yellowstone National Park encompasses 2,219,791 acres, of which, wetlands comprise 228,766 acres, or approximately 10.3 percent of the park (NPS 2000b). The predominate wetlands, totaling over 118,500 acres (about 5 percent of the park), are classified as palustrine and include wet meadows, swamps, marshes, potholes, fens, bogs, and shallow ponds. Yellowstone's lacustrine wetlands, defined as lakes and ponds greater than 20 acres in size or having a water depth exceeding 6.6 feet at low water, occupy 100,888 acres or 4.5 percent of the park. Yellowstone Lake, which represents 90 percent of this acreage, is at least 400

feet deep and over 100 square miles in surface area. The final class of wetlands are the riverine wetlands, which occupy 9,350 acres of the park (Elliot and Hektner 2000).

The treatment areas are primarily upland forests. There may be some treatment areas that are in or near 100-year floodplains associated with higher order streams, but these floodplains are not mapped.

Impacts of Alternative A, Continue Current Management/No Action

Under this alternative there would be an increased potential for an uncontrolled wildfire. Such a fire would cause direct and indirect, negligible to moderate, adverse effects to wetland resources. The loss of vegetation within and surrounding wetlands would bring about a disruption of decomposition and nutrient cycling processes (Breen et al. 1988). An unnatural increase in soil erosion and runoff could result following a large fire and consequently impact sediment deposition and turbidity. Long-term, beneficial effects from wildfire would result from the release of nutrients and mineral cycling, which would beneficially affect wetland soils and vegetation. Fire also plays a role in establishing and maintaining some wetland plant communities (USGS 2001). The effect of wildfire on wetlands would vary with the intensity, extent, and location of the burned area in the park.

There would be no effect to any known 100-year floodplains as a result of implementation of the no action alternative.

Cumulative Effects. The no action alternative would have the potential, depending on the number of other projects and plans that would address the buildup of fuel loads, to adversely affect wetlands in the event of a wildfire. If fuel reduction treatments take place on lands adjacent to the backcountry treatment areas located near park boundaries, the potential adverse effect on wetlands would be minor and less if the no action alternative were the only plan implemented. Conversely, if other fuel reduction plans are not implemented, the overall potential adverse effect on wetlands could be moderate.

Conclusion. In the event of an uncontrolled wildfire, destruction of wetland vegetation would increase run-off and sedimentation that would result in short- and long-term, negligible to moderate, direct and indirect, adverse effects to the resource.

Alternative A would not produce major adverse impacts on wetland or floodplain resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS

planning documents. Consequently, there would be no impairment of wetland or floodplain resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

In the absence of mitigation measures, fuel reduction treatments would have the potential for short-term, negligible, adverse effects on wetlands. These impacts would potentially result from treatments in areas adjacent to or closely upgradient of wetlands. However, implementing mitigation measures (identified in the description of Alternative B) and using best management practices, including not transporting debris removed from treatment areas through wetlands and not burning slash piles in or close to wetlands, would eliminate the potential for adverse effects to wetlands. Wetlands in a proposed treatment area would be avoided during thinning activities. As a result, treatment activities would have no effects on wetlands.

There would be no effects to known 100-year floodplains as a result of implementation of the Alternative B.

Cumulative Effects. Alternative B, in combination with other fuel management plans and projects, would have no effects on wetlands, primarily because each of the individual fuel management plans and projects includes measures to protect wetlands. In the event of a fire in a suppression zone, none of the fire management actions associated with the preferred alternative or with other plans and projects would compound the effects of fire on wetlands with additional effects related to suppression. Taken cumulatively, fuel and fire management plans and actions would not affect wetlands.

Conclusion. Fuels management activities associated with the preferred alternative would not have an effect on wetlands because potential adverse effects would be avoided with the implementation of mitigation measures and the use of best management practices.

Alternative B would not produce major adverse impacts on wetland or floodplain resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of wetland or floodplain resources or values as a result of the implementation of Alternative B.

WILDERNESS

Affected Environment

In Yellowstone National Park, 2,022,221 acres is considered wilderness, representing 91 percent of the park's acreage and including all the remote

primitive lands in the park. The remaining 9 percent of the park is classified as administrative and facilities, developed areas, and roads (NPS 1972). Wilderness areas of Yellowstone National Park are classified as designated (2,016,181 acres) or potential (6,040 acres) in the park's Wilderness Recommendation (NPS 1972). NPS *Management Policies 2001* (NPS 2000c) state that all wilderness categories, including suitable, study, proposed, recommended, and designated shall be treated as wilderness. This assessment is consistent with NPS *Management Policies 2001*, thus all categories of wilderness are considered in the analysis.

Under the park's wilderness recommendation (NPS 1972), 5 of the 30 backcountry cabins proposed as treatment sites are not included in wilderness. Each of these five cabins is placed in a 9-acre enclave which is not classified as wilderness. The cabins are Cabin Creek, Cove, Fawn Pass, Heart Lake, and Mary Mountain cabins. The other backcountry patrol cabins addressed in the Wilderness Recommendation (NPS 1972) and proposed as treatment sites under the preferred alternative are considered to be in the wilderness area as management facilities. These backcountry patrol cabins have been determined to be the "minimum tool, equipment, or structure necessary to accomplish permitted activity" (NPS 1972). The frontcountry sites are located in developed areas and some of the structures are considered to be administrative facilities. Therefore, the three frontcountry sites are not considered wilderness and are excluded from this analysis. Thus, 25 proposed treatment sites are in wilderness and approximately 243 acres of wilderness would be affected by fuels management activities under Alternative B.

Based on the NPS *Management Policies 2001* (NPS 2000c), all management decisions affecting wilderness must be consistent with the minimum requirement concept. Section 6.3.5 of NPS *Management Policies 2001* states:

> When determining minimum requirement, the potential disruption of wilderness character and resources will be considered before, and given significantly more weight than, economic efficiency and convenience. If a compromise of wilderness resource or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable.

The foundation of the minimum requirement concept is that a determination of whether the proposed activity is appropriate or necessary for administration of the area as wilderness and does not pose a significant impact to wilderness resources and character. It must also be determined that the techniques and types of equipment needed to implement the proposed action minimize impacts to wilderness resources and character. As a result, the use of motorized tools in wilderness areas, including chainsaws for fuel reduction treatments would require a Minimum Requirement Analysis. The Minimum Requirement Analysis for management activities proposed in this assessment was conducted by park staff and is appended to this document (Appendix D).

Impacts of Alternative A, Continue Current Management/No Action

Under this alternative, fuels would continue to build-up in the treatment areas, increasing the potential for wildland fire and loss of the structures. In the event of a wildfire, adverse effects on wilderness resources could be extensive depending on the size and intensity of the burn and the level of suppression efforts. Fire damage to large tracts of land in the wilderness area would adversely affect the visual character, soils, vegetation, wildlife, and degrade air quality within the treatment areas. Fire suppression efforts would additionally adversely affect soil resources in the wilderness area as well as disrupt the natural quiet from human presence, aircraft and use of suppression tools. All wildland fires within wilderness would be effectively managed considering wilderness resource values, while providing for public and fire personnel safety using the full range of strategic and tactical options. Wildland fire management response would include the application of minimum impact suppression techniques and minimum requirement suppression techniques. The no action alternative would have direct, long-term, negligible adverse impacts on wilderness resources as less than one percent of the wilderness resources of the park would be affected if the proposed treatments were not implemented.

In the absence of wildland or prescribed fire, natural conditions would continue to be altered within the wilderness portions of the treatment areas and may adversely affect forest ecosystem health and integrity. The long-term adverse effects of continuing the current management program in the treatment areas would be negligible considering the small amount of total park wilderness affected.

Cumulative Effects. The continued build-up of fuel in the treatment areas under the no action alternative, in combination with high fuel loads in areas adjacent to the treatment sites, increases the potential for wildfire to spread uncontrolled within and across park boundaries, thus adversely affecting larger portions of wilderness. Also, the no action alternative would not complement fuel management plans that would be implemented on adjacent U.S. Forest Service wilderness lands.

Alternative A would not provide protection of wilderness resources within the park from fire effects. Wilderness areas in the region are threatened by increased visitation, which increases the risk of human-caused fires and increased recreational use of wilderness on Forest Service lands. In the event of a wildfire, the no action alternative would contribute to the adverse effects of these other activities, resulting in long-term, minor to moderate adverse cumulative effects.

Conclusion. In the event of a wildfire, long-term adverse impacts to wilderness resources and values, such as soils, vegetation, and natural quiet would be no greater than minor in the proposed wildland-urban interface treatment areas. In

the absence of fire, fuels would increase in the treatment areas resulting in negligible adverse effects.

Alternative A would not produce major adverse impacts on wilderness resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of wilderness resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

Analysis. Implementing fuels management activities would result in visual and noise intrusions on wilderness areas, which would adversely affect wilderness character. Under Alternative B, cutting and limbing trees, as part of the fuels reduction treatments, would be accomplished using chainsaws. The use of chainsaws in wilderness is justified in the Minimum Requirement Analysis (included as Appendix D). The primary reasons for the justification of motorized tool use are worker safety and the minimization of implementation time, thus resulting in a shorter period of potential effects on wilderness values and other resources (e.g., wildlife, visitor experience). The presence of work crews, fuels reduction activities such as thinning and clearing of vegetation, and the use of power tools such as chainsaws and brush cutters could adversely affect wilderness values and resources in a short-term, local, minor to moderate intensity. Management activities associated with the preferred alternative would result in short-term, local impacts because work crews would only be present for a brief period of time (3-10 days at each site) and the areas affected would be small in comparison with the overall extent of wilderness.

Management activities in the treatment areas would reduce the potential for extreme suppression measures and risks to firefighters in conjunction with efforts to save back- and frontcountry structures and therefore provide a long-term benefit to wilderness. Through avoidance and other mitigating measures, damage to wilderness resources and values from future fire or from suppression activities would be sharply reduced. The overall adverse effects of Alternative B on wilderness resources would be negligible considering the small amount (0.012 percent) of the park's total wilderness area that would be affected.

Cumulative Effects. Implementation of the proposed action would, in the short-term, continue the cumulative, minor, adverse effects that already exist due to the inclusion of backcountry cabins in wilderness and human intrusions. However, this plan provides for long-term beneficial effects to wilderness through the reduced potential for extreme fire-suppression activities that would be used to save structures in the park.

In addition to the wilderness area in the park, 70 percent of the national forest that borders 62 percent of the park boundary is managed as designated wilderness. This plan, in combination with wilderness plans implemented within the park and on adjacent forest service lands, would, in the long-term, provide increased resource protection and preservation of wilderness in the region. As the area of wilderness affected by the proposed treatments in the park is relatively small, management actions under Alternative B would contribute inconsequentially to these overall beneficial effects.

Conclusion. Implementation of the preferred alternative would result in negligible, short-term, local adverse effects on wilderness resources as a result of the presence of humans and fuels reduction equipment (i.e., motorized chainsaws and brushcutters). Long-term beneficial effects would occur as a result of the reduced potential for loss of structures integral to the park's mission and the reduction in suppression efforts that would be used to protect those structures in the event of a wildfire. The proposed action would proactively reduce the impacts that fire suppression would have around structures by minimizing the chances of a fire advancing unimpeded on the backcountry cabins and continuing across the wilderness.

Alternative B would not produce major adverse impacts on wilderness resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of wilderness resources or values as a result of the implementation of Alternative B.

WILDLIFE

Affected Environment

Yellowstone National Park is home to a wide variety of wildlife. About 290 species of birds, 50 species of mammals, and 18 species of fish use the habitats in the park. The distribution, abundance, and diversity of species within the park varies by season, elevation, and variety of habitats present. Table 8 lists some of the wildlife species found within Yellowstone National Park (NPS 1991b).

Table 8: Bird and Mammal Species of Yellowstone National Park

Common Name	Scientific Name
Birds	
Double-crested cormorant	*Phalacrocorax auritus*
Great blue heron	*Ardea herodias*
Canada goose	*Branta canadensis*

Table 8: Bird and Mammal Species of Yellowstone National Park

Common Name	Scientific Name
Trumpeter swan	*Cygnus buccinator*
Mallard	*Anas platyrhynchos*
Common merganser	*Mergus merganser*
Osprey	*Pandion haliaetus*
Bald eagle	*Haliaeetus leucocephalus*
Swainson's hawk	*Buteo swainsoni*
Red- tailed Hawk	*Buteo jamaicensis*
Golden eagle	*Aquila chrysaetos*
American kestrel	*Falco sparverius*
Blue grouse	*Dendragapus obscurus*
Killdeer	*Charadrius vociferus*
Sandhill crane	*Grus canadensis*
Spotted sandpiper	*Actitis macularia*
California gull	*Larus californicus*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*
Great horned owl	*Bubo virginianus*
Belted kingfisher	*Ceryle alcyon*
Hairy woodpecker	*Picoides villosus*
Northern flicker	*Colaptes auratus*
Olive- sided Flycatcher	*Contopus cooperi*
Western wood-pewee	*Contopus sordidulus*
American robin	*Turdus migratorius*
Black-billed magpie	*Pica hudsonia*
Steller's jay	*Cyanocitta stelleri*
Clark's nutcracker	*Nucifraga columbiana*
American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Dark-eyed junco	*Junco hyemalis*
Pine siskin	*Carduelis pinus*
Lincoln’s sparrow	*Melospiza lincolnii*
White-crowned sparrow	*Zonotrichia leucophrys*
Wilson’s warbler	*Wilsonia pusilla*
Mountain bluebird	*Sialia currucoides*
Western tanager	*Piranga ludoviciana*
Green-tailed towhee	*Pipilo chlorurus*
Red-breasted nuthatch	*Sitta canadensis*

Table 8: Bird and Mammal Species of Yellowstone National Park

Common Name	Scientific Name
Mountain chickadee	*Parus gambeli*
Mammals	
Deer mouse	*Peromyscus maniculatus*
Least chipmunk	*Eutamias minimus*
Golden-mantled ground squirrel	*Spermophilus lateralis*
Red squirrel	*Tamiasciurus hudsonicus*
Yellow-bellied marmot	*Marmota flaviventris*
Northern pocket gopher	*Thomomys talpoides*
Muskrat	*Ondatra zibethicus*
Meadow vole	*Microtus pennsylvanicus*
Bushy-tailed woodrat	*Neotoma cinerea*
Porcupine	*Erethizon dorsatum*
Long-tailed weasel	*Mustela frenata*
Short-tailed weasel	*Mustela erminea*
River otter	*Lutra canadensis*
Badger	*Taxidea taxus*
Coyote	*Canis latrans*
Red fox	*Vulpes vulpes*
Gray wolf	*Canis lupus*
Bobcat	*Felis rufus*
Mountain lion	*Felis concolor*
Black bear	*Ursus americana*
Grizzly bear	*Ursus arctos horribilis*
American bison	*Bison bison*
Bighorn sheep	*Ovis canadensis*
Pronghorn	*Antilocapra americana*
Mule deer	*Odocoileus hemionus*
Moose	*Alces alces*
Elk	*Cervus canadensis*

Impacts of Alternative A, Continue Current Management/No Action

Alternative A would result in a continuation of current management practices, including full suppression of wildfires in those areas outside wildland fire use zones and no additional actions to reduce fuel loads around structures would be

implemented. In the event of a wildfire, the heavy fuel loads would likely create fire conditions that would be more severe and suppression measures would require a greater effort than if fuel loads were reduced. Assuming that such a fire would eventually occur, the effects to wildlife would primarily be short-term, direct, and the impacts would range from negligible to moderate, depending on the intensity and size of the wildfire and the suppression effort. There would be disturbance to wildlife species directly as a result of the fire, from suppression activities, and later as a result of habitat rehabilitation efforts. Most wildlife are mobile enough to avoid direct fire-related mortality and direct adverse effects would be locally negligible to minor as a result of disturbance and relocation. However, a fire during the breeding season could have a direct, moderate adverse effect on some wildlife species, particularly nesting bird and small mammal species (Erwin and Stasiak 1979 in Smith 2000). Retention of all downed wood and snags in the park would provide important habitat for wildlife (Brown and Bright 1997 in Smith 2000), resulting in a long-term, minor beneficial effect to wildlife species reliant on such habitat features, including cavity nesters (e.g., hairy woodpecker, mountain bluebird, northern flicker) and small mammals.

Cumulative Effects. A wildfire event under no-action conditions would have a greater potential for advancing unimpeded across the park backcountry or through frontcountry developed areas, and suppression efforts to save the backcountry patrol cabins or frontcountry developed sites would contribute to negligible to moderate, direct, adverse cumulative effects on wildlife. The uncertainty regarding the intensity of the effect is based on not knowing what other projects and plans would contribute to the cumulative effect because of the variety of other projects and plans that could be underway when a fire breaks out and the immense size of the park.

Conclusion. Under the no-action alternative, a short-term, direct, negligible to moderate adverse impact would occur to wildlife as a result of a wildfire, suppression, and habitat rehabilitation efforts. Long-term, minor beneficial effects for wildlife would accrue as a result of the continued increase in downed wood and snags, providing wildlife habitat structural elements. However, this benefit would be offset by a greater fire risk and the increased fire intensities typically associated with larger fuel loads.

Alternative A would not produce major adverse impacts on wildlife resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of wildlife resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

Thinning forest stands around backcountry sites and frontcountry developed areas, and piling and burning slash in relatively small piles, would represent a negligible, direct, short-term, local, adverse effect to wildlife. These adverse effects to wildlife would be negligible because the disruption or destruction of habitat and foraging areas would be limited to very small areas, especially when considered in the context of the total area available for wildlife in the park. Opening the canopy around the structures is likely to allow the understory to develop to a much greater degree than is normal in dense lodgepole pine forests, the most common community that would be treated. This would likely result in an increase of forbs and berry-producing shrubs, which would provide a negligible benefit to birds, small mammals, and bears (Blanchard and Knight in Smith 2000). The effect would be negligible because the area treated would be so small relative to the overall size of foraging areas available in the park.

Wildlife mortality would be unlikely due to the mobility of larger wildlife and birds (Smith 2000) and availability of secure refuges in burrows, rock crevices, and under moist forest litter for small mammals (Ford et al. 1999 in Smith 2000). Slash burn piles would be located in areas that would have little or no potential to directly affect wildlife. Retention of increasingly greater amounts of downed wood and snags in the treatment areas as distance from the structure increased (within 120 to 400 feet from structures) would provide valuable habitat for wildlife (Brown and Bright 1997 in Smith 2000) resulting in long-term, negligible beneficial effect for wildlife.

Cumulative Effects. Wildlife is adversely affected by numerous activities in the park, including developments that occupy habitat, roads that fragment habitat, and the general adverse effect that humans have as a result of disrupting wildlife foraging, resting, nesting, and breeding activities. The construction or renovation of developments, use and maintenance of roads, and continual visitation would combine with the preferred alternative to have an overall cumulative adverse effect on wildlife. However, the proposed action's relative contribution to the overall cumulative effect of these activities on wildlife would be inconsequential because of the small, discrete areas that would be affected and the temporary nature of the disturbance associated with implementation of the fuels management project.

Two of the other projects and plans with potential to interact with this proposed fuels management project and potentially have a cumulative effect on wildlife are the park's Exotic Vegetation Management Plan (NPS 1986) and a contingency plan that has been developed for the Greater Yellowstone Area (GYA Preparedness Plan) to ensure timely recognition of approaching critical fire situations (see the Project's Relationship to Other Plans section for more information regarding these plans and projects). The effects of these plans and projects on wildlife, combined with the effects of the proposed action, are difficult to predict. Regardless, the proportional contribution of the proposed fuels

management action would again be inconsequential when considered in relation to the effects of these and all other projects and plans in the park.

Conclusion. The adverse impacts to wildlife associated with Alternative B would be short-term, local, and negligible because of the relatively small areas of habitat that would be disturbed and the temporary nature of the implementation of the thinning and slash pile burning activities. Mitigation measures used to offset potential adverse effects to endangered and threatened species (refer to the biological assessment in Appendix C) would reduce the potential for adverse effects to other wildlife species as well.

Alternative B would not produce major adverse impacts on wildlife resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of wildlife resources or values as a result of the implementation of Alternative B.

CULTURAL RESOURCES

Affected Environment

Archeological Resources: At least 12,000 years before present, during what is now known as the Paleoindian Period, small, highly mobile human groups were present in the Yellowstone region. These groups used beautifully crafted stone weapons and tools to pursue and utilize large game. Left behind are Clovis, Folsom, and Cody Complex sites, consisting of remains of camps and quarries and sites where animals were killed. The Obsidian Cliff Plateau, an extruded lava flow that is approximately 180,000 years old, was of special importance to prehistoric peoples. Obsidian obtained from this site was widely used in not only the region, but was traded as far east as Ohio and Canada.

The Archaic Period in Yellowstone was characterized by mobile groups who utilized a greater variety of plant foods and small game. The park area was most heavily used by these groups during the Late Archaic, from 1000 B.C. to A.D. 200. Later sites in the park may be related to small groups who resided in lower valleys outside the park but who sent parties into the area to hunt game and gather plant materials and other subsistence items. Archeological sites from this time include tipi rings, hunting blinds, and lithic scatters, among others. Although only around two per cent of the park has been surveyed for archeological resources, more than 1,000 prehistoric archeological sites have been identified.

Historic Resources: Historically, early traders, prospectors, explorers, and survey parties traveled through the park, many of them following the Madison River Valley. Construction of the Virginia City and National Park Free Wagon Road in 1873 began the steadily increasing stream of visitors that continues

today. Over the years a number of tourist and administrative facilities, including roadways and park entrance structures, have been added. The park's historic resources relate to European-American exploration and occupation, military administration, NPS administration, and early concessions operations, and include roads, bridges, backcountry cabins, museums, entrance stations, residences, and hotels.

Park entrance stations were considered one of the most important building types for Rustic design in park areas. The stations were designed to provide a definite entrance to the park, and on a subconscious level to create a sense of place and identity, a physical and psychological boundary between the rest of the world and what was set aside as a permanently wild place. The historic Northeast Entrance Station at the Cooke City/Silver Gate entrance to the park consists of two log buildings, a checking station and ranger station/residence, both of classic Rustic design.

Yellowstone was established in 1872, becoming the world's first national park. A civilian administration from 1872-1866 was followed by the U.S. Army. The military played a major role in Yellowstone during the early years, helping to protect natural resources and to contribute to scientific observations of wildlife and other resources. Initially headquarters were established at Mammoth Hot Springs, but detachments were sent to various locations throughout the park to help enforce campfire, fishing, and firearms regulations, and to protect the park from poaching and vandalism.

Game poachers were a major problem; they did not suspend operations during winter months, but built shelters and cached supplies in prepared locations. To deter poachers, the army began sending out winter patrols. Yellowstone's harsh winter conditions necessitated shelter for soldiers during their patrols, so by the fall of 1890, six "snowshoe" cabins had been erected a day's ski apart (about 10 miles). Lacking modern equipment like radios, patrolling soldiers' survival depended upon their wilderness skills and the protection afforded by the isolated cabins.

Most of the early one-room cabins were 12- by 16-feet in size, with gable end doors and extended roofs, characteristic of the Rocky Mountain-style log cabin. Building materials were generally obtained on-site, and the remote cabins were furnished with food and cooking and serving utensils. The Bechler River Soldier Station and barn and the Buffalo Lake Patrol Cabin are representative of the military period in Yellowstone history. The Bechler River Soldier Station was built in the far southwest corner of the park in 1910 to enhance the protection for the southwestern part of the park. Built in 1912, the Buffalo Lake Patrol Cabin is the oldest extant backcountry cabin in the park.

After creation of the National Park Service in 1916, the ranger corps used the same system of patrol established during the Army years. The National Park Service decided that an "old time log cabin effect" was appropriate for out-of-the-

way places in Yellowstone, so new cabins were to be of log construction, and designed to fit rangers' needs. These cabins are likely to have been designed and built by the backcountry rangers.

Designs of the Snowshoe Cabins built between 1920 through 1930 (after establishment of the National Park Service but before adoption of standard plans) vary slightly from one cabin to the next, but reflect the Service's philosophy of constructing vernacular buildings that were both functional and harmonious in design with their natural setting. These styles helped establish the park's architectural theme. The Cache Creek, Crevice Mountain, Daly Creek, Fawn Pass, Fox Creek, Harebell, Heart Lake, Lower Blacktail, Mary Mountain, and South Riverside patrol cabins are examples of this period and type of construction. The Fox Creek Patrol Cabin is also notable for the dovetail notches at the corners and the cleat daubing technique between logs.

Yellowstone National Park was one of the first agencies in the country to take a lead in preserving and building up the remnant herds of bison. Originally, the buffalo were closely herded during the day and put in fenced pasture at night. After 1915, the animals were kept on open range all summer. The Slough Creek Ranch housed the assistant buffalo herder who oversaw haying operations in the Slough Creek Meadows, which produced hay for winter consumption by bison, elk, and the park's horse herd. After reductions in the bison herds, and changes in wildlife management concepts, the Slough Creek structures were put to other uses. However, the buildings are eligible for the National Register for their association with the Lamar Buffalo Ranch, the history of wildlife management in the park and the preservation of bison, as well as the history of park rangers.

In addition, the Slough Creek buildings are a representative example of the snowshoe cabins built in Yellowstone National park after creation of the National Park Service, but before adoption of standard plans. The storehouse/bunkhouse is a vernacular example of utilitarian buildings constructed by the National Park Service, one which blends with its natural setting.

During the 1930s, other Snowshoe Cabins were built in the Rocky Mountain Style to meet standardized plans based on a park's pre-existing vernacular architecture. In the case of Yellowstone, the standard designs were refined versions of cabin designs dating back to the military administration of the park. The designs for these structures carefully adhered to the philosophy that man-made features should harmonize with the environment. Examples of structures built during this period include the Buffalo Plateau, Calfee Creek, Fern Lake, Trail Creek, and Upper Miller Creek.

The massive logs found in the Calfee Creek building exhibit excellent craftsmanship during construction. The Miller Creek Cabin was one of the most distinctive, and was the last snowshoe cabin to exhibit certain design characteristics, including vertical log posts in the open porch gable, oversized wall logs, and a steeply pitched roof. Associated buildings and structures

(outhouse, woodshed, radio antenna, hitching rail, and corral) are of more recent vintage, and do not contribute to the significance of the Miller Creek Cabin.

The Civilian Conservation Corps (CCC) built additional rustic log structures throughout the park during the 1930s. One of these structures was the Heart Lake Tool Cache/Barn (1934). The Lower Blacktail Deer Creek Patrol Cabin was remodeled in 1936. This work may have been done by the Montana Civil Works Administration Program who completed a nearby horse barn and corral, outhouses, pasture fencing, and a bridge in 1934.

The Nez Perce Patrol Cabin is one of only two extant patrol cabins that were built in the 1940s. Although it is of wood frame, it reflects the basic elements of the earlier, standardized design of the “snowshoe cabin” developed during the 1930s (NPS 1999b).

Designs of the park’s vernacular buildings changed over time, but provide an excellent example of prevailing NPS landscape philosophy; that is, the cultural character of a region’s architecture could provide sources for a cultural theme as well as harmonious construction. The historic snowshoe cabins continue to be maintained and used by park rangers, and are important reminders of the soldiers and rangers that dedicated themselves to protecting this special place.

Ethnographic Resources: Yellowstone National Park was visited by the ancestors of many Western and Plains tribes, including the Shoshone, Crow, Gros Ventres, Flathead, and Nez Perce. A few bands of Shoshone-speaking Sheepeaters occupied the park during the early and middle nineteenth century. The park’s natural and cultural resources continue to be significant to these traditionally associated tribes. Places within the park are associated with the development and maintenance of ethnically distinctive peoples, and are closely linked with peoples’ own sense of community. Yellowstone National Park has more than 55 ethnographic resources identified by affiliated tribal peoples. These resources include animals such as bison, plants, thermal areas, mineral paint and obsidian sources, Yellowstone Lake, vision questing sites, and rendezvous and hunting sites. Many of these groups built wickiups (conical timbered lodges) as temporary shelters during hunting forays or obsidian procurement expeditions.

Representatives of Yellowstone’s affiliated tribes participate in periodic consultation meetings with park managers, and each of the affiliated tribes was contacted regarding the fuels management project. However, no tribal comments were received regarding the hazard fuel reductions (see “Consultation and Coordination Section” of this document). Developed areas, such as those identified in the proposed plan, tend not to be areas of interest to tribes. However, most tribes are very concerned about public safety issues, and generally support efforts such as this program represents.

Cultural Landscapes: No cultural landscapes have been formally identified for any of the project areas. However, the historic scene at Fort Yellowstone (including the Bechler River and Buffalo Lake cabins) is evocative of the military occupation during the late 19th and early 20th centuries and should be maintained. The majority of the historic structures included in this project are located in a pastoral meadow setting, consisting of forbs and grasses, with sedges and other grasses in the wetter areas. Outside of the meadows, the canopy is formed by coniferous trees.

The East and Northeast entrances are characterized by modern and historic development in open areas that are bisected by roadways. At the Northeast Entrance Station, the historic ranger station/residence is partially screened from public view by the surrounding vegetation (primarily evergreens) and its raised elevation above the roadway.

Museum Collections: Museum collections can include historic artifacts, natural specimens, and archival and manuscript material. These resources may be threatened by fire, theft, vandalism, natural disasters, and careless acts. There are no museum collections within or near the proposed treatment areas.

National Register of Historic Places: Obsidian Cliff has been nominated as a National Historic Landmark, but the majority of the park's prehistoric and historic archeological sites are unevaluated for eligibility to the National Register of Historic Places. Over 100 structures within the park, including a number of those itemized in Appendix B, are listed on the National Register and on the park's List of Classified Structures. The patrol cabins have been identified as a National Register-eligible property type in the Multiple Property Documentation Form: "The Historic Resources of Yellowstone National Park, 1872-1966." The structures are important for their association with the administration of the park and conservation of natural resources during the period of significance 1872-1949. Other National Register of Historic Places properties within the park and adjacent to or within the Area of Potential Effect include the Lake Hotel, the oldest operating hotel in the park. Built in 1891 and renovated in 1903 and 1929, the hotel continues to offer gracious dining and lodging opportunities. The Northeast Entrance Station Historic District and the Bechler River Soldier Station Historic District are National Historic Landmarks associated with the proposed treatment areas.

Previous Investigations: Over the past three decades, numerous archeological surveys and testing projects have been conducted in the park. Surveys of the Lake area are summarized in Sanders et al. (2001), while other relevant archeological investigations are cited in Shortt (1999, 2000). Areas at Lake were inventoried by Capek (1989) and Cannon and Phillips (1993). Williams and Wright (1981) surveyed areas along Yellowstone Lake. The Bechler developed area was surveyed by Karplus in 1996. Other relevant areas were surveyed by Jones and Parks (1995), Sanders et al. (1996), and Sanders, Wolf, and Rogers (1997). Johnson inventoried the Trail Creek and Bechler areas (1997, 2000),

while Cannon (1995) conducted investigations at Lamar Mountain. Information on survey status also was provided by park staff (A. Johnson, NPS Archeologist, pers. comm., March 2002; T. Olliff, NPS Natural Resources Program Manager, pers. comm., April 2002).

Regulations and Policies: The National Historic Preservation Act, as amended in 1992 (16 USC 470 *et seq*.), and the National Environmental Policy Act, as well as the National Park Service's Director's Order-28, *Cultural Resource Management Guideline (1997*), *Management Policies 2001* (NPS 2000c), and Director's Order-12, *Conservation Planning, Environmental Impact Analysis and Decision-making* (NPS 2001a), require the consideration of impacts on cultural resources listed on or eligible for listing on the National Register of Historic Places. The undertakings described in this environmental assessment are subject to Section 106 of the National Historic Preservation Act, under the terms of the 1995 Service-wide Programmatic Agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.

Impacts of Alternative A, Continue Current Management/No Action

Under this alternative, fuels would not be removed, and consequently, wildland fires are ultimately likely within the treatment areas. The park's cultural resources are nonrenewable, so adverse effects generally would be direct and long-term.

Historic Resources. The historical patrol cabins and other structures and sites with flammable wooden elements (listed in Appendix B) are especially vulnerable to wildfires and fire suppression activities. Buildings could be badly damaged or lost to fire. Damaged structures are more likely to be vandalized. In areas near these historic structures, pre-suppression and routine maintenance activities would help to maintain some structural clearance from surrounding vegetation, and during suppression of wildland fires, mitigation would include some or all of the strategies discussed above. However, due to their isolated nature, protection of these historic properties during wildland fires would be difficult, and not always feasible. Direct damage to or loss of historic structures and sites from wildfire and wildfire suppression activities would result in long-term, adverse impacts of minor to moderate intensity to these resources.

Archeological Resources. All of the park's treatment areas contain archeological resources (both buried and on the surface) that may be placed at risk from unwanted wildland fires and associated suppression activities. Besides losses directly attributed to fire, heating associated with wildland fire can cause smudging, cracking or other damage to artifacts or ruins. Diagnostic artifacts such as organic and ethnobotanical remains could be lost during a fire, or their analytic characteristics (carbon dating, etc.) could be destroyed. The glaze on historic and prehistoric ceramics could be altered by fire and heat, and other inorganic artifacts such as flakes and ground stone could be badly damaged.

Pictographs and petroglyphs could be burned, or lost as heated stone spalls away.

Artifacts can be damaged and soils compressed by heavy equipment. Adverse impacts also may result from human activities such as fire line and helispot construction, establishment of field camps or first aid stations, slurry drops, thinning, and artifact collecting by fire crews or visitors. Activities following a fire, including removal of hazard trees, reconstruction of campgrounds, building water bars and trail repair, habitat rehabilitation, and removal of firelines also may disturb buried resources.

Any or all of the mitigation measures previously described in the “Alternative” section would be executed under the supervision of a qualified cultural resource specialist. However, because during wildfire suppression activities unidentified archeological sites could not be protected, and because professional expertise and many of the mitigation measures listed above may be unavailable for some areas, archeological resources could suffer direct, minor to moderate, long-term, adverse impacts.

Minor to moderate, long-term, indirect adverse impacts also could result from fire and fire suppression activities. For example, cultural resources on slopes or in areas without surface vegetation are especially susceptible to soil erosion. Erosion can displace in-situ resources or expose buried resources to the elements. Exposed sites become more vulnerable to weathering and unauthorized collecting.

Following a wildland fire, post-fire cultural resource surveys would be conducted to identify and evaluate newly discovered sites and/or document damage to known sites. A plan would be developed to ensure site stabilization or information retrieval, and, during rehabilitation of fire control lines and other post-fire activities, care would be taken to avoid damage to archeological or ethnographic resources. Unfortunately, resources identified following a fire often have been damaged, resulting in a loss of site integrity.

Ethnographic Resources. Ethnographic resources are vulnerable to wildfires and suppression activities. These resources may not easily be identified by fire crews, so could be lost during wildland fires. American Indian tribes often are reticent about identifying locations of sensitive sites, so some ethnographic sites may remain undocumented. If ethnographic resources are lost or damaged by wildland fires or fire suppression activities, long-term, minor to moderate adverse impacts would occur.

Cultural Landscapes. While no cultural landscapes have been identified within the project areas, fires or damage from suppression activities can result in unacceptable changes to viewsheds by removing important landscape elements, structures or historic sites, and leaving behind unsightly burned and scorched vegetation, stumps, and unvegetated fire lines. Fire or suppression activities

could have short- and long-term, minor to moderate adverse impacts on the viewshed in all units.

Cumulative Impacts. The number and variety of cultural resources in the region continue to be diminished through development of residences, highways, and businesses, erosion, and collection of artifacts for profit or personal interest. Wildland fires also contribute to cumulative losses of cultural resources available for scientific study, the practice of traditional tribal activities, and visitor enjoyment.

When impacts of the no-action alternative are combined with these other past, present and foreseeable future activities and processes affecting cultural resources, minor to moderate, adverse cumulative effects on archeological, historic and ethnographic resources would be anticipated under this alternative.

Conclusion. Depending upon the intensity and scope of future wildfires, and based on the availability of mitigation measures and qualified personnel, direct impacts to historic and ethnographic sites would be long-term, adverse, and of minor to moderate intensity. Direct and indirect adverse impacts on archeological resources from fires and fire suppression activities would be minor to moderate and long-term.

Viewshed changes resulting from fire or suppression activities (loss of trees and structures, burned vegetation and stumps, exposed soils in fire lines) could cause short- and long-term, minor to moderate adverse impacts. Some impacts would be minor because vegetation could be replanted or may regenerate.

Alternative A would not produce major adverse impacts on cultural resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of cultural resources or values as a result of the implementation of Alternative A.

Impacts of Alternative B, the Preferred Alternative

The preferred alternative would provide for reduction of fuel loads in specified areas along the wildland-urban interface at park developed areas (East Entrance, Northeast Entrance, Bechler developed area, and Lake Utility area) as well as around isolated historic cabins in the backcountry (see Table 1 for the list of proposed treatment sites).

Historic Resources. Historic structures are especially vulnerable to fire. Woody materials immediately adjacent to historic buildings would be carefully removed, using hand tools and, as appropriate, chain saws or brushcutters. Damage to adjacent buildings during vegetation removal and disposal would be reduced by taking care to avoid disturbance of foundations or walkways, felling trees away

from buildings, and by sawing the limbs and logs into transportable small pieces. Fuels reduction around historic structures and sites would reduce the potential for loss of or damage to the structure during a wildland fire.

Archeological Resources. Some of the area of potential effect has been inventoried and evaluated for archeological resources (see earlier discussion of "Previous Investigations"). Prior to implementation of the plan, a professional archeologist would inventory unevaluated areas identified in Appendix B and, in consultation with the Wyoming, Idaho, and Montana State Historic Preservation Officers, evaluate newly discovered sites. The archeologist would identify suitable areas, both on-site and off-site, where slash piles could be located away from known cultural sites.

Ground-disturbing activities, including equipment access and piling and moving slash, would be located to avoid identified resources. The archeologist would identify vulnerable sites for avoidance to help prevent inadvertent damage during fuel removal. Wildland fires would be suppressed in areas containing vulnerable sites, and fire lines would not be allowed through archeological sites. Hazard fuels would be carefully removed within and immediately adjacent to cultural sites to reduce fire danger. Protective measures such as application of fire shelters to historic buildings, ethnographic and archeological sites, and other vulnerable sites would be used where appropriate. These measures would reduce the potential for resource loss or damage.

Fuel reduction, particularly along trails, could make surface artifacts and site features more visible. While increased visibility would allow archeologists to more easily identify previously unknown sites, exposed artifacts also would be more vulnerable to unauthorized collection. To reduce these losses, work crews would be briefed about the need to protect cultural resources, and would be instructed regarding the illegality of collecting artifacts on federal lands to avoid any potential violations of the Archaeological Resources Protection Act of 1979 as amended (16 USC 470aa-mm). This would include instructions for notifying appropriate personnel if human remains were discovered.

Fuel removal could leave exposed surface resources vulnerable to erosion, causing loss of artifacts and site integrity. Damage to sites would be reduced by careful design of project work and by archeological monitoring. Monitoring would include examination of ground exposed during fire management activities to identify previously unidentified cultural resources, such as shallow archeological sites, and to identify areas requiring protective measures. If unanticipated archeological site discoveries were made, the archeologist would halt work in the area of the find, and protect the area until further investigation can be made. If necessary, mitigation would be developed in consultation with the Wyoming, Idaho, and Montana State Historic Preservation Officers. These procedures and other mitigating measures would help ensure that fire management activities would not damage or destroy cultural resources.

Ethnographic Resources. Archeological sites valued by tribes could be adversely impacted, both short-and long-term, by thinning or limbing. The National Park Service would work with tribes and with work crews to protect these resources. Where appropriate, non-cultural woody fuels adjacent to known ethnographic resources within the proposed treatment sites would be removed to reduce the fire danger during wildland fires.

Cultural Landscapes. Wildland fires could leave charred areas, and burned trees and stumps, creating a short-term visual impact on the viewsheds surrounding the historic structures. To avoid these impacts, wherever possible fire lines around development areas and historic structures would be created some distance outside of the visual perimeter, resulting in little or no effect on the viewshed. Fuel buildups near known cultural resources would be reduced, enhancing resource protection for structures while retaining a backdrop of trees that form part of the historic scene.

Cumulative Effects. As described for Alternative A, past and continuing urban development of residences, highways, and businesses, erosion, and collection of artifacts for profit or personal interest contribute to reduced numbers and variety of archeological and historic resources in the region. Some fires may still occur, causing resource loss. These losses cumulatively diminish the resources available for scientific study and visitor enjoyment. When impacts of the preferred alternative, including protection of resources and reduction of fuel loads, are combined with these other past, present and foreseeable future activities and processes affecting cultural resources, long-term, minor adverse cumulative impacts would occur. Minor, long-term, beneficial cumulative effects also would occur due to reduction of fuel loads and carefully planned protection efforts.

Conclusion. Reduction of fuels adjacent to and within sites and historic structures, would have a long-term, minor to moderate beneficial impact on cultural resources by making them much less vulnerable to future fires. Through avoidance and other mitigating measures, damage to cultural resource sites from future fire or from suppression activities would be sharply reduced, resulting in moderate beneficial impacts over the long-term. With mitigating measures, only negligible to minor, direct and indirect short- and long-term adverse impacts to archeological, historic, ethnographic, and viewshed resources would be expected.

Alternative B would not produce major adverse impacts on cultural resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of Yellowstone National Park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other NPS planning documents. Consequently, there would be no impairment of cultural resources or values as a result of the implementation of Alternative B.

Section 106 Summary

This environmental assessment provides detailed descriptions of two alternatives, the no action and preferred alternative, analyzes the potential impacts associated with possible implementation of each alternative, and describes the rationale for choosing the preferred alternative. Also contained in the environmental assessment are mitigation measures that would help offset and minimize potential adverse effects on cultural resources.

Implementation of the preferred alternative would reduce potential damage to or loss of structures and sites from wildland fires, resulting in an important long-range benefit to the park's historic properties by making sites much less vulnerable to wildland fires. Removal of fuels, including potential ground-disturbing activities, would be carefully planned in areas containing cultural sites so that no damage would occur to historic structures, ethnographic sites, or archeological resources during or after fuels removal and disposal. Prior to fuels management activities, archeological sites would be flagged for avoidance, and tight limits would be established to prevent site damage. Most of the isolated cabin sites are situated in or near a meadow. Removal of trees adjacent to these structures would be done in a manner that would preserve important characteristics of the scenic viewshed. Work crews would be instructed about the sensitivity and importance of cultural sites.

To reduce unauthorized collecting from areas, treatment personnel would be educated about cultural resources in general and the need to protect any cultural resources encountered. Work crews would be instructed regarding the illegality of collecting artifacts on federal lands to avoid any potential Archeological Resources Preservatives Act violations. This would include instructions for notifying appropriate personnel if human remains were discovered. In the unlikely event that cultural resources were discovered during construction, work would be halted in the vicinity of the resource, and procedures outlined in 36 CFR 800 would be followed.

Yellowstone National Park staff would continue to educate visitors regarding archeological site etiquette to provide long-term protection for surface artifacts and architectural features. Concerned American Indian groups have been contacted regarding this project, but no comments were received. The park would continue to work with tribes to protect valued ethnographic resources.

This environmental assessment will be sent to the Montana, Wyoming, and Idaho State Historic Preservation Offices for review and comment as part of the Section 106 compliance for the project areas. Identification and evaluation of National Register potential has been completed for most of the historic structures and for some of the archeological sites in the area of potential effect (see Appendix B).

Prior to implementation of the selected alternative, survey information and an evaluation of potential National Register of Historic Places eligibility for previously

unevaluated sites within the area of potential effect will be sent to the appropriate State Historic Preservation Office to complete Section 106 compliance. If necessary, additional mitigation measures would be developed in consultation with the State Historic Preservation Officer and, as appropriate, with concerned American Indian tribes.

Pursuant to 36 CFR Part 800.5, implementing regulations of the National Historic Preservation Act (revised regulations effective January 2001), addressing the criteria of effect and adverse effect, the National Park Service finds that the implementation of the preferred alternative in selected, previously inventoried areas of Yellowstone National Park, with identified mitigation measures, would not result in adverse effects to archeological, historic, ethnographic, cultural landscape, or museum collection resources currently identified as eligible for or listed on the National Register of Historic Places.

Many of these backcountry project areas contain both National Register-eligible and non-eligible buildings and sites. All these resources would be protected and avoided during project implementation, regardless of their National Register status.

ECONOMIC EFFECTS

Affected Environment

The majority of Yellowstone National Park lies within the state of Wyoming. The northern boundary of the park crosses into Montana in Park County. The western boundary of the park extends into Fremont County, Idaho. The park has four gateway communities – one for each boundary line. The most heavily used entrance is West Yellowstone on the western boundary in Montana. This station records over 1 million park entrances each year. From the south, visitors enter through Jackson, Wyoming and the Grand Teton corridor. This entrance is used by approximately 750,000 million visitors each year. On the northern boundary, the park entrance at Gardiner, Montana records over 500,000 entrances each year. About 300,000 visitors arrive annually at the Northeast Entrance, through the Cooke City, Montana corridor, (NPS 2000d).

With over 4 million visitors to the park each year, Yellowstone serves as a major contributor to the local and regional economy. Recreational use of the park contributes an average of $735 per visitor during summer months. During winter months, visitors spend an average of $1,129 during their stay. Retailers that provide services to park visitors are among the largest employers in the region.

Table 9. Economic Outline of the Five Counties Bordering Yellowstone National Park

State/County	2000 Population	Population Change (1990-2000)	Average Household Income (1997 model estimate)	Major Economic Activities
Idaho				
Fremont County	11,819	+ 8.1%	$30,579	Agriculture, forestry, fisheries
Montana				
Gallatin	67,831	+ 34.4 %	$35,710	Retail, professional specialty occupations
Park County	15,694	+ 8.1%	$29,845	Retail, precision production (crafts and repair occupations)
Wyoming				
Park County	25,786	+ 11.3%	$35,150	Retail, professional specialty occupations
Teton County	18,251	+ 63.3%	$46,385	Retail, construction

Two boundary counties have experienced rapid growth over the past decade. Gallatin County in Montana and Teton County in Wyoming have grown at rates much greater than their state averages of 12.9 and 8.9 percent, respectively. The average household income of Teton County ($46,385) varies substantially from the national average of $37,005. In each of the five counties, over 90 percent of 2000 Census respondents responded that they were white and non-Hispanic (U.S. Dept. of Commerce 2001a, b, and c).

The park is surrounded largely by lands managed by the U.S. Forest Service. Wilderness areas have been designated along large portions of the western and southern boundaries within the state of Wyoming. Development near the park is largely limited to corridors adjacent to established roads and highways. These travel corridors are the paths used by visitors to access the park. Economic uses of the Forest Service lands include grazing by permittees, timber harvest, recreation, hunting, and fishing.

The project areas includes 31 backcountry sites (including the Bechler developed area) and three frontcountry or developed areas. Seven of the backcountry cabins are near the park boundary with Forest Service lands. The backcountry cabin sites near the boundary are remote, and not in the vicinity of privately owned lands. The three developed sites of the project area are at the Lake Utility area, East Entrance and Northeast Entrance. Development at these locations

includes park facilities and visitor services. There is no private property adjacent to or in the vicinity of these treatment sites.

Impacts of Alternative A, Continue Current Management/No Action

There would be no short-term economic consequences as a result of continuing current management. Long-term effects would include continued potential for wildfire in the treatment areas. In the event of a wildfire, economic losses would be both direct and indirect. Direct economic losses are those related to property and asset damage caused by the fire. Tourism and activities related to visitation in the vicinity of the treatment sites could be affected during the fire, if access is restricted or if smoke obscures views or makes visitors uncomfortable. Indirect economic losses would be those associated with adverse effects of fire on treatment sites and surrounding ecosystem. Given the size and location of the proposed treatment sites, reduced economic opportunities associated with visitation to the treatment sites could have negligible adverse effects on the local economy.

Cumulative Effects. The no action alternative does not contribute to fuels reduction and fire management in Yellowstone National Park; however, there would be no cumulative economic effects resulting from implementation of the no action alternative.

Conclusion. Implementation of the no action alternative would have negligible to minor effects of the local economy. The 31 backcountry and three frontcountry sites would not receive fuels reduction treatments. The potential for these sites to be lost to fire would not be reduced. Given the size and location of the backcountry treatment areas, it is unlikely that damage to or loss of these sites would have measurable economic effects. The loss of structures at the frontcountry areas could have a minor adverse effect.

Impacts of Alternative B, the Preferred Action

Management activities associated with the preferred alternative include, 1) mechanical thinning using handtools and chainsaws; 2) salvage of cuttings for firewood; 3) piling and burning slash; and 4) chipping and scattering slash where burning is not appropriate.

Thinning and limbing activities would not be expected to yield economic effects. Slash pile burns implemented under Alternative B could have negligible, short-term, direct effects on visitor activities in the immediate vicinity. The burning activities would be small-scale and controlled. The effects on economic activities associated with park tourism would be negligible.

The possibility of escaped slash pile fire would be mitigated under pre-approved fire plans. These plans include parameters for suitable weather conditions, computer modeling, and use of natural and man-made fire breaks to control each

burn. The potential for escaped treatment fire poses a negligible effect to economic activities, with implementation of mitigation measures.

Long-term economic effects would also be negligible. Reduction in fuel loading within the project area would help protect selected backcountry cabins and frontcountry development from the adverse economic effects caused by wildfire. This added protection would provide negligible, localized, beneficial effects.

The economic effect on park operations was not considered in the assessment of effects. The costs associated with reducing fuels in the treatment areas was not a major factor in the park's decision to take action to reduce fuels in the wildland-urban interface. The benefits achieved by taking action, most importantly enhanced firefighter safety and protection of irreplaceable historic structures, were the main factors in considering the proposed action. The costs of fuel reduction treatments is a concern for the park service, and the park would make every effort to conserve funding where appropriate and when it did not compromise the safety of workers or the full protection of the historic structures.

Cumulative Effects. Implementation of Alternative B would contribute beneficially, but negligibly, to economic benefits of the park's overall fuels reduction and fire management program. The preferred alternative would also complement the fire management plans and projects on surrounding National Forest lands, thus contributing to an overall beneficial cumulative effect.

Conclusion. Economic effects of implementation of the preferred alternative would be negligible.

PARK OPERATIONS

Affected Environment

The superintendent at Yellowstone National Park is responsible for the full scope of managing the park, its staff and residents, all of its programs, and its relations with persons, agencies, and organizations interested in the park.

Park staff provide the full scope of functions and activities to accomplish management objectives and meet requirements in law enforcement, emergency services, public health and safety, science, resource protection and management, visitor services, interpretation and education, community services, utilities, housing, fee collection, and management support.

The backcountry cabins are located at relatively remote sites, and serve a variety of purposes in park operations. Rangers use cabins located near park boundaries during hunting season to prevent hunters from entering the park. Several of the cabins serve as housing for rangers on fire watch. The Clear Creek cabin is used by fisheries biologists as a research camp. The cabin is located near a fishnet where specimens are collected for research purposes.

The cabins are maintained as basic shelter. They do not provide users with plumbing, electricity, or other conveniences. A hand-pump is used to obtain water for domestic use, and a wood-burning stove is available for warmth and cooking. The cabins are stocked with food rations for use in emergencies. Upkeep of the cabins involves preventing animals from inhabiting the structures, maintenance of bear-proof trash collectors, and routine repairs to ensure structural integrity.

The Lake Utilities area, East Entrance and Northeast Entrance are developed areas with park facilities. The Lake Utilities area also includes park housing. Park operations at these locations includes routine utility maintenance, painting and repair of buildings.

Impacts of Alternative A, Continue Current Management/No Action

Under Alternative A, no additional defensible space would be established adjacent to the backcountry cabins or at the frontcountry sites. In the event of an approaching wildfire, these park facilities would continue to be at risk from the presence of combustible fuels. This would increase the potential for these structures to be damaged or consumed by fire.

Park operations could be affected if the usefulness of these structures were diminished. The cabins play a role in wildlife protection, fire prevention, and research. The park entrance facilities serve visitor access needs, and allow park staff to gather fees and distribute park information. The Lake Utilities area contains infrastructure elements as well as employee housing. Loss any of these structures could result in negligible to minor adverse effects on park operations. These adverse effects would likely be short and long-term, as specific functions would be interrupted until new facilities or alternate locations for management actions could be identified.

Cumulative Effects. As a part of operations, the park works cooperatively with numerous federal, state, and local land agencies to manage and suppress wildfires. Federal lands surrounding the park have active fire management plans that include wildland fire suppression and the use of prescribed fire. Under the no action alternative, interagency cooperation would continue, as would the park's other ongoing fire management activities. The no action alternative would make no contribution to cumulative effects of these other fire management activities.

Conclusion. Implementation of the no action alternative would result in potential short and long-term adverse effects on park operations. Structures in the project area would not benefit from the establishment of adjacent defensible space, leaving them vulnerable to damage by wildfire. The effects would be localized and of negligible to minor intensity.

Impacts of Alternative B, the Preferred Alternative

Park staff would be required to carry out a portion of the proposed action. This includes, but is not limited to, clearing trees and brush using hand tools and chainsaws, transporting slash suitable for firewood use, chipping of slash, and planning and management of slash pile burns. These actions would be within park staff job descriptions. Adverse effects to park operations would be negligible and short-term and would not add considerably to the workload of park staff.

The preferred alternative would reduce fuel loads at the sites selected for treatment. Creation of this defensible space would represent a minor, long-term, beneficial effect to the park staff by protecting useful park structures from wildfire damage and increasing safety for firefighters.

Cumulative Effects. The current fire management plan includes activities to keep surface fuel loads low and to reduce the potential for fires to spread. The park manages wildland fires with a range of techniques that include suppression and the use of both management and natural prescribed fire. In addition, the park cooperates with other federal and state land management agencies to prevent and mange fire. Implementation of the preferred alternative would make a minor, positive contribution to other fire management activities to protect public health and safety and valuable park resources from wildfire damage.

Conclusion. Alternative B would result in negligible, short-term, localized, adverse effects to park operations from treatment implementation. Long-term effects to park operations would be beneficial and minor, resulting from a reduced potential for wildfire to damage useful park structures and an increase in safety for firefighters.

PUBLIC HEALTH AND SAFETY

Affected Environment

Hazardous fuels management in Yellowstone would benefit several groups. Park visitors, employees, nearby residents, and firefighters would likely experience positive effects to their health and safety by reducing the chance of wildfire.

Visitation to Yellowstone National Park exceeds 3 million visitors each year with the majority of visitation occurring in the summer months. Visitor use in the park is concentrated in the major developed areas, such as Old Faithful, Canyon, Lake, and Mammoth Hot Springs. Backcountry use accounts for between 5 and 10 percent of park visitation (NPS 2000a).

Gateway communities that include West Yellowstone, Gardiner, Cooke City, and Silver Gate, Montana, and Cody and Jackson, Wyoming surround Yellowstone National Park. In 2000 the combined population of Park and Gallatin counties, Montana, bordering Yellowstone National Park to the north and west,

respectively, was 83,525 people (U.S. Dept. of Commerce 2001a and b). Park County, Wyoming, which includes the park, has a population of 25,786 (U.S. Dept. of Commerce 2001c).

Impacts of Alternative A, Continue Current Management/No Action

Under Alternative A, full suppression of wildland fire would be maintained in those areas outside wildland fire use zones. Maintaining the current management program would result in the continued accumulation of fuels in the proposed treatment areas and the risk of exposure to wildfire would increase. Small fires as well as suppression efforts would pose little threat to the public and a minor threat to firefighters. A spread of the fire from the treatment area however could have more pronounced effects. Attempts to suppress a large fire would result in increased risk to the health and safety of firefighters. Smoke from large fires could create health hazards for those with respiratory conditions. Risks to employees and visitors would be reduced with implementation of appropriate health and other safety warnings including the closure of developed and backcountry sites. In the event that a fire spreads across park boundaries, the effects to public health and safety would increase. Overall the risks to public health and safety from wildfire could include loss of life and property, injury, and health effects caused by exposure to smoke emissions and represent a minor to moderate, short- and long-term adverse effect.

Cumulative Effects. With the number of existing residential and commercial developments on the park's periphery, there would be an increased risk to human safety and public property because the no action alternative would not complement fuel reduction efforts that would occur on adjacent lands.

Conclusion. Alternative A would have a minor to moderate adverse affect on public health and safety in the short- and long-term in the event of a wildfire.

Impacts of Alternative B, the Preferred Alternative

Implementation of selective thinning in the treatment areas poses a short-term risk to work crews only during management activity. Conducting hazard fuels reduction projects would cause safety concerns due to exposure of workers to potentially dangerous equipment such as saws, axes, and chainsaws. However, diligent training of work crews would reduce the level of risk. Short-term adverse effects of the preferred alternative would therefore be negligible. There is no anticipated risk to visitors from implementation of thinning activities under the preferred alternative. There is minimal amount of visitation in the backcountry (less than 10 percent) and treatment areas in both the developed areas and in the backcountry would be closed during fuel reduction activities.

Slash pile burning poses a negligible, short-term, local, adverse effect on health and safety. Smoke produced by fires would be the primary effect and would be,

in most cases, no more than a slight nuisance to work crews. There would be no risk to visitors from smoke of slash-piles as this method of debris disposal would likely not take place in the front-country, developed areas. Chipping would be considered at these sites instead.

Long-term effects to employees, visitors, firefighters, neighbors, and nearby communities would be minor to moderate and beneficial. The goal of this action is to effectively reduce the potential of wildfire, protect life and property, and ensure perpetuation of the cultural and natural resources of the park. By reducing the potential for wildfire, associated potential loss of life and property and exposure to the dangers of fire would be decreased. In addition, avoiding the costs and results of large-scale fire suppression would result in efficient use of public funding for park operations and maintenance.

Cumulative Effects. In conjunction with the current fire management plan, fire management projects in the surrounding area and fuel management projects being implemented in the seven adjacent national forests and in Grand Teton National Park, the proposed action would reduce the potential for adverse effects to public health and safety associated with wildfire.

Conclusion. Short-term, direct, adverse effects to health and safety resulting from exposure of workers to hazardous equipment would be negligible with implementation of appropriate safety training. Long-term effects, namely those associated with reduced opportunity for uncontrolled wildfire, would be beneficial and minor to moderate.

VISITOR USE AND EXPERIENCE

Affected Environment

Recreational visitation to Yellowstone National Park has grown by more than 11.9 percent in the last 14 years, from 2,404,862 in 1982 to 2,730,810 in 2001. However, more recently visitation is on a slight downward trend showing a 12.8 percent decrease in visitation from 1999 to 2001 (3,131,381 to 2,730,810, respectively).

Most of the visitation (70 percent) occurs in the peak seasons during the three months of summer. During the peak season (early July to mid-August), facilities such as campgrounds, lodges, visitor centers, restaurants, service stations, and shops are used at or beyond capacity.

Visitation has increased during the non-peak season - fall, winter, and spring - by 43 percent since 1976 due to increased snowmobiling and general winter visitation.

Visitor use (75 percent+) in the park is concentrated in the major developed areas. Most park visitation centers on wildlife viewing and viewing thermal

features. Only 9 percent of visitors took a backcountry trail and only 1 percent used a backcountry campsite (NPS 2000a).

More than 90 percent of the park is considered backcountry and managed as wilderness. The park's backcountry has not been developed, with the exception of a relatively sparse trail system, a network of designated campsites, and 43 ranger patrol cabins and lookouts, most of which are defined historic properties.

Impacts of Alternative A, Continue Current Management/No Action

Under Alternative A, full suppression of wildland fire would be maintained in those areas outside wildland fire use zones. Maintaining the current management program would result in the continued accumulation of fuels in the proposed treatment areas and the risk of exposure to wildfire would increase. Small fires as well as suppression efforts would pose little threat to the visitor experience. A spread of the fire from the treatment area, however, could have more pronounced effects. Large fires would have slightly increased potential to disrupt or restrict activities of those visitors using the backcountry due to backcountry closures and smoke. Overall effects of fire on visitor use/experience would represent a negligible, short- and long-term adverse effect due to the limited number of visitors who use the park's backcountry. A fire at the frontcountry sites would potentially cause minor to moderate adverse effects on visitor use and experience because of the proximity to visitor centers and services and the disruption that a fire and suppression efforts would cause.

Cumulative Effects. Although numerous construction and maintenance projects are planned in the Greater Yellowstone Area over the next 20 plus years, the major emphasis of these projects is to replace, repair, and rehabilitate existing facilities that are approaching the end of their service life. Where new facilities are proposed, they would be concentrated in and adjacent to existing developed areas to minimize the creation of new, isolated developments. The park's long range interpretive plan recommends upgrading and providing new satellite and gateway visitor centers within or adjacent to existing developed areas (NPS 2000b). Because there are no future development actions planned for backcountry areas, negligible cumulative effects to visitor use and experience at the backcountry sites would be anticipated.

Conclusion. Alternative A would have a negligible adverse affect on the visitor use/experience in the short- and long-term in the event of a wildfire due to the limited number of visitors who use the park's backcountry. A fire at the frontcountry sites would potentially cause minor to moderate adverse effects on visitor use and experience.

Impacts of Alternative B, the Preferred Alternative

Implementation of selective thinning in the treatment areas (canopy clearing within 400 feet of structures) would expose visitors to thinning crew movements and activities, the noise of chainsaws, and smoke from the burning of slash. The effects on visitor use and experience would be slightly higher for the three frontcountry treatment areas (119 acre total) due to higher visitor concentrations as compared to the more remote backcountry treatment sites (31 sites - 295 acre total). The selective thinning that would occur on each of these small treatment areas would not be visibly noticeable to most visitors. Overall the effects of this thinning activity for both frontcountry and backcountry treatment sites would represent a direct, negligible, short- and long-term adverse effect due to the limited number of visitors who would frequent these sites, the dispersed locations of the treatment areas, the small size of the treatment areas, and the closure of treatment areas to visitors during treatment. The reduced risk of wildfire affecting cultural resources under this alternative would result in minor beneficial effect on visitor use and experience.

Cumulative Effects. The cumulative effects associated with Alternative B would include those discussed above under Alternative A. In addition, the preferred alternative would have a beneficial cumulative affect on upgraded and new visitor centers by providing a higher degree of protection from wildfire at the Northeast and East Entrance areas, where treatments are proposed.

Conclusion. The thinning operation in Alternative B would have a negligible adverse affect on visitor use/experience in the short- and long-term due to the limited number of visitors who would frequent the backcountry sites, the dispersed locations of the backcountry treatment areas, the small size of the backcountry treatment areas, and the closure of treatment areas to visitors during treatment. Fuels management activities at the frontcountry sites would employ mitigation measures to offset adverse effects to visitors during implementation of the treatments.

CONSULTATION/COORDINATION

AGENCIES/TRIBES/ORGANIZATIONS/INDIVIDUALS CONTACTED

Tribes. On April 13, 2001 a letter was sent to 96 representatives of the park's affiliated tribes announcing the Spring 2001 general consultation. The option of discussing the hazardous fuels management project was included in the announcement. The annual meeting was held on the 25th and 26th of April 2001, with 16 representatives from eight tribes attending. The attendees did not choose to address the proposed action, nor were any comments received regarding the plan (R. Sucec, NPS Cultural Anthropologist, pers. comm., February 2002). The tribes will be sent a copy of the EA for review and comment.

State Historic Preservation Office. This environmental assessment will be sent to the Montana, Wyoming, and Idaho State Historic Preservation Offices for review and comment as part of the on-going Section 106 compliance for the project and the treatment areas.

U.S. Fish and Wildlife Service. Park staff requested endangered and threatened species verification from the U.S. Fish and Wildlife Service. A copy of this letter is included in Appendix A. A biological assessment evaluating the effects of the proposed action on listed, and proposed species was submitted to the U.S. Fish and Wildlife Service. The Service concurred with the "may affect, not likely to adversely affect" determination on May 31, 2002. The biological assessment is included in Appendix C.

U.S. Forest Service. The Gardiner Ranger District was consulted about the proposed action in conjunction with continued efforts to coordinate with other agencies regarding fire protection activities.

LIST OF PREPARERS

Name	Role on project	Title	Office
		National Park Service	
Phil Perkins	Project Lead	Fire Management Officer	Yellowstone National Park
Andy Mitchell	Assistant Project Lead	Assistant Fire Management Officer	Yellowstone National Park
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Name	Role on project	Title	Office
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Norman, Mark	Contributing Author	Environmental Scientist	Denver
Rhodes, Diane	Contributing Author	Cultural Resource Specialist/Archeologist	Denver
White-Scott, Nicole	Contributing Author	Environmental Scientist	Denver
Young, Bart	Project Manager	Environmental Planner	Denver

LIST OF AGENCY AND ORGANIZATIONAL RECIPIENTS

This list includes only agencies and organizations. A list of individual recipients of the environmental assessment is on file at Yellowstone National Park planning office.

Billings, MT Public Library

Bozeman, MT Public Library

Cody, WY Public Library

Jackson, WY Public Library

Yellowstone National Park Research Library

Beaverhead National Forest

Big Hole National Battlefield

Bridger-Teton National Forest

Custer National Forest

Environmental Protection Agency, Region 8 - Denver

Gallatin National Forest

Glacier National Park

Grand Teton National Park

Grant-Kohrs Ranch National Historic Site

Idaho Department of Commerce

Idaho Department of Parks and Recreation

Idaho Fish and Game Department

Idaho State Historic Preservation Office

Little Bighorn Battlefield National Monument

Montana Department of Commerce

Montana Department of Fish Wildlife and Parks

Montana Intergovernmental Review Clearinghouse

Natural Resource Conservation Service - Bozeman and Cody

Shoshone National Forest

Targhee National Forest

Teton County Certified Local Government

Town of West Yellowstone

U.S. Army Corps of Engineers

U.S. Fish and Wildlife Service - Cheyenne, WY

Western Federal Lands Highway Division

Wyoming Department of Transportation

Wyoming Game and Fish Department

Wyoming Office of Federal Land Policy

Wyoming State Clearinghouse

Wyoming State Historic Preservation Office

Wyoming State Lands and Investments

Wyoming State Library

Wyoming Travel Commission

Advisory Council on Historic Preservation - Western Office of Project Review

Alliance for Wild Rockies

American Fisheries Society

American Wildlands

Bear Creek Council

Beartooth Alliance

Billings Chamber of Commerce

Bozeman Area Chamber of Commerce

Buffalo Bill Historical Center

Center for Urban Affairs

Cheyenne High Plains Audubon

Citizens for Teton Valley

Cody Chamber of Commerce

Cooke City/Silver Gate Chamber of Commerce

Defenders of the Rockies

Defenders of Wildlife

Fremont County Audubon Society

Gallatin County Commissioners

Gardiner Chamber of Commerce

Great Bear Foundation

Greater Yellowstone Association of Conservation Districts

Greater Yellowstone Coalition

Hamilton Stores, Incorporated

Idaho Falls Chamber of Commerce

Idaho Wildlife Federation

Jackson Hole Alliance for Responsible Planning

Jackson Hole Chamber of Commerce

Lander Chamber of Commerce

Livingston Chamber of Commerce

Montana Audubon Council

Montana State University

Montana State Historic Preservation Office

Montana Wildlife Federation

National Audubon Society

National Parks and Conservation Association

Nature Conservancy - Idaho Chapter

Nature Conservancy - Montana Chapter

Nature Conservancy - Wyoming Chapter

National Wildlife Federation

Northern Plains Resource Council

Northern Rockies Conservation Cooperative

Northwestern University

Park County (MT) Commissioners

Park County (WY) Commissioners

Park County Environmental Council

Pinedale Chamber of Commerce

Red Lodge Chamber of Commerce

Riverton Chamber of Commerce

Sacajawea Audubon Society

Sierra Club Idaho Chapter

Sierra Club Northern Plains Regional Office

Sierra Club Teton Group

Sierra Club Utah Chapter

Snake River Audubon Society

Star Valley Development Association

Stone Fly Society

Teton County Commissioners

Teton County Historic Preservation Board

University of Colorado

University of Wyoming

Upper Missouri Breaks Audubon Society

Utah Audubon Society

Utah Wilderness Association

Utah Wildlife Federation

West Yellowstone Chamber of Commerce

Wild Forever

Wilderness Society

Wyoming Wildlife Federation

Wyoming Association of Professional Historians

Wyoming Heritage Society

Wyoming Outdoor Council

Xanterra Parks and Resorts

Yellowstone Association

Yellowstone Park Foundation

Yellowstone Valley Audubon Society

Northern Arapaho Tribe

Blackfeet Tribe

Northern Cheyenne Tribe

Coeur d'Alene Tribe

Confederated Tribes of Salish and Kootenai

Crow Tribe

Crow Tribe/Apsaalooke Nation

Kiowa Tribe

Nez Perce Tribe of Lapwai

Nez Perce Tribe of Nespelem

Nez Perce Tribe of Colville

Eastern Shoshone Tribe

Shoshone-Bannock Tribes

Assiniboine and Sioux Tribes of Fort Peck

Gros Ventre and Assiniboine Tribes

Cheyenne River Sioux Tribe

Crow Creek Sioux Tribe

Flandreau Santee Sioux Tribe

Lower Brule Sioux Tribe

Oglala Sioux Tribe

Rosebud Sioux Tribe

Standing Rock Sioux Tribe

Spirit Lake Sioux Tribe

Sisseton-Wahpeton Sioux Tribe

Yankton Sioux Tribe

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APPENDIX A: LETTERS AND OTHER COORDINATION DOCUMENTATION

United States Department of the Interior

NATIONAL PARK SERVICE
PO Box 168
Yellowstone National Park
Wyoming 82190

IN REPLY REFER TO:

D18(YELL)

JUN 07 2001

Dear Interested Party:

Yellowstone National Park is proposing to implement a series of mechanical fuels reduction projects at the Lake, East Entrance, and Northeast Entrance areas. The proposed projects are designed to remove highly flammable fuels surrounding development structures. The proposed thinning cut is designed to enhance the survivability of structures as well as the firefighters assigned to protect them in the event of a wildfire incident. The past practice of aggressive suppression of lightning and human-caused fires has resulted in plant communities with a high amount of combustible fuels, which present a very high risk to structures and human activities that occur within the park.

The proposed fuels reduction project would follow the *Yellowstone National Park Structure Protection and Firefighter Protection Hazard Fuels Management Guidelines*, an addendum to the *Wildland Fire Management Plan* that was approved in March 1992. The plan addresses the threat of wildland fire entering developed areas, both frontcountry developments and backcountry administrative sites (cabin areas). The goals of the plan are to enhance visitor, resident, and firefighter safety and to protect structures through a proactive program of fuels management.

During the winter of 2000-2001, federal wildland fire management policy was reviewed. The review provided clearer direction to federal agencies that protection of human life is an overriding principle. Wildland fire will be used to protect, maintain and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role. Planning must provide for firefighter and public safety, address important values to be protected, be consistent with resource management objectives, and comply with environmental laws and regulations.

The three proposed treatment areas are the Lake developed area and the developed areas associated with the East and Northeast Entrances. The proposed areas to be treated will be described by a zone with a perimeter 400 feet from the edge of the outside buildings in each development. Individual project plans will be written that will include maps and all other pertinent data. The acreages to be treated are Lake: 161.3 acres; East: 22.9 acres; and Northeast: 19.2 acres. The proposed treatment would consist of thinning the forest so that the edges of all remaining tree crowns are generally 20 feet apart.

In addition, saplings would be thinned to a level that would support the new forest density and some ground fuels would be removed as well.

To evaluate alternatives and determine environmental consequences, an environmental assessment will be prepared for these projects. Yellowstone National Park management staff would like to hear about your concerns regarding implementation of this proposal. The park welcomes your input in understanding issues and developing alternatives for resolving a variety of management issues. Issues identified to date include effects to vegetation, wildlife (including threatened and endangered species), cultural resources, and visitor experience. Alternatives could include different treatment and disposal techniques or treatment zones. Please send your comments by July 7, 2001, to the Planning Office, Mechanical Fuels Reduction Project, Yellowstone National Park, P.O. Box 168, Yellowstone National Park, Wyoming 82190. For additional information, the *Wildland Fire Management Plan* and *Yellowstone National Park Structure Protection and Firefighter Safety Hazard Fuels Management Guidelines* documents are available from the Wildfire Specialist, Yellowstone National Park, P.O. Box 168, Yellowstone National Park, Wyoming 82190.

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

Sincerely,

R. Obernesser

Rick Obernesser
Acting Superintendent

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4000 Airport Parkway
Cheyenne, Wyoming 82001

ES-61411
sl/W.25/WY5571.sl

February 19, 2002

Mr. Don Kellett
Parsons Engineering Science, Inc.
Suite 900
1700 Broadway
Denver, CO 80290

Dear Mr. Kellett:

Thank you for your fax requesting a species list for the Yellowstone National Park Wildland-Urban Interface fuels management projects proposed in Park and Teton counties, Wyoming.

In accordance with section 7(c) of the Endangered Species Act of 1973, as amended (Act), my staff has determined that the following threatened or endangered species, or species proposed for listing under the Act, may be present in the project area.

Listed and Proposed Species

Species	Status	Expected Occurrence
Bald eagle (*Haliaeetus leucocephalus*)	Threatened	Nesting. Winter resident. Migrant.
Grizzly bear (*Ursus arctos horribilis*)	Threatened	Resident.
Gray wolf (*Canis lupus*)	Experimental (Formerly Endangered)	Potential resident.
Whooping crane (*Grus americana*)	Experimental (Rocky Mtn. pop'n only)	Resident. Migrant.
Black-footed ferret (*Mustela nigripes*)	Endangered	Potential resident in prairie dog (*Cynomys* sp.) colonies.
Canada lynx (*Lynx canadensis*)	Threatened	Resident of forested areas
Mountain plover (*Charadrius montanus*)	Proposed	Grasslands statewide

Bald eagle
Work that may affect these birds, their young, eggs, or nests (for example, if you are going to undertake construction in the vicinity of a nest), should be coordinated with our office before any actions are taken in order to determine if consultation under the Act may be necessary. The U. S. Fish and Wildlife Service (Service) recommends the project area be surveyed for nesting eagles and roost areas. If any active nests or roost areas are identified within 1 mile of the proposed project, we recommend avoiding work in the area between February 15 and August 15 and avoiding impacts to any nests and roost areas. If timing and/or location of the work cannot be modified to avoid possible impacts you should contact this office to discuss consultation requirements pursuant to the Act.

Grizzly bear
The proposed projects fall within the grizzly bear range and habitat. Timber operations can affect the bear by altering habitat, creating roads and increasing contact with humans. These issues should be considered when assessing the impacts of this project on the grizzly bear. In addressing potential impacts your environmental assessment should include a detailed description of historic and current bear use and a description of suitable bear habitat available in the area. Include habitat variables such as berry production, details on potential impacts to whitebark pine, and entries into the forest associated with the project. Information on whitebark pine impacts should include extent and condition of whitebark pine occurring in mixed and pure stands within the project area, estimates on the amount to be removed, and anticipated regeneration. Entries into the forest includes, the number of roads built into the project area and number of operations associated with the project. Finally, we need information regarding the cumulative impacts of this action and other past, present, and future actions including timber harvests, road building, recreation, loss of big game hiding cover effectiveness or impacts to species dependant upon mature forest.

Gray wolf
All wolves within Wyoming are now considered part of the nonessential experimental population. Although such wolves remain listed and protected under the Act, additional flexibility is provided for their management under the provisions of the final rule and special regulations promulgated for the nonessential experimental population on November 22, 1994 (59 FR 60252). Requirements for interagency consultation under section 7 of the Act differ based on the surface ownership and/or management responsibility where the animals occur. On any unit of National Park System or National Wildlife Refuge System lands, wolves that are part of the experimental population are considered a threatened species and the full provisions of section 7 apply. Thus, the Service and any other action agency is prohibited from authorizing, funding or carrying out an action within a National Park or National Wildlife Refuge that is likely to jeopardize the continued existence of the gray wolf. Formal section 7 consultation is required if a Federal action within these areas "may affect" the gray wolf.

Whooping crane
The whooping crane is also considered part of a non-essential experimental population. It too is considered a threatened species, when found on National Park System or National Wildlife Refuge System lands, and therefore the full provisions of section 7 under the Act apply.

Whooping cranes can tolerate very little human disturbance, especially during nesting, brood rearing, and during flightless molt (May to mid-August). Slight human disturbance is often sufficient to cause adults to desert nests. On wintering grounds, whooping cranes will tolerate human disturbance if it is not associated with obvious threats. Potential hazards to whooping cranes increase as human use of crane habitat increases.

Black-footed ferret

Black-footed ferrets may be affected if prairie dog colonies are impacted. If white-tailed prairie dog (*Cynomys leucurus*) colonies or complexes greater than 200 acres will be disturbed, surveys for ferrets should be conducted even if only a portion of the colony or complex will be disturbed. A white-tailed prairie dog town or complex consists of two or more neighboring prairie dog towns each less than 7 kilometers (4.34 miles) from each other (Black-footed Ferret Survey Guidelines, USFWS, 1989). If a field check indicates that prairie dog towns may be affected, you should contact this office for guidance on ferret surveys.

Canada lynx

In the final rule for listing the Canada lynx March 2000, the Service identified that significant threats to the lynx were (1) loss and/or modification of habitat; (2) past commercial harvest (trapping), which is partially responsible for the extremely small lynx population; (3) inadequate regulatory mechanisms to protect lynx and their habitat; and (4) other factors such as increased human access into suitable habitat and human-induced changes in habitat allowing other species (e.g., bobcats and coyotes) to move into lynx habitat and compete with them. Examples of human alteration of forests include loss of and conversion of forested habitats through urbanization, ski area and other developments; fragmentation that leads to isolation of forested habitats by highways or other major construction; and certain timber harvesting practices and fire suppression measures.

Elevated levels of human access into forests are a significant threat to Canada lynx because they increase the likelihood of lynx encountering people, which may result in more lynx deaths by intentional and unintentional shooting, trapping, and being hit by automobiles. Human access into Canada lynx habitat in many areas has increased over the last several decades because of increased construction of roads and trails and the growing popularity of snowmobiles and other off-road vehicles.

Mountain plover

Mountain plover breeding and wintering habitats are known to include grasslands, mixed grassland areas and short-grass prairie, shrub-steppe, plains, alkali flats, agricultural lands, cultivated lands, sod farms, and prairie dog towns. Plovers may nest on sites where vegetation is sparse or absent, or near closely cropped areas, manure piles or rocky areas. Mountain plovers are rarely found near water and show a preference for previously disturbed areas or modified habitat. They may be found on heavily grazed pastures throughout their breeding range and may selectively nest in or near prairie dog towns.

The Service recommends surveys for mountain plovers in all suitable habitat as well as avoidance of nesting areas to minimize impact to plovers in a site planned for development.

While the Service believes that plover surveys, avoidance of nesting and brood rearing areas, and timing restrictions (avoidance of important areas during nesting) will lessen the chance of direct impacts to and mortality of individual mountain plovers in the area, these restrictions do nothing to mitigate indirect effects, including changes in habitat suitability and habitat loss. Surveys are, however, a necessary starting point. In some cases, activities can be conducted between August 15th and March 15th to avoid affecting this species.

Consultation

Section 7(c) of the Act requires that a biological assessment be prepared for any Federal action that is a major construction activity to determine the effects of the proposed action on listed and proposed species. If a biological assessment is not required (i.e., all other actions), the lead Federal agency is responsible for review of proposed activities to determine whether listed species will be affected. We would appreciate the opportunity to review any such determination document. If it is determined that the proposed activities may affect a listed species, you should contact this office to discuss consultation requirements. If it is determined that any Federal agency program or project "is likely to adversely affect" any listed species, formal consultation should be initiated with this office. Alternatively, informal consultation can be continued so we can work together to determine how the project could be modified to reduce impacts to listed species to the "not likely to adversely affect" threshold. If it is concluded that the project "is not likely to adversely affect" listed species, we should be asked to review the assessment and concur with the determination of not likely to adversely affect.

For those actions where a biological assessment is necessary, it should be completed within 180 days of receipt of a species list, but can be extended by mutual agreement between the lead agency and the Service. If the assessment is not initiated within 90 days of receipt of a species list, the list of threatened and endangered species should be verified with me prior to initiation of the assessment. The biological assessment may be undertaken as part of the agency's compliance of section 102 of the National Environmental Policy Act (NEPA), and incorporated into the NEPA documents. The Service recommends that biological assessments include:

1. a description of the project;
2. a description of the specific area potentially affected by the action;
3. the current status, habitat use, and behavior of threatened and endangered species in the project area;
4. discussion of the methods used to determine the information in item 3;
5. direct and indirect impacts of the project to threatened and endangered species, including impacts of interrelated and interdependent actions;
6. an analysis of the effects of the action on listed and proposed species and their habitats including cumulative impacts from Federal, State, or private projects in the area;
7. measures that will reduce or eliminate adverse impacts to threatened and endangered species;
8. the expected status of threatened and endangered species in the future (short and long term) during and after project completion;
9. determination of "is likely to adversely affect" or "is not likely to adversely affect" for listed species;

10. determination of "is likely to jeopardize" or "is not likely to jeopardize" for proposed species;
11. Alternatives to the proposed action considered, a summary of how impacts of those alternatives on listed and proposed species would differ from the proposed action, and the reasons for not selecting those alternatives.
12. citation of literature and personal contacts used in the assessment.

A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare biological assessments. However, the ultimate responsibility for section 7 compliance remains with the Federal agency, and written notice should be provided to the Service upon such a designation. We recommend that Federal agencies provide their non-Federal representatives with proper guidance and oversight during preparation of biological assessments and evaluation of potential impacts to listed species.

Section 7(d) of the Act requires that the Federal agency and permit or license applicant shall not make any irreversible or irretrievable commitment of resources which would preclude the formulation of reasonable and prudent alternatives until consultation on listed species is completed.

Regarding species proposed for listing, Federal agencies must determine whether any of their proposed activities are likely to jeopardize the continued existence of the species. If jeopardy is likely, that agency must confer with the Fish and Wildlife Service.

We will work with the lead Federal agency in the section 7 consultation process. The analysis of project impacts must assess direct impacts of the project, as well as those impacts that are interrelated to or interdependent with the proposed action. Impacts to listed species on non-Federal lands must be evaluated along with such impacts on Federal lands. Any measures that are ultimately required to avoid or reduce impacts to listed species will apply to Federal as well as non-Federal lands.

Thank you for the opportunity to review the proposed work. Please keep this office informed of any developments or decisions concerning this project.

If you have any questions please contact Sarah Laughlin or Darryl York of my staff at the letterhead address or phone (307) 772-2374, extension 33 and 24 respectively.

Sincerely,

for Michael M. Long
Field Supervisor
Wyoming Field Office

cc: Director, WGFD, Cheyenne, WY
Nongame Coordinator, WGFD, Lander, WY
NPS, Yellowstone National Park, WY

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APPENDIX B: CULTURAL RESOURCES IN THE PROPOSED TREATMENT AREAS

The following table lists the known cultural resources and National Register status of historic properties in each of the interface units.

Resource Name and National Register of Historic Places Status	Potential Effects of the Preferred Alternative	Further Section 106 Compliance Needed
Bechler River Soldier Station Historic District (Built 1910, HS-231 to 233) [LCS HAS 1911] forms a non-contiguous part of the Fort Yellowstone National Historic Landmark (NHL) District. At Bechler River, the soldier station, horse barn, office, and storage shed are contributing to the National Register eligibility, while the generator shed, the fire cache/shop, and the trailer are non-contributing.	Beneficial effect of project implementation on historic properties (No Adverse Effect). No archeological or ethnographic resources present.	*There are no archeological resources within the Area of Potential Effect. If SHPO concurs with determinations of effect in this EA, Section 106 compliance would be complete for this area.*
Buffalo Lake Snowshoe (Patrol) Cabin (Built 1912, HS-234). The Buffalo Lake Snowshoe/Patrol Cabin forms a non-contiguous part of the Fort Yellowstone National Historic Landmark District.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*If SHPO concurs with determinations of effect in this EA, Section 106 compliance would be complete for NHL properties in this area. Archeological resources would be inventoried and evaluated, and Section 106 compliance completed prior to project implementation.*
Buffalo Plateau Patrol Cabin (HS-237, built in 1934). Determination of eligibility submitted to Montana SHPO August 15, 2001; determined eligible by NPS.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The Buffalo Plateau area has had archeological inventory and no sites were found within the Area of Potential Effect. If SHPO concurs with determinations of effect in this EA, Section 106 compliance would be complete for historic properties in this area.*
Cabin Creek. This structure is a non-historic A-frame cabin.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Any unsurveyed portions of the Area of Potential Effect would be inventoried and Section 106 compliance would be completed prior to project implementation*.

Cache Creek Snowshoe/Patrol Cabin (HS-278, Built 1922). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties. (No Adverse Effect). No effect on archeological or ethnographic resources.	*Cache Creek has been surveyed for archeological resources. Sites would be protected and avoided during project implementation. If SHPO concurs with determinations of effect in this EA, Section 106 compliance would be complete for this area.*
Calfee Creek Patrol Cabin (HS-279, built 1930, *aka* Miller Creek Snowshoe Cabin). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect). No archeological sites would be affected.	*The terrace area surrounding the cabin has been inventoried, locating two nearby prehistoric sites. However, there are no trees on the terrace, and sites and structures would not be affected by this project.*
Cove Patrol Cabin This non-historic cabin is an A-frame of recent construction.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation.*
Crevice Mountain Ranger Station (HS-261) (including associated barn, root cellar, and trash scatter). Determined eligible for the National Register on October 30, 2001 under Criteria A and C at the state level.	Beneficial effect of project implementation on historic properties (No Adverse Effect). No effect on presently identified archeological resources.	*No further compliance needed for historic structures.* *Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation. An historic dump present in the Area of Potential Effect would be avoided during project implementation.*
Daly Creek Patrol Cabin, built ca. 1926-1929 and restored in the late 1990s. Likely to be eligible for the National Register, but status unevaluated.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance for historic and prehistoric resources would be completed prior to project implementation.*

East Entrance. The East Entrance Road (48YE829) was determined eligible for the National Register March 12, 1992.	Beneficial effect of project implementation on historic properties (No Adverse Effect). No effect on archeological resources.	*If SHPO concurs with determinations of effect in this EA, Section 106 compliance would be complete.*
Elk Tongue Patrol Cabin is a modern frame structure.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Prehistoric remains were found in the general area during excavation for a pit toilet. Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation.*
Fawn Pass Snowshoe Cabin (Built 1925, HS-350). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation.*
Fern Lake Snowshoe Cabin (Built 1931, HS-283). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation.*
Fox Creek Snowshoe Cabin (HS-229, Built 1915). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation.*
Harebell Snowshoe Cabin (HS-219). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation.*

Heart Lake Snowshoe Cabin and Barn (Built 1923, HS – 300). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The Heart Lake area has been inventoried, and archeological sites would be avoided and protected during project. If SHPO concurs with determinations of effect in this EA, Section 106 compliance would be complete for this area.*
Howell Creek Patrol Cabin is a non-historic A-frame structure.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation.*
Lake Utility Area. Most of the area is of Mission 66 vintage. Buildings 268 (mess hall, 1951-1952) and 269 (bunkhouse, 1950-1951) are unevaluated for the National Register.	Beneficial effect of project implementation on historic properties (No Adverse Effect). No effect on archeological resources.	*Section 106 would be completed prior to project implementation. Prehistoric and historic archeological sites would be protected during project.*
Lamar Mountain Patrol Cabin. The patrol cabin (HS-282) was determined eligible for the National Register August 29, 1991. A Memorandum of Agreement was developed, and the cabin was moved to Lamar Mountain in 1992.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Site 48YE60 was recorded and tested, and recommended as ineligible for the register. Section 106 would be completed prior to project implementation.*
Lower Blacktail Patrol Cabin (HS-0265, Barn built 1936, and HS-0264 Patrol Cabin, built 1925). Determination of eligibility submitted to Montana SHPO August 15, 2001; determined eligible by NPS.	Beneficial effect of project implementation (No Adverse Effect).	*The area has been inventoried, and archeological resources would be avoided during project implementation. If SHPO concurs with determinations of effect in this EA, Section 106 compliance would be complete.*

Lower Slough Creek Hay Ranch Patrol Cabin (HS-272, built c. 1921) and **Lower Slough Creek Barn ("Scout Cabin"** (built in 1926). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*An historic dump is present in the Area of Potential Effect. Any unsurveyed portions of the Area of Potential Effect would be inventoried, and Section 106 compliance would be completed prior to project implementation.*
Mary Mountain Patrol Cabin (HS- 360, built in 1927) is eligible to the National Register (NPS 1999b).	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The area would be inventoried, and Section 106 compliance completed prior to project implementation.*
Miller Creek Snowshoe Cabin (Upper cabin, HS-280, built 1934). Determined eligible for the National Register on September 19, 2000 under Criteria A and C at the state level. (Note that the Lower Miller Creek Patrol Cabin is identified on USGS maps as the Calfee Creek Patrol Cabin.)	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The area would be inventoried, and Section 106 compliance completed prior to project implementation.*
Nez Perce Snowshoe Cabin (HS-152). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The area would be inventoried, and Section 106 compliance completed prior to project implementation.*
Northeast Entrance Cooke Ranger Station/Residence (HS-251) and the Northeast Entrance Checking Station, (HS- 254) are, collectively, a National Historic Landmark.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*No archeological resources are present in the area. If SHPO concurs with determinations of effect in this document, no further Section 106 compliance would be necessary.*
Northeast Entrance Road (48YE821) is eligible for the National Register.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*No archeological resources are present in the area. If SHPO concurs with determinations of effect in this document, no further Section 106 compliance would be necessary.*

Observation Peak Fire Lookout (HS-855, built in 1937). Potentially eligible for the National Register, but to be evaluated as part of future study of lookout towers.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The area would be inventoried, and Section 106 compliance for historic structures and archeological resources completed prior to project implementation.*
Outlet Patrol Cabin is a modern A-frame cabin.	No historic properties affected.	*No archeological resources are present within the Area of Potential Effect.*
South Riverside Patrol Cabin was built in 1920. Likely to be eligible for the National Register, but status is undetermined.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The area would be inventoried, and Section 106 compliance for archeological and historic resources completed prior to project implementation*.
Sportsman Lake Patrol Cabin (HS-145). The cabin was lost in the 1988 Yellowstone fire, and was replaced with a Rustic-style log building.	No historic properties affected.	*There are no archeological resources in the project area. A non-historic cabin within the Area of Potential Effect would be inventoried. If SHPO concurs with determinations of effect in this EA, no further Section 106 compliance is needed.*
Thorofare Snowshoe Cabin and Barn (HS-291 & 292, ca. 1915). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The area would be inventoried, and Section 106 compliance completed prior to project implementation*.
Three River Junction is a non-historic A-frame.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The Area of Potential Effect has been inventoried with negative results. If SHPO concurs with determinations of effect in this EA, no further Section 106 compliance is needed.*
Trail Creek Cabin (Built 1933, HS-228). Probably eligible but documentation not submitted.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The Area of Potential Effect has been inventoried with negative results. Section 106 for the cabin would be completed prior to project implementation.*

Union Falls is a modern A-frame cabin.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The Area of Potential Effect has been inventoried with negative results. If SHPO concurs with determinations of effect in this EA, no further Section 106 compliance is needed.*
Upper Miller Creek Buffalo Herder's Cabin (HS-280). Determination of eligibility submitted to Wyoming SHPO August 29, 2000; determined eligible by NPS under Snowshoe Cabin context.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*Site(s) at Upper Miller Creek may be a source for obsidian. Section 106 compliance would be completed prior to project implementation.*
Winter Creek Patrol Cabin is a non-historic structure.	Beneficial effect of project implementation on historic properties (No Adverse Effect).	*The area would be inventoried, and Section 106 compliance completed prior to project implementation*.

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APPENDIX C: BIOLOGICAL ASSESSMENT AND U.S. FISH AND WILDLIFE SERVICE CONCURRENCE

Biological Assessment
May 2002

NPS Photo

Wildland-Urban Interface Fuels Management

YELLOWSTONE

National Park ● Wyoming

BIOLOGICAL ASSESSMENT FOR

YELLOWSTONE NATIONAL PARK

WILDLAND-URBAN INTERFACE FUEL MANAGEMENT PROJECT

TABLE OF CONTENTS

SUMMARY

This biological assessment (BA) has been prepared in conjunction with Yellowstone National Park's proposal to undertake wildland-urban interface fuel management projects.

The proposed action would implement forest thinning measures in a 400-foot radius around structures in the park (refer to Table 1 for a list of the proposed treatment sites) and may affect, but would not likely adversely affect, the bald eagle (*Haliaeetus leucocephalus*), grizzly bear (*Ursus arctos horribilis*), gray wolf (*Canis lupus*), and Canada lynx (*Lynx canadensis*). The conclusions presented regarding the potential for effects to listed species are largely based on the analyses of the project by Yellowstone National Park biologists. Note that six sites were deleted from the list of proposed treatment sites after the analyses were prepared. These sites are Cold Creek Cabin, Cougar Creek Cabin, Hellroaring Cabin, Lake Hotel Area, Pelican Springs Cabin, and Upper Blacktail Cabin. As a result, some analyses refer to sites and propose mitigation measures for locations that are no longer being proposed for treatment (e.g., seasonal restriction at Cougar Creek Cabin to avoid adverse effects to grizzly bears). The analyses, with tables, text, and recommended mitigation measures (also referred to as conservation measures) to offset potential adverse effects, are included as Appendix C.

The proposed action would not affect the black-footed ferret (*Mustela nigripes*), mountain plover (*Charadrius montanus*), or whooping crane (*Grus americana*) because the proposed treatments would not occur in habitats where these species are found. Refer to Table 2 for a list of endangered, threatened, and proposed species with potential to occur in Park and Teton counties, Wyoming and Park County, Montana. The National Park Service anticipates that the proposed fuels management actions in Yellowstone National Park would not adversely affect or jeopardize the continued existence of any listed or proposed species, nor would the proposed action adversely affect any designated critical habitats.

PROJECT DESCRIPTION

The proposed action would create fire buffer zones, referred to throughout this document as treatment areas, with low fuels availability between park wildlands and existing developments (i.e., structures) inside the park. Within the treatment areas, there would be a reduced probability that a wildfire, if ignited, would burn uncontrolled or destroy the structure(s) in the treatment area. In addition, the reduced volumes of fuel in the treatment areas would likely reduce the intensity of a fire that originated outside of a treatment area, decrease the likelihood that a fire would cross the treatment area, and could increase firefighters' ability to gain control of a wildfire. The proposed action would thin the forest so that the edges of all remaining tree crowns would be generally 20 feet apart. The treatments would be implemented in three developed frontcountry areas (areas associated with development and easily accessed by visitors) and at 31 backcountry cabins (locations away from roads and developments, and in relatively remote areas of the park) (including the Bechler developed area) within the park. The three frontcountry treatment areas, the Lake Utility, East Entrance, and Northeast Entrance areas, encompass approximately 119.4 acres, much of which are developed with structures and roads. The backcountry sites would each be treated over an area

ranging from 4 to 15 acres, depending on the amount of adjacent forest and number of structures present, plus 18.5 acres of treatment in the Bechler developed area. The total acreage to be treated in the backcountry would be about 304.5 acres, resulting in a total proposed treatment area of 423.9 acres. This represents about 0.02 percent of Yellowstone National Park's total acreage. The proposed actions would thin forested areas within a 400-foot perimeter from the structure or outermost buildings in each development. Treatment of all the proposed sites would likely be implemented over a period of five years or longer, and the work would be accomplished when the sites were accessible (snow-free) and in accordance with the seasonal restrictions identified in the analyses portion of this document. Implementation of the treatments would take from 3 to 10 days at each site, depending on the size of the treatment area and the density of the forest to be treated. Work crews would use the cabins for overnight accommodations with tents pitched at those sites where cabins would be unable to accommodate the entire crew. Treatments would be implemented using chain saws and hand tools. The treatment described is the preferred alternative in the environmental assessment. Table 1 presents a list of the proposed treatment areas, Figure 1 shows the approximate locations of the treatment sites, and aerial photographs with the proposed treatment areas delineated are provided in Appendix A.

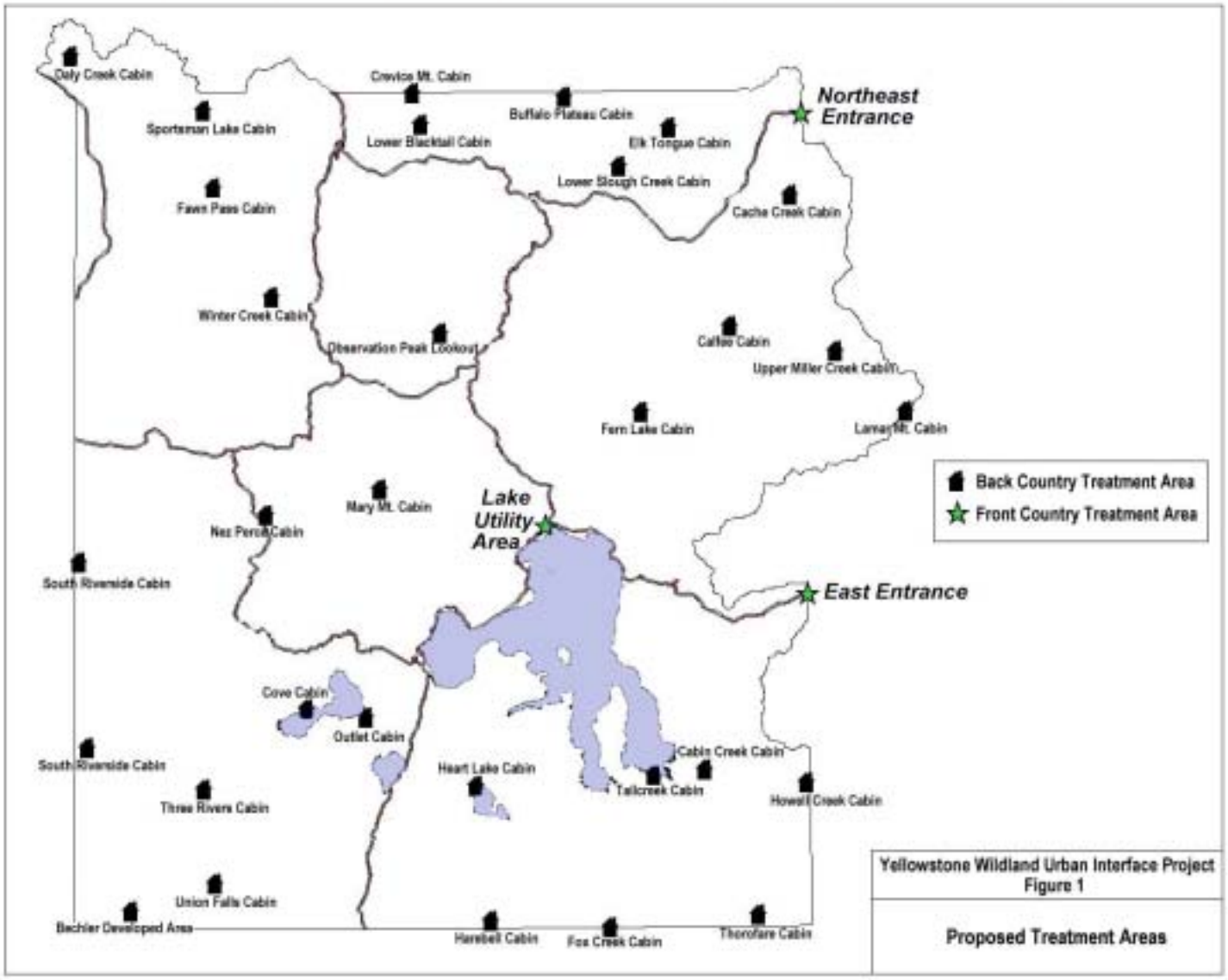
TABLE 1. PROPOSED TREATMENT AREAS

Treatment Area	Size (Acres)
BACKCOUNTRY CABINS	
Buffalo Lake	8.0
Buffalo Plateau	8.1
Cabin Creek	5.2
Cache Creek	14.9
Calfee Creek	13.0
Cove Cabin	9.9
Crevice Cabin	15.7
Daly Creek	9.9
Elk Tongue	4.7
Fawn Pass	9.3
Fern Lake	9.4
Fox Creek	12.1
Harebell	14.7
Heart Lake	4.6
Howell Creek	5.8
Lamar Mountain	6.5
Lower Blacktail	12.8
Lower Slough Creek	7.1
Mary Mountain	14.0
Nez Perce	10.8

Treatment Area	Size (Acres)
Observation Peak	11.5
Outlet Cabin	9.5
South Riverside	7.2
Sportsman Lake	11.5
Three River Junction	5.2
Thorofare	8.3
Trail Creek	8.3
Union Falls	9.9
Upper Miller Creek	11.5
Winter Creek	6.6
Subtotal	286
DEVELOPED AREA	
Bechler	18.5
Subtotal	18.5
FRONTCOUNTRY DEVELOPED AREAS	
East Entrance	28.4
Lake Utility Area	67.0
Northeast Entrance	24.0
Subtotal	119.4
Total	**423.9**

An environmental assessment (EA) is in preparation to evaluate the effects of the proposed action. In addition to assessing the proposed action described above (the preferred alternative), the alternative of continue current management/no action also is being evaluated in the EA. Fuel reduction activities associated with the preferred alternative would include the use of mechanized and hand tools to implement the previously described thinning, saplings would be thinned to a level that would support the new forest density, and some ground fuels would be removed. The resulting debris would be scattered, piled and burned on-site, or hauled off-site. No prescribed burning would be used. Mitigation measures would be used to minimize or offset potential adverse effects to wildlife species and resources. As described in the section addressing potential effects to Canada lynx, most pole-sized saplings, seedlings, and dead and down woody material would be removed within 120 feet of structures. More pole-size saplings, seedlings, and dead and down woody material would be left to retain cover for snowshoe hares and lynx between the 120-400 foot perimeters and the amount of potential fuel not removed would increase with distance from the structure.

Neither of the alternatives would have major adverse environmental consequences. In the key area of fire control, the preferred alternative (Alternative B), which is also identified in the EA as the environmentally preferred alternative, would best meet the goals of the wildland-urban interface project.


Daly Creek Cabin
Crevice Mt. Cabin
Buffalo Plateau Cabin
Northeast Entrance
Sportsman Lake Cabin
Lower Blacktail Cabin
Elk Tongue Cabin
Lower Slough Creek Cabin
Fawn Pass Cabin
Cache Creek Cabin
Winter Creek Cabin
Observation Peak Lookout
Calfee Cabin
Upper Miller Creek Cabin
Fern Lake Cabin
Lamar Mt. Cabin
Back Country Treatment Area
Front Country Treatment Area
Mary Mt. Cabin
Lake Utility Area
Nez Perce Cabin
South Riverside Cabin
East Entrance
Cove Cabin
Outlet Cabin
Cabin Creek Cabin
South Riverside Cabin
Heart Lake Cabin
Tellcreek Cabin
Howell Creek Cabin
Three Rivers Cabin
Union Falls Cabin
Bechler Developed Area
Harebell Cabin
Fox Creek Cabin
Thorofare Cabin
Yellowstone Wildland Urban Interface Project
Figure 1
Proposed Treatment Areas

LISTED SPECIES

The federally listed species that potentially occur in Park and Teton counties, Wyoming and Park County, Montana are presented in Table 2. No critical habitats for these species are currently designated or proposed for designation within any of the project areas. The list of species was obtained from the U.S. Fish and Wildlife Service, Cheyenne, Wyoming Ecological Services office. The Fish and Wildlife Service letter is included in Appendix B.

TABLE 2. ENDANGERED, THREATENED, PROPOSED, AND CANDIDATE SPECIES IN PARK AND TETON COUNTIES, WYOMING AND PARK COUNTY, MONTANA

Common Name	Scientific Name	Status [a]
	BIRDS	
Bald eagle	*Haliaeetus leucocephalus*	T
Mountain plover	*Charadrius montanus*	P
Whooping crane	*Grus americana*	EXPn
	MAMMALS	
Black-footed ferret	*Mustela nigripes*	E
Canada lynx	*Lynx canadensis*	T
Gray wolf	*Canis lupus*	EXPn
Grizzly bear	*Ursus arctos horribilis*	T

[a/] E = federally endangered; T = federally threatened; P = proposed for federal listing as threatened; C = candidate for federal listing; EXPn = experimental, non-essential population (equivalent to threatened status in National Park System)

SPECIES CHARACTERISTICS AND PROJECT EFFECTS

This section addresses each of the listed species presented in Table 2 and describes the potential effects to these species that would be associated with the proposed fuel management project.

BALD EAGLE

Bald eagle (*Haliaeetus leucocephalus*) populations in the lower 48 states are currently listed as threatened. Bald eagles are typically associated with riparian habitats and use large trees for nesting, resting, and roosting. Bald eagles are typically found around and along lakes and riparian corridors in the park. None of the proposed treatments would occur near any bald eagle nests. An analysis of known bald eagle nest locations and the proposed treatment locations using geographic information systems (GIS) indicates that all bald eagle nests in Yellowstone National Park are greater than 1 mile from the proposed project treatment areas (McEneaney 2002).

It is possible that eagles could be temporarily affected by treatment implementation at one or more of the backcountry patrol cabins, especially those located on lakeshores or near rivers or streams. However, eagles would likely react to the short-term disturbance by temporarily avoiding the area while treatments were being implemented and this would not represent an adverse effect. The fuels management treatments would be limited to the 400-foot radius around the targeted structures and would not cause any adverse effects to bald eagles. In three of the backcountry sites (Trail Creek, Heart Lake, and Lower Blacktail, [although the eagle biologist also identified Cougar Creek Cabin, it is no longer proposed for treatment]), bald eagles are present and conservation measures would be necessary to avoid adverse effects. At these three sites, perch trees near riparian corridors would not be removed.

If a new bald eagle nest or roost is established within 1 mile of any of the proposed treatment areas, treatments would not be implemented between February 15 and August 15 to avoid potential adverse effects to bald eagles, their young, eggs or nests. No treatments that would directly adversely affect a bald eagle nest or roost would be implemented at any time.

The proposed fuel management actions may affect bald eagles within Yellowstone National Park, but would not likely adversely affect the bald eagle because the proposed treatment sites are relatively distant from known bald eagle nests, the work associated with the actions would be short-term, and the resulting forest thinning would not adversely affect the bald eagle or its nesting and foraging habitat. Perch trees near riparian habitat at the Trail Creek, Heart Lake, and Lower Blacktail Cabins, and near the Lake Utility Area, would not be removed.

MOUNTAIN PLOVER

Mountain plover (*Charadrius montanus*) are proposed as threatened. Plover breeding and wintering habitats include grasslands, mixed grassland areas and short-grass prairie, shrub-steppe, plains, alkali flats, agricultural lands, cultivated lands, sod farms, and prairie dog colonies (FWS 2002). Nest sites typically occur in areas with vegetation less than 4 inches in height; having at least 30 percent bare ground; and less than 5 percent slope, and are often heavily grazed by domestic livestock or prairie dogs (NRCS 2002).

In the 130-year history of Yellowstone National Park, there are no records of mountain plovers occurring in the park. Therefore, none of the treatments would be implemented in any of the mountain plover's preferred habitats. As a result, the proposed action would not affect or jeopardize the mountain plover.

WHOOPING CRANE

The Rocky Mountain population of the whooping crane (*Grus americana*) is considered a non-essential experimental population. Under the terms of Section 7 of the Endangered Species Act, non-essential experimental populations are considered threatened when the species is on lands under the ownership or managed by the National Park Service (or National Wildlife Refuge System). Whooping cranes that may be found in Yellowstone National Park are part of a foster population that migrates from Grays Lake

National Wildlife Refuge in Idaho to the Bosque del Apache National Wildlife Refuge on the Rio Grande River in New Mexico (Ashton and Dowd 1991).

The whooping crane prefers freshwater marshes, wet prairies, shallow portions of rivers and reservoirs, grain and stubble fields, shallow lakes and lagoons for feeding and loafing during migration. Overnight roosting sites usually have shallow water in which the cranes stand. Whooping cranes are usually found in small groups of seven or fewer individuals and they are easily disturbed when roosting or feeding (Ashton and Dowd 1991).

None of the proposed treatments would affect potential whooping crane habitat and whooping cranes are not found in the proposed treatment areas. This conclusion is supported by the National Park Service wildlife biologists at Yellowstone National Park and is documented in the cover letter of the analyses included in Appendix C. As a result, the proposed action would not affect the whooping crane or its preferred habitats.

BLACK-FOOTED FERRET

The black-footed ferret (*Mustela nigripes*), federally-listed as endangered, lives on short-grass prairies and is highly dependent on prairie dog colonies for shelter, prey, and virtually all its needs (Nowak 1991). The proposed fuel management activities would have no effect on any prairie dog colonies nor to areas known to be used by black-footed ferrets in the park (there are none). As a result, the black-footed ferret would not be affected by the proposed fuel management project.

CANADA LYNX

The Canada lynx (*Lynx canadensis*), federally-listed as threatened, prefers boreal forest habitats primarily in Alaska and Canada, but is also found at higher elevations in the western U.S. mountains where conditions are similar to the boreal forests of northern regions (Ruggiero et al. 1994). The proposed fuels management project would potentially affect lynx and their habitat, but the effects would not be adverse nor would any critical habitat be adversely affected. The no adverse effect determination is based on the small size of the project areas relative to the size of potential lynx habitat in the park; or in the case of the Lake, Northeast, and East Entrance areas, unsuitable habitat around the sites; effects from noise and workers implementing the treatments would be temporary (3-10 days per site); the sites are already developed and are likely normally avoided by lynx because of the recurring ranger visits; and the treatment areas are discrete, widely separated, and changes in the forest structure would pose no barriers to lynx movements or dispersal. In addition, the treatments would not adversely affect the snowshoe hare or its habitat, thus forest thinning around the targeted structures would not affect the primary prey of the lynx. To ensure that the proposed action would not adversely affect the Canada lynx, the fuels management treatments would include the following mitigation measures.

Fuel management treatments would enhance horizontal cover for snowshoe hares and Canada lynx and retain as much of the understory structure as possible while still providing the canopy spacing and reducing ladder fuels to create an effective firebreak. Specifically, the treatment area that completely eliminates pole-size saplings, seedlings, and dead and down woody material would be minimized. Most pole-sized saplings,

seedlings, and dead and down woody material would be removed within 120 feet of structures. However, more pole-size saplings, seedlings, and dead and down woody material would be left to retain cover for hares and lynx between the 120-400 foot perimeters, with the proportion of fuel retained increasing with distance from the structure. Also, treatment should avoid stump grinding, stump removal, or cutting stumps low to the ground. “Feathering” vegetation in an irregular pattern and increasing its density progressively distant from the structure would be beneficial for lynx while meeting the need for the proposed action.

GRAY WOLF

The gray wolf (*Canis lupus*), reintroduced to the park in 1995-96, is listed as non-essential, experimental population in Yellowstone National Park. Under the terms of Section 7 of the Endangered Species Act, non-essential experimental populations are considered threatened when the species is on lands under the ownership of, or managed by, the National Park Service (or National Wildlife Refuge system).

Although 23 of the backcountry sites and 2 of the frontcountry sites are within the home range of existing wolf packs, only 2 of the sites (Daly Creek and Cabin Creek) are near wolf dens (the dens are near but not within the proposed treatment sites) (Smith and Olliff 2002). Smith and Olliff (2002) state that wolves that do not den near the proposed treatment sites would not be affected by the proposed fuel management project and that for the sites that are near wolf dens (i.e., Daly Creek and Cabin Creek cabins), implementation of treatments should not begin until after the denning season is complete (August 1). By following Smith and Olliff’s recommendation regarding the seasonal restriction, the proposed fuels management treatment may affect, but would not likely adversely affect the gray wolf.

GRIZZLY BEAR

The grizzly bear (*Ursus arctos horribilis*) can be found in all the habitat types within Yellowstone National Park. The analysis of effects related to implementation of fuels reduction at the proposed sites, prepared by Gunther and Ireland (2002), was based on seasonal habitat quality mapping. No whitebark pine trees would be affected by the treatments, any whitebark pine trees encountered would be left uncut, and no new roads would be created as a result of the project. Grizzly bear habitat was ranked as low, medium, and high quality in the spring (den emergence through May 31), summer (June 1 through August 31), and fall (September 1 through den entrance) seasons. Although Gunther and Ireland (2002) identified potential short-term displacement from low and medium quality habitats around backcountry cabins, they indicate that such a temporary disturbance would have very little impact on bear feeding activities. However, for proposed treatment areas in high quality grizzly habitat, bears could be deterred from accessing important food sources. To offset this potential adverse effect, fuels reduction treatments in high quality grizzly habitat would be limited at the following sites to the dates presented. This timing restriction would significantly reduce the likelihood of displacing grizzly bears from areas containing high quality habitat and food sources. As a result, the proposed fuels management actions may affect but would not adversely affect grizzly bears in either low or medium habitat regardless of when treatments were

implemented or in high quality habitat when the seasonal restrictions shown below are followed.

TABLE 3. SEASONAL RESTRICTIONS ON TREATMENTS IN GRIZZLY BEAR HABITAT

Treatment Area	Seasonal Restriction
Lake Utility Area	Conduct work after July 1
East Entrance Area	Conduct work prior to September 1
Northeast Entrance Area	Conduct work prior to September 1
Buffalo Lake Cabin	Conduct work prior to September 1
Buffalo Plateau Cabin	Conduct work prior to September 1
Cabin Creek Cabin	Conduct work after July 15
Cache Creek Cabin	Conduct work prior to September 1
Calfee Creek Cabin	Conduct work prior to September 1
Cove Cabin	Conduct work prior to September 1
Elk Tongue Cabin	Conduct work between June 1 and August 31
Fawn Pass Cabin	Conduct work between June 1 and August 31
Fern Lake Cabin	Conduct work between July 4 and August 31
Harebell Cabin	Conduct work between June 1 and August 31
Heart Lake Cabin	Conduct work after July 1
Howell Creek Cabin	Conduct work prior to September 1
Lamar Mountain Cabin	Conduct work between June 1 and August 31
Lower Slough Creek Cabin	Conduct work prior to September 1
Mary Mountain Cabin	Conduct work between June 16 and August 31
Nez Perce Cabin	Conduct work between June 16 and August 31
Observation Peak Cabin	Conduct work prior to September 1
Outlet Cabin	Conduct work prior to September 1
South Riverside Cabin	Conduct work prior to June 1
Sportsman Lake Cabin	Conduct work prior to September 1
Trail Creek Cabin	Conduct work between July 15 and August 31
Upper Miller Creek Cabin	Conduct work prior to September 1
Winter Creek Cabin	Conduct work prior to September 1
Bechler Developed Area	Not in high quality grizzly habitat; no seasonal restrictions
Crevice Cabin	Not in high quality grizzly habitat; no seasonal restrictions
Daly Creek Cabin	Not in high quality grizzly habitat; no seasonal restrictions
Three River Junction Cabin	Not in high quality grizzly habitat; no seasonal restrictions
Thorofare Cabin	Not in high quality grizzly habitat; no seasonal restrictions
Fox Creek Cabin	Not in high quality grizzly habitat; no seasonal restrictions
Lower Blacktail Cabin	Not in high quality grizzly habitat; no seasonal restrictions
Union Falls Cabin	Not in high quality grizzly habitat; no seasonal restrictions

In addition to seasonal restrictions in frontcountry areas as indicated in Table 3, Gunther and Ireland (2002) noted that fuel management treatments could result in an increase in forb production, thus attracting grizzly bears. For example, exotic Alsike clover, a highly preferred grizzly bear food, often invades disturbed areas at the Lake and East Entrance areas. This could attract bears to these developed areas. To avoid this problem, the park should monitor vegetation changes resulting from fuels management treatments and develop a plan to remove exotic forbs in the frontcountry treatment areas.

The fuels management treatments at the proposed sites may affect, but would not likely adversely affect grizzly bears, if the seasonal restrictions and vegetation monitoring/control measures that are described above are implemented.

CONCLUSIONS

Implementation of the proposed fuels management project may affect but would not likely adversely affect any listed species in Yellowstone National Park. In the case of the grizzly bear, there are restrictions and mitigation measures that are necessary to offset the potential for adverse effects in high quality grizzly habitat areas. Adhering to these seasonal restrictions and implementing the mitigation measures described are critical to avoiding adverse effects to the grizzly. The treatments that would occur in low and medium quality grizzly bear habitat do not require mitigation measures or seasonal restrictions because the potential adverse effects are discountable (defined as effects that are extremely unlikely to occur). One seasonal restriction was identified to offset potential adverse effects to the gray wolf, namely, conduct treatment at the Cabin Creek site after August 1.

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Appendices A (Proposed Treatment Areas) and B (USFWS Correspondence) of the Biological Assessment are in the Environmental Assessment as Appendix A (Letters and Other Coordination Documentation) and Appendix E (Proposed Treatment Sites)

APPENDIX C

Effects Analyses from Yellowstone National Park Threatened and Endangered Species Biologists

Wildland Urban Interface Effects on T&E Species							
Species: Bald Eagle (Haliaeetus leucocephalus)							
Treatment Area	Acres	Has a survey been completed?	Is habitat present?	Does the species occur in the treatment area?	Is treatment likely to affect (without implementing conservation measures?	If NO-why?	If yes, list conservation measures
Bechler	21	Yes	no	no	no	Not bald eagle habitat	
Lake Hotel and Utility Area	161	Yes	yes	yes	no	too much human activity	save trees by lake
East Entrance	24	Yes	no	no	no	Not bald eagle habitat	
Northeast Entrance	28	Yes	no	no	no	Not bald eagle habitat	
Crevice Cabin	15.8	Yes	no	no	no	Not bald eagle habitat	
Sportsman Lake Cabin	13.2	Yes	yes	no	no	Rarely Used habitat	
South Riverside Cabin	11.4	Yes	no	no	no	Not bald eagle habitat	
Buffalo Lake Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Winter Creek Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	

Daly Creek Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Mary Mountain Cabin	17.6	Yes	no	no	no	Not bald eagle habitat	
Observation Peak Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Pelican Springs Cabin	15	Yes	yes	no	no	Rarely Used habitat	
Cabin Creek Cabin	11.5	Yes	yes	no	no	Rarely Used habitat	
Cove Cabin	16.3	Yes	yes	no	no	Rarely Used habitat	
Three River Junction Cabin	11.5	Yes	yes	no	no	Rarely Used habitat	
Nez Perce Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Thorofare Cabin	15.5	Yes	no	no	no	Not bald eagle habitat	
Trail Creek Cabin	6.1	Yes	yes	no	no		save trees by lake
Fern Lake Cabin	14.2	Yes	no	no	no	Rarely Used habitat	
Heart Lake Cabin	14.6	Yes	yes	yes	yes		save trees by lake
Fox Creek Cabin	15.8	Yes	no	no	no	Not bald eagle habitat	
Buffalo Plateau Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Harebell Cabin	14.7	Yes	no	no	no	Not bald eagle habitat	
Cache Creek Cabin	15	Yes	no	no	no	Not bald eagle habitat	

Cold creek Cabin	13.5	Yes	no	no	no	Not bald eagle habitat	
Lamar Mountain Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Lower Blacktail Cabin	18.4	Yes	yes	yes	yes		Save trees by river
Upper Blacktail Cabin	19.6	Yes	no	no	no	Not bald eagle habitat	
Hellroaring Cabin	13.4	Yes	yes	no	no	Rarely Used habitat	
Fawn Pass Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Union Falls Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Calfee Creek Cabin	13	Yes	yes	no	no	Rarely Used habitat	
Howell Creek Cabin	12.4	Yes	no	no	no	Not bald eagle habitat	
Lower Slough Creek Cabin	12.7	Yes	yes	yes	no	Rarely Used habitat	
Outlet Cabin	10.8	Yes	yes	yes	no	Rarely Used habitat	
Elk Tongue Cabin	11.5	Yes	yes	yes	no	Rarely Used habitat	
Upper Miller Creek Cabin	11.5	Yes	no	no	no	Not bald eagle habitat	
Cougar Creek Cabin	13.4	Yes	yes	yes	no		Leave Trees Creekside

Bald Eagle Habitat Evaluation

Submitted by Terry McEneaney

- Bald eagles do no nest near any of the developed areas or backcountry cabins in the treatment area
- Of the developed areas, only one site (Lake Hotel) has habitat present. At this site, there is typically too much human activity for eagles to nest. When people are not present, they use trees on the shoreline of the lake for perches. As a conservation measure, save the trees on the shoreline of the lake.
- Of the backcountry sites, bald eagle habitat is present in 13 or 37% of the sites.
- In four of the backcountry sites (11%), the species is present and conservation measures are necessary. In all four cases conservation measures require saving perch trees by riparian corridors.
- All bald eagle nests in Yellowstone are miles away from the project areas. This information is based on annual aerial bald eagle surveys.
- The proposed action in the project sites may affect, but is not likely to adversely affect bald eagles. The 1988 wildfires had more impact to bald eagles than will the proposed action; since that time, the bald eagle population has increased from 15 active nests in 1988 to 31 active nests in 2001.

Wildland Urban Interface Effects on T&E Species								
Species: Canada lynx (Lynx canadensis)								
Treatment Area	Acres	Survey completed?	Site in lynx habitat?	Historic species occurrence?	Occurrence Based on Lynx Project Surveys	Is treatment likely to affect (without implementing conservation measures?	If NO-why?	If yes, list conservation measures
Bechler	21	YES	YES	NO	NO	YES	See narrative.	See narrative.
Lake Hotel and Utility Area	161	NO	YES	YES	NA	YES	See narrative.	See narrative.
East Entrance	24	YES	YES	YES	NO	YES	See narrative.	See narrative.
Northeast Entrance	28	NO	YES	YES	NA	YES	See narrative.	See narrative.
Crevice Cabin	15.8	NO	NO	NO	NA	NO	See narrative.	See narrative.
Sportsman Lake Cabin	13.2	YES	YES	NO	NO	YES	See narrative.	See narrative.
South Riverside Cabin	11.4	NO	YES	NO	NA	YES	See narrative.	See narrative.
Buffalo Lake Cabin	11.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Winter Creek Cabin	11.5	NO	YES	YES	NA	YES	See narrative.	See narrative.
Daly Creek Cabin	11.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Mary Mountain Cabin	17.6	YES	YES	NO	NA	YES	See narrative.	See narrative.

Observation Peak Cabin	11.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Pelican Springs Cabin	15	NO	YES	NO	NA	YES	See narrative.	See narrative.
Cabin Creek Cabin	11.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Cove Cabin	16.3	YES	YES	NO	NO	YES	See narrative.	See narrative.
Three River Junction Cabin	11.5	YES	YES	NO	NO	YES	See narrative.	See narrative.
Nez Perce Cabin	11.5	YES	YES	NO	NO	YES	See narrative.	See narrative.
Thorofare Cabin	15.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Trail Creek Cabin	6.1	NO	YES	NO	NA	YES	See narrative.	See narrative.
Fern Lake Cabin	14.2	NO	YES	NO	NA	YES	See narrative.	See narrative.
Heart Lake Cabin	14.6	YES	YES	YES	NO	YES	See narrative.	See narrative.
Fox Creek Cabin	15.8	NO	YES	NO	NA	YES	See narrative.	See narrative.
Buffalo Plateau Cabin	11.5	NO	YES	YES	NA	YES	See narrative.	See narrative.
Harebell Cabin	14.7	NO	YES	NO	NA	YES	See narrative.	See narrative.
Cache Creek Cabin	15	NO	YES	YES	NA	YES	See narrative.	See narrative.
Cold creek Cabin	13.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Lamar Mountain Cabin	11.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Lower Blacktail Cabin	18.4	NO	YES	NO	NA	YES	See narrative.	See narrative.
Upper Blacktail Cabin	19.6	YES	NO	YES	NO	NO	See narrative.	See narrative.

Hellroaring Cabin	13.4	YES	NO	NO	NO	NO	See narrative.	See narrative.
Fawn Pass Cabin	11.5	YES	YES	NO	NO	YES	See narrative.	See narrative.
Union Falls Cabin	11.5	YES	YES	NO	NO	YES	See narrative.	See narrative.
Calfee Creek Cabin	13	NO	YES	NO	NO	YES	See narrative.	See narrative.
Howell Creek Cabin	12.4	NO	YES	NO	NO	YES	See narrative.	See narrative.
Lower Slough Creek Cabin	12.7	YES	YES	NO	NO	YES	See narrative.	See narrative.
Outlet Cabin	10.8	YES	YES	NO	NO	YES	See narrative.	See narrative.
Elk Tongue Cabin	11.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Upper Miller Creek Cabin	11.5	NO	YES	NO	NA	YES	See narrative.	See narrative.
Cougar Creek Cabin	13.4	NO	YES	YES	NA	YES	See narrative.	See narrative.

LYNX: CRITERIA AND NARRATIVE FOR RESPONSES TO QUESTIONS ON WUI THINNING PROJECT

Survey completed?

Yes: at least 1 lynx detection snow tracking survey of at least 1 km length occurred last winter (2000-2001) or this winter (2001-2002) within 3 km of the site.

No: no detection surveys have occurred as described above

Site in lynx habitat: does the site occur in or near lynx habitat currently, or where forest succession may produce lynx habitat any time in the future?

Yes: the site occurs in habitat types that contain or have potential to contain Engelmann spruce, subalpine fir, lodgepole pine, or Douglas-fir or occurs within 1 km of a continuous block (>1 km^2) such a habitats. Exception: sites in xeric Douglas-fir habitats.

No: the site does not occur in habitats as described above. Typical habitats in this category are sagebrush steppe, grassland steppe, or xeric Douglas-fir types.

Historic species occurrence in the treatment area?

Yes: $\geq$ 1 observation (undocumented reliability) of a lynx within 3 km of the site occurs in our record of historic observations (1887-1998).

No: not as above

Occurrence based on lynx project surveys:

Yes: based on lynx project snow tracking surveys (2000-present), at least 1 observation of a possible, probable, or definite lynx track occurs within 3 km of the site.

No: not as above

N\A: not applicable, because no lynx project surveys have occurred in the area

Is the treatment likely to affect (without implementing conservation measures)?

Yes: the site supports habitats with spruce, subalpine fir, lodgepole pine, or Douglas-fir, or has the potential to support these species, or occurs within 1 km of such habitats that exceed 1 km^2 area. Effects of the project are not necessarily adverse.

No: the site does not occur as described above.

If No, why?

The site does not occur in or near habitats that could support resident lynx now or in the future. Our snow tracking surveys in forests lacking spruce, subalpine fir, lodgepole pine, or Douglas-fir of any age or successional stage indicate that these habitats lack sufficient cover and forage to support snowshoe hares, the primary lynx prey. This conclusion applies to the present and future habitat potentials for snowshoe hares and lynx. Also, habitat modification associated with the thinning projects at each site, as described in the Hazard Fuels Management Guidelines, is very unlikely to affect dispersing lynx traveling though these marginal habitats because 1) the footprint of thinning at sites is typically small (maximum of 11 acres; most areas are actually much smaller), noise will be temporary, and residual downfall will not be sufficiently dense to occlude lynx movements.

If yes, identify conservation measures that insure that effects will not be adverse.

Foresters should enhance horizontal cover for hares and lynx, i.e., minimize the treatment area that completely eliminates pole-size saplings, seedlings, and dead and down woody material. Within 120 feet of structures, most pole-sized saplings, seedlings, and dead and down woody material will be removed. Between the 120-400 foot perimeter, more pole-size saplings, seedlings, and dead and down woody material should be left to retain cover for hares and lynx. Also, treatment should avoid cutting stumps low to the ground, stump grinding, or stump removal. “Feathering” vegetation in an irregular pattern and increasing its density progressively distant from the structure will be beneficial for lynx.

Wildland-Urban Interface Fuel Reduction Project						
Species: Gray wolf (Canis lupus)						
Treatment Area	Acres	Survey completed?	Site in gray wolf pack home range?	Is treatment likely to affect (without implementing conservation measures?	If NO-why?	If yes, list conservation measures
Bechler	21	YES	NO	NO	No den site near project area	
Lake Hotel and Utility Area	161	YES	NO	NO	No den site near project area	
East Entrance	24	YES	YES	NO	No den site near project area	
Northeast Entrance	28	YES	YES	NO	No den site near project area	
Crevice Cabin	15.8	YES	YES	NO	No den site near project area	
Sportsman Lake Cabin	13.2	YES	YES	NO	No den site near project area	
South Riverside Cabin	11.4	YES	NO	NO	No den site near project area	
Buffalo Lake Cabin	11.5	YES	NO	NO	No den site near project area	
Winter Creek Cabin	11.5	YES	YES	NO	No den site near project area	
Daly Creek Cabin	11.5	YES	YES	YES		Do not begin work until after denning season (after August 1)
Mary Mountain Cabin	17.6	YES	YES	NO	No den site near project area	
Observation Peak Cabin	11.5	YES	NO	NO	No den site near project area	

Pelican Springs Cabin	15	YES	YES	NO	No den site near project area	
Cabin Creek Cabin	11.5	YES	YES	YES		Do not begin work until after denning season (after August 1)
Cove Cabin	16.3	YES	NO	NO	No den site near project area	
Three River Junction Cabin	11.5	YES	NO	NO	No den site near project area	
Nez Perce Cabin	11.5	YES	YES	NO	No den site near project area	
Thorofare Cabin	15.5	YES	YES	NO	No den site near project area	
Trail Creek Cabin	6.1	YES	YES	NO	No den site near project area	
Fern Lake Cabin	14.2	YES	YES	NO	No den site near project area	
Heart Lake Cabin	14.6	YES	NO	NO	No den site near project area	
Fox Creek Cabin	15.8	YES	YES	NO	No den site near project area	
Buffalo Plateau Cabin	11.5	YES	YES	NO	No den site near project area	
Harebell Cabin	14.7	YES	NO	NO	No den site near project area	
Cache Creek Cabin	15	YES	YES	NO	No den site near project area	
Cold creek Cabin	13.5	YES	YES	NO	No den site near project area	
Lamar Mountain Cabin	11.5	YES	YES	NO	No den site near project area	
Lower Blacktail Cabin	18.4	YES	YES	NO	No den site near project area	
Upper Blacktail Cabin	19.6	YES	YES	NO	No den site near project area	

Hellroaring Cabin	13.4	YES	YES	NO	No den site near project area	
Fawn Pass Cabin	11.5	YES	YES	NO	No den site near project area	
Union Falls Cabin	11.5	YES	NO	NO	No den site near project area	
Calfee Creek Cabin	13	YES	YES	NO	No den site near project area	
Howell Creek Cabin	12.4	YES	NO	NO	No den site near project area	
Lower Slough Creek Cabin	12.7	YES	YES	NO	No den site near project area	
Outlet Cabin	10.8	YES	NO	NO	No den site near project area	
Elk Tongue Cabin	11.5	YES	YES	NO	No den site near project area	
Upper Miller Creek Cabin	11.5	YES	YES	NO	No den site near project area	
Cougar Creek Cabin	13.4	YES	YES	YES		Do not begin work until after denning season (after August 1)

Gray Wolf Habitat Evaluation

Submitted by Doug Smith and Tom Olliff

- Of the developed areas, only two sites (East Entrance and Northeast Entrance) are within the home range of existing wolf packs.
- Of the backcountry sites, 25 are within the home ranges of existing wolf packs.
- In three of the backcountry sites, wolves have historically denned near, but not within, the project area. In these sites (Daly Creek Cabin, Cougar Creek Cabin, Cabin Creek Cabin), work should not begin until after the denning season is complete (August 1).
- Wolves that do not den near project sites are unlikely to be affected by the proposed action.
- The proposed action in the three project sites near dens may affect, but is not likely to adversely affect gray wolves, especially if the recommended conservation measures are followed.

Wildland Urban Interface Effects on T&E Species							
Species: Grizzly Bear							
Treatment Area	Acres	Has a survey been completed?	Is habitat present?	Does the species occur in the treatment area?	Is treatment likely to affect (without implementing conservation measures?	If NO-why?	If yes, list conservation measures
Bechler	34.8	No	Yes	Yes	Discountable	Not in high quality habitat	
Lake Hotel and Utility Area	299.2	No	Yes	Yes	Yes		Conduct work after 7/1
East Entrance	47.8	No	Yes	Yes	Yes		Conduct work prior to 9/1
Northeast Entrance	31.7	No	Yes	Yes	Yes		Conduct work prior to 9/1
Crevice Cabin	15.8	No	Yes	Yes	Discountable	Not in high quality habitat	
Sportsman Lake Cabin	13.2	No	Yes	Yes	Yes		Conduct work prior to 9/1
South Riverside Cabin	11.4	No	Yes	Yes	Yes		Conduct work prior to 6/1
Buffalo Lake Cabin	11.5	No	Yes	Yes	Yes		Conduct work prior to 9/1
Winter Creek Cabin	11.5	No	Yes	Yes	Yes		Conduct work prior to 9/1
Daly Creek Cabin	11.5	No	Yes	Yes	Discountable	Not in high quality habitat	
Mary Mountain Cabin	17.6	No	Yes	Yes	Yes		Conduct work 6/16 - 8/31

Observation Peak Cabin	11.5	No	Yes	Yes	Yes		Conduct work prior to 9/1
Pelican Springs Cabin	15	No	Yes	Yes	Yes		Conduct work after 7/4
Cabin Creek Cabin	11.5	No	Yes	Yes	Yes		Conduct work after 7/15
Cove Cabin	16.3	No	Yes	Yes	Yes		Conduct work prior to 9/1
Three River Junction Cabin	11.5	No	Yes	Yes	Discountable	Not in high quality habitat	
Nez Perce Cabin	11.5	No	Yes	Yes	Yes		Conduct work 6/16 - 8/31
Thorofare Cabin	15.5	No	Yes	Yes	Discountable	Not in high quality habitat	
Trail Creek Cabin	6.1	No	Yes	Yes	Yes		Conduct work 7/15 - 8/31
Fern Lake Cabin	14.2	No	Yes	Yes	Yes		Conduct work 7/4 - 8/31
Heart Lake Cabin	14.6	No	Yes	Yes	Yes		Conduct work after 7/1
Fox Creek Cabin	15.8	No	Yes	Yes	Discountable	Not in high quality habitat	
Buffalo Plateau Cabin	11.5	No	Yes	Yes	Yes		Conduct work prior to 9/1
Harebell Cabin	14.7	No	Yes	Yes	Yes		Conduct work 6/1 - 8/31
Cache Creek Cabin	15	No	Yes	Yes	Yes		conduct work prior to 9/1
Cold creek Cabin	13.5	No	Yes	Yes	Discountable	Not in high quality habitat	
Lamar Mountain Cabin	11.5	No	Yes	Yes	Yes		Conduct work 6/1 - 8/31
Lower Blacktail Cabin	18.4	No	Yes	Yes	Discountable	Not in high quality	

						habitat	
Upper Blacktail Cabin	19.6	No	Yes	Yes	Yes		Conduct work after 7/1
Hellroaring Cabin	13.4	No	Yes	Yes	Discountable	Not in high quality habitat	
Fawn Pass Cabin	11.5	No	Yes	Yes	Yes		Conduct work 6/1 - 8/31
Union Falls Cabin	11.5	No	Yes	Yes	Discountable	Not in high quality habitat	
Calfee Creek Cabin	13	No	Yes	Yes	Yes		Conduct work prior to 9/1
Howell Creek Cabin	12.4	No	Yes	Yes	Yes		Conduct work prior to 9/1
Lower Slough Creek Cabin	12.7	No	Yes	Yes	Yes		Conduct work prior to 9/1
Outlet Cabin	10.8	No	Yes	Yes	Yes		Conduct work prior to 9/1
Elk Tongue Cabin	11.5	No	Yes	Yes	Yes		Conduct work 6/1 - 8/31
Upper Miller Creek Cabin	11.5	No	Yes	Yes	Yes		Conduct work prior to 9/1
Cougar Creek Cabin	13.4	No	Yes	Yes	Yes		Conduct work prior to 9/1

Grizzly Bear Habitat Evaluation Methods

Submitted by Kerry Gunther and Darren Ireland

We used GIS to overlay the Hazard Fuels Treatment Zones over maps depicting the vegetal quality of grizzly bear habitat during the spring (den emergence through May 31), summer (June 1 through August 31), and fall seasons (September 1 through den entrance). The number of acres of low, medium, and high quality habitat within each Hazard Fuels Treatment Zone were then calculated for each season.

The seasonal habitat quality maps were derived from habitat and cover type maps for Yellowstone National Park (Despain 1990) in combination with information on the quality and abundance of grizzly bear foods within different habitat and cover types (Mattson et al. 1986). Habitat types and cover types within Yellowstone National Park were mapped by Despain (1990) from air photos to approximately a five-acre resolution. Therefore, these maps should be considered relatively broad or coarse in scale and not capable of detecting small micro-sites. Mattson et al. (1986) used diet item value, relative frequency of diet consumption, preference of diet item, diversity of feeding opportunity, and seasonal adjustment to derive grizzly bear habitat component value coefficients for the habitat types mapped by Despain (1990). We did not conduct surveys around each backcountry cabin or developed area to determine the accuracy of the habitat and cover type maps.

The food value of habitat to grizzly bears is also influenced by factors other than vegetation. The presence of concentrations of non-vegetal, protein rich food sources such as winter-killed carrion, elk calving areas, elk rutting areas, and cutthroat trout spawning streams significantly increase the value of habitat to bears. In addition to quantitatively assessing the quality of vegetation to bears in each Hazard Fuels Treatment Zone, we also qualitatively assessed each treatment zone for the presence or absence of protein rich mammal or fish food resources.

Since the grizzly bear is a generalist omnivore capable of successfully foraging for food over vast areas, we believe that negative impacts to grizzly bears due hazard fuels reduction around backcountry cabins would be discountable in areas and seasons containing only low to medium quality grizzly bear habitat. We recognize that there is a low potential for some short-term displacement of grizzly bears from low and medium quality habitat around backcountry cabins, but that short-term displacement from these habitats would have very little impact on bear feeding activities. Therefore, we did not recommend conservation measures for Hazard Fuels Treatment Zones that contained only low to medium

quality habitat during all three seasons. We believe that hazard fuels reduction work could temporarily displace grizzly bears on a short-term basis, from important foods in areas of high quality habitat. Therefore in Hazard Fuels Treatment Zones that contain high quality habitat, we recommended dates for fuels reduction work that avoid the season or seasons of highest value to grizzly bears. We believe that this will significantly reduce the likelihood of displacing grizzly bears from areas containing high quality habitat.

Our biggest concern with Hazard Fuels reduction adjacent to front-country developments is that if fuels reduction results in an increase in forb production, it could attract grizzly bears to habitat adjacent to developments. At the Lake and East Entrance developments, exotic Alsike Clover often invades disturbed areas. Clover is a highly preferred bear food and could attract and hold grizzly bears to developed areas. Grizzly bears that frequent developed areas are often removed from the population due to concern for human safety. As mitigation, we recommend that the park implement a program to monitor changes in vegetation that result from fuels reduction efforts. We also recommend that the park have a plan in place to remove exotic forbs within the Hazard Fuels Treatment Zones, if they become established as a result of fuels reduction.

DEFINITIONS USED IN GRIZZLY TABLE

Has a survey been completed? For grizzly bears the answer is no because I did not conduct surveys to evaluate grizzly bear habitat around each backcountry cabin or each of the developed areas. Instead I based my evaluation on existing grizzly bear habitat quality maps. The grizzly bear habitat quality maps were derived from air photos with limited field checking for accuracy.

Is habitat present? For grizzly bears the answer is yes because grizzly bears can be found in all of the habitat types that occur throughout the park.

Does the species occur in the treatment area? For grizzly bears the answer is yes because grizzly bears are found throughout the park.

Is treatment likely to affect? For grizzly bears the answer is yes-may effect, but not likely to adversely effect, because this project could result in short term displacement of grizzly bears from the treatment areas. For areas in high quality habitat I recommend mitigation to significantly reduce the chances of displacement. For areas in low or medium quality habitat I don't recommend mitigation because the impacts are likely discountable. The U.S. Fish and Wildlife Service defines ***discountable impacts*** as impacts that are extremely unlikely to occur.

APPENDIX D

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List of Contacts/Contributors/Preparers

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APPENDIX D: MINIMUM REQUIREMENT ANALYSIS

The Minimum Requirement Concept

The Wilderness Act of 1964 states in section 4(c) that "…*except as necessary to meet the minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area) there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation…"* within a Wilderness area. The Act allows for the administrative exception, but it is an exception not to be abused and to be exercised very sparingly and only when it meets the test of being the minimum necessary for wilderness. National Park Service Policy dictates that all management decisions affecting wilderness must be consistent with the minimum requirement concept.

The minimum requirement concept enables managers to examine and document if a proposed management action is appropriate in wilderness, and if it is, what is the least intrusive equipment, regulation, or practice (minimum tool) that will achieve wilderness management objectives. The completion of this process assists managers in making informed and appropriate decisions concerning actions conducted in wilderness.

In wilderness, how a management action is carried out is as important, if not more important, than the end product. When determining minimum requirement, the potential disruption of wilderness resources and character will be considered before, and given significantly more weight than, economic efficiency and convenience. If a compromise of wilderness resources or character is unavoidable, only those actions that preserve wilderness character in the long run and/or have localized, short-term adverse impacts will be acceptable.

The Process

To apply the minimum requirement concept at Yellowstone National Park, a Minimum Requirement Analysis will be completed for any management action, including but not limited to, natural and cultural resource projects, administrative facilities, trail and camp area projects and research, within wilderness. It is the responsibility of the lead person for any proposed action to complete a Minimum Requirement Analysis Worksheet. Depending on the level of review required, the Minimum Requirement Analysis Worksheet may be used alone or in conjunction with the with other park review processes, such as Project Proposal/ Clearance or Flight Requests.

The Minimum Requirement Analysis is a two-part process. Part A helps determine whether or not the proposed management action is appropriate or necessary for administration of the area as wilderness, and does not pose a significant impact to wilderness resources and character. Part B describes alternatives for the proposed action in detail, and evaluates each, to determine the techniques and/or types of tools and equipment (minimum tool) needed to

ensure that overall impacts to wilderness resources and character are minimized. The Minimum Requirement Analysis Worksheet and instructions for its completion are included on the following pages in this appendix.

Recurring actions, such as spring trail opening, campsite rehabilitation and management prescribed fire, may be analyzed and the minimum requirement decision and specific guidelines documented in an approved management plan (e.g., Fire Management Plan). This eliminates the necessity of the action being analyzed each time it is conducted. Any action not analyzed and approved in a current management plan, or any deviation from an approved action and its specific guidelines, must be analyzed on a case by case basis.

The minimum requirement concept is not intended to limit choices. It challenges managers to examine every planned management action to determine if it is appropriate and necessary in wilderness and to choose the best alternative that would least impact unique wilderness resources and character. The purpose and philosophy of wilderness must be considered when evaluating alternatives. Wilderness goals, objectives and desired future conditions must be well understood by anyone proposing and/or analyzing actions.

Tool and Equipment Use

Life and health-threatening search and rescue, medical incidents or environmental emergencies which seriously threaten wilderness resources may require a "higher degree" of minimum requirement than most wilderness management actions. The appropriate minimum requirement for emergencies will be selected by determining what tool/technique will meet emergency and wilderness objectives, while best protecting human health and safety, and wilderness resources and character.

Stricter standards will be in place for the use of motorized equipment and mechanical transport in non-emergency actions. In Management Class 1 areas, only hand tools and traditional practices will be used. Motorized equipment and mechanical transport will not be allowed, except in emergency situations. In Management Class 2, 3 and 4 areas, hand tools and traditional practices will be used whenever possible. Motorized equipment and mechanical transport will not routinely be used, unless first being reviewed using the Minimum Requirement Analysis Worksheet or approved in a current management plan (i.e., Fire Management Plan).

For actions which motorized equipment or mechanical transport uses are approved, they will be planned to minimize impacts to park users and resources by utilizing the least obtrusive and impacting schedules. Season of year, day of week and time of day should be considered. Any proposed use of motorized equipment, except in emergency situations, on holidays and weekends between Memorial Day and June 30th or anytime between July 1st and Labor Day will require that a Minimum Requirement Analysis Worksheet be prepared and the

action approved by the Assistant Superintendent. This will be done on a case by case basis (e.g., special project) or on a programmatic level (e.g., trail work) in an approved management plan (e.g., Fire Management Plan).

MINIMUM REQUIREMENT ANALYSIS WORKSHEET
YELLOWSTONE NATIONAL PARK

YELL 5/2001)

PROPOSED ACTION: Wildland-Urban Interface: Hazard Fuels Management DATE: 7/31/02

LEAD PERSON(S): Perkins, Mitchell, Hafer WORK UNIT(S): USNPS YNP

PART A: Minimum Requirement *(should the action be done in proposed wilderness)*

1 IS ACTION AN EMERGENCY?

YES → ACT ACCORDING TO APPROVED EMERGENCY MINIMUM TOOL CRITERIA

NO ↓

Answer: ☐ Yes ☒ No

Explain: Action is not under an immediate time constraint nor is it an immediate threat to human life safety, or natural or cultural resources.

2 DOES ACTION CONFLICT WITH LEGISLATION, PLANNED WILDERNESS GOALS, OBJECTIVES OR FUTURE DESIRED CONDITIONS?

YES → DO NOT DO IT

NO ↓

Answer: ☐ Yes ☒ No

Explain: This action conforms to an approved YNP Fire Management Plan. There is no approved YNP Backcountry/Wilderness Plan to date. Under RM 41, Use of tools must conform to the "minimum tool concept".

3 IS ACTION PRE-APPROVED BY THE WILDERNESS AND BACKCOUNTRY OR OTHER PARK MANAGEMENT PLAN?

YES → DO ACCORDING TO APPROVED CRITERIA

NO ↓

Answer: ☒ Yes ☐ No

Explain: There is no approved YNP Backcountry Management Plan. The activity is allowed by the Yellowstone Fire Management Plan and Park Aviation Management Plan within the strict parameters provided by the Minimum Tool Analysis process.

4 CAN ACTION BE ACCOMPLISHED THROUGH A LESS INTRUSIVE ACTION THAT SHOULD BE TRIED FIRST? (Visitor Education…)

YES → DO IT

NO ↓

Answer: ☐ Yes ☒ No

Explain: Motorized tools will be used only when non-motorized tools are not appropriate or to mitigate natural and cultural resource impacts. While a helicopter poses an intrusion on the soundscape, its intrusions are strictly temporary and less impact to other natural resources.

5 CAN ACTION BE ACCOMPLISHED OUTSIDE OF PROPOSED WILDERNESS AND STILL ACHIEVE ITS OBJECTIVES?

YES → DO IT THERE

NO → DO PART B

Answer: ☐ Yes ☒ No

Explain: The fuel reduction will be accomplished in 3 non-wilderness and in 20 backcountry cabins.

PART B: Minimum Tool *(how the action should be done in proposed wilderness)*

6 DESCRIBE, IN DETAIL, ALTERNATIVE WAYS TO ACCOMPLISH THE PROPOSED ACTION * (These may include, primitive skill/tool, mechanized/ motorized, and/or combination alternatives) (Use addition pages if necessary)

GO TO NEXT STEP

* Minimum questions to answer for each alternative:
- What is proposed?
- Where will the action take place?
- When will the action take place?
- What design and standards will apply?
- What methods and techniques will be used?
- How long will it take to complete the action?
- Why is it being proposed in this manner?
- What mitigation will take place to minimize action impacts?

7 EVALUATE WHICH ALTERNATIVE WOULD HAVE THE LEAST OVERALL IMPACT ON WILDERNESS RESOURCES, CHARACTER AND VISITOR EXPERIENCE **

GO TO NEXT STEP

** Minimum criteria used to evaluate each alternative:
- Biophysical effects
- Social/Recreational/Experiential effects
- Societal/Political effects
- Health/Safety concerns
- Economical/Timing considerations

8 SELECT AN APPROPRIATE, PREFERRED ALTERNATIVE

IF REQUIRED → **9** ATTACH TO APPROPRIATE PROJECT PROPOSAL/CLEARANCE FORM FOR REVIEW AND APPROVAL/DISAPPROVAL SIGNATURE

Alternative 1: Use hand tools for all fuel reduction activities; use pack stock to deploy personnel, equipment, and supplies.

PRO: Use of hand tools and pack stock is quieter and complies with wilderness legislation.

CON: Use of hand tools is inherently more dangerous for tree falling due to: 1.) more people and longer times spent for falling activities, 2.)hand tools precludes use of safety enhancing techniques such as quarter cutting and back-boring, and 3.) Cumulative fatigue caused by use of hand tools is a concern.

Pack stock are inherently more intrusive in that they: 1.) Promote soil erosion, 2.) Consume native vegetation, 3.)Contribute to the proliferation of exotic plant species through a variety of vectors, 4.) They transport less weight per trip, thus increasing all other associated impacts, 5.) Are statistically more dangerous than the other alternative methods of transport.

Alternative 2: Use of chainsaw for fuel reduction activities, use helicopter to supply crews and equipment to sites.

PRO: Use of chain saws and helicopters can be safer to crews, more efficient to accomplish tasks and will lessen the overall time crews and activities will work in the wilderness. Some natural and cultural resource damage may be alleviated by not using stock animals. Helicopters will lessen resource damage by: 1.) not promoting the proliferation of exotic weed species, 2.) not impacting soils or promote erosion, 3.) lessening human wildlife confrontations via flight rather than trail travel, and 4.) Impact on the soundscape is transient

CON: Use of chain saws and helicopters will be more imminently intrusive to wilderness values and will not comply with wilderness legislation.

Alternative 3: Combination of using hand tools and chainsaws to remove hazard fuels, and by using foot and horse traffic as well as helicopters to deploy crews, supplies, and equipment.

PRO: By using a combination of non-motorized and non-motorized equipment to accomplish work objectives, park managers can make sound decisions whether to use chainsaws or hand tools, and to use helicopters versus non-mechanized transportation to deploy crews and equipment based on worker safety, natural and cultural resource protection, visitor use, and wilderness values.

CON: By using a combination of motorized and non-motorized equipment for backcountry hazard fuel reduction, there may be more time required for accomplishing work objectives requiring longer stays in park wilderness.

List preferred alternative and give justification:

Upon review and comparison, alternative 3 is the preferred alternative for backcountry hazard fuel reductions because:

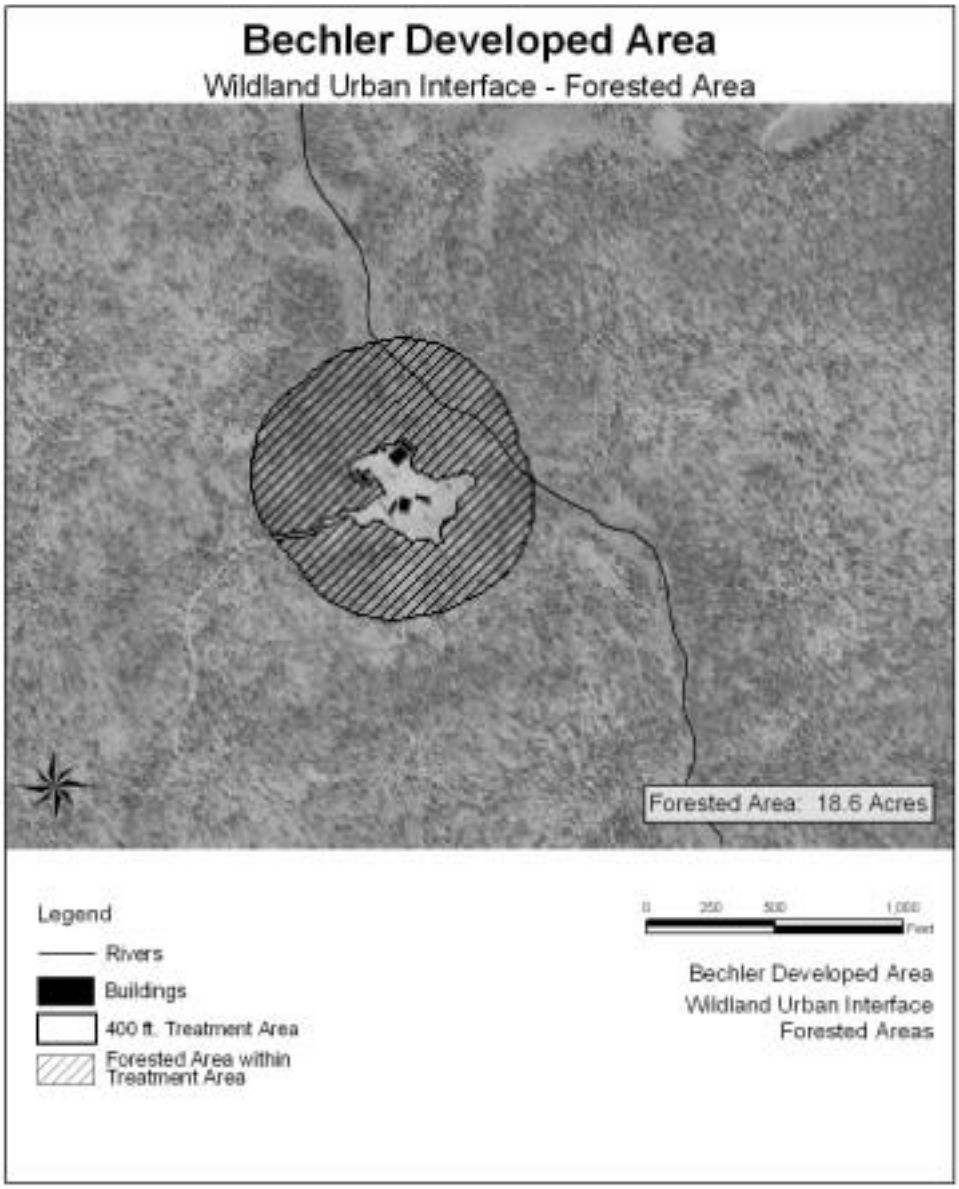
A. It is the method that is the least impact to park natural and cultural resources.

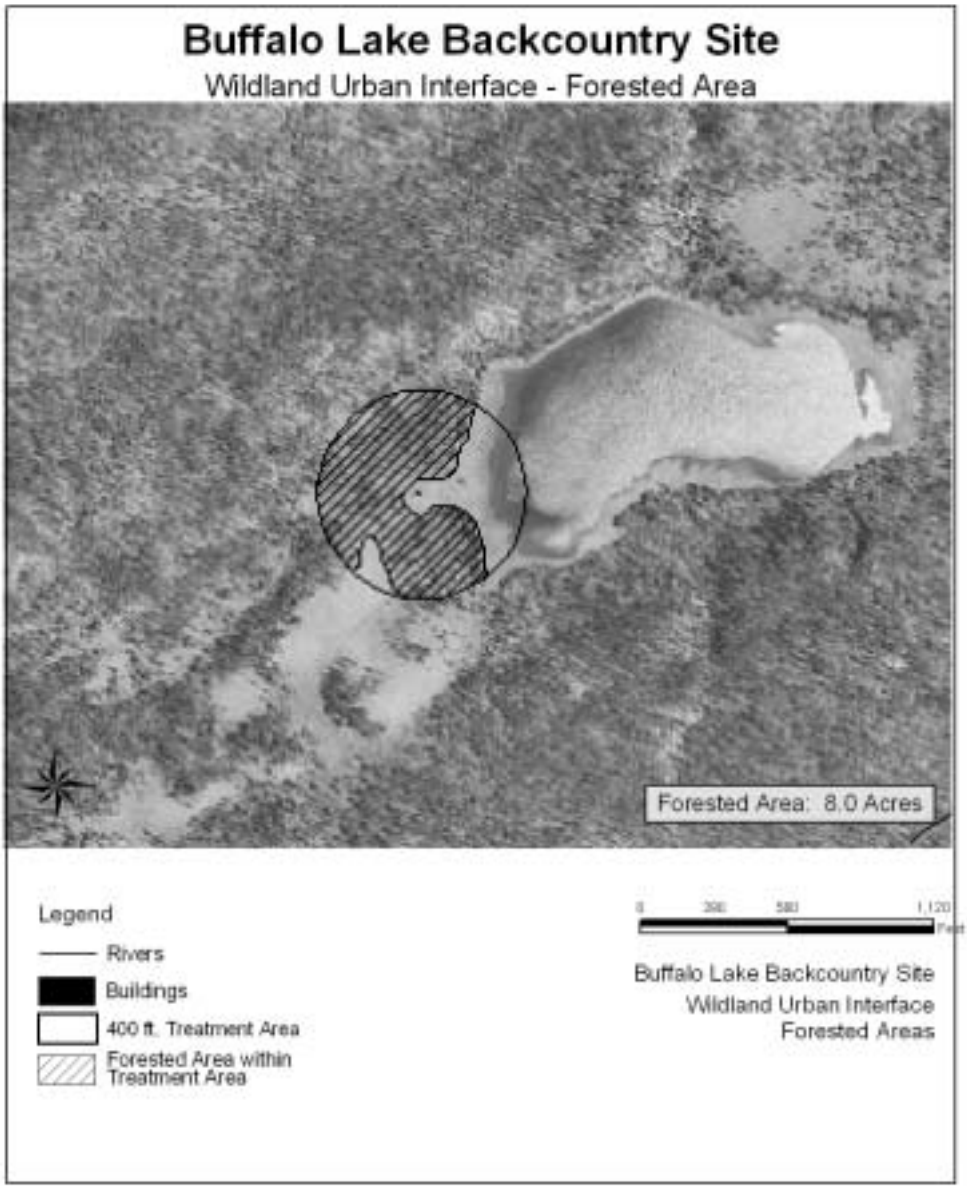
B. It is at least as safe if not safer than the other 2 alternatives to park staff

C. It will minimize intrusion to park wilderness values and upon park visitors in the backcountry.

D. It will allow maximum flexibility to manage this project to allow a safer work environment, protect park resources and yet accomplish this with minimum intrusion within park wilderness areas.

APPENDIX E: PROPOSED TREATMENT SITES


Bechler Developed Area
Wildland Urban Interface - Forested Area
Forested Area: 18.6 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Bechler Developed Area
Wildland Urban Interface
Forested Areas


Buffalo Lake Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 8.0 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
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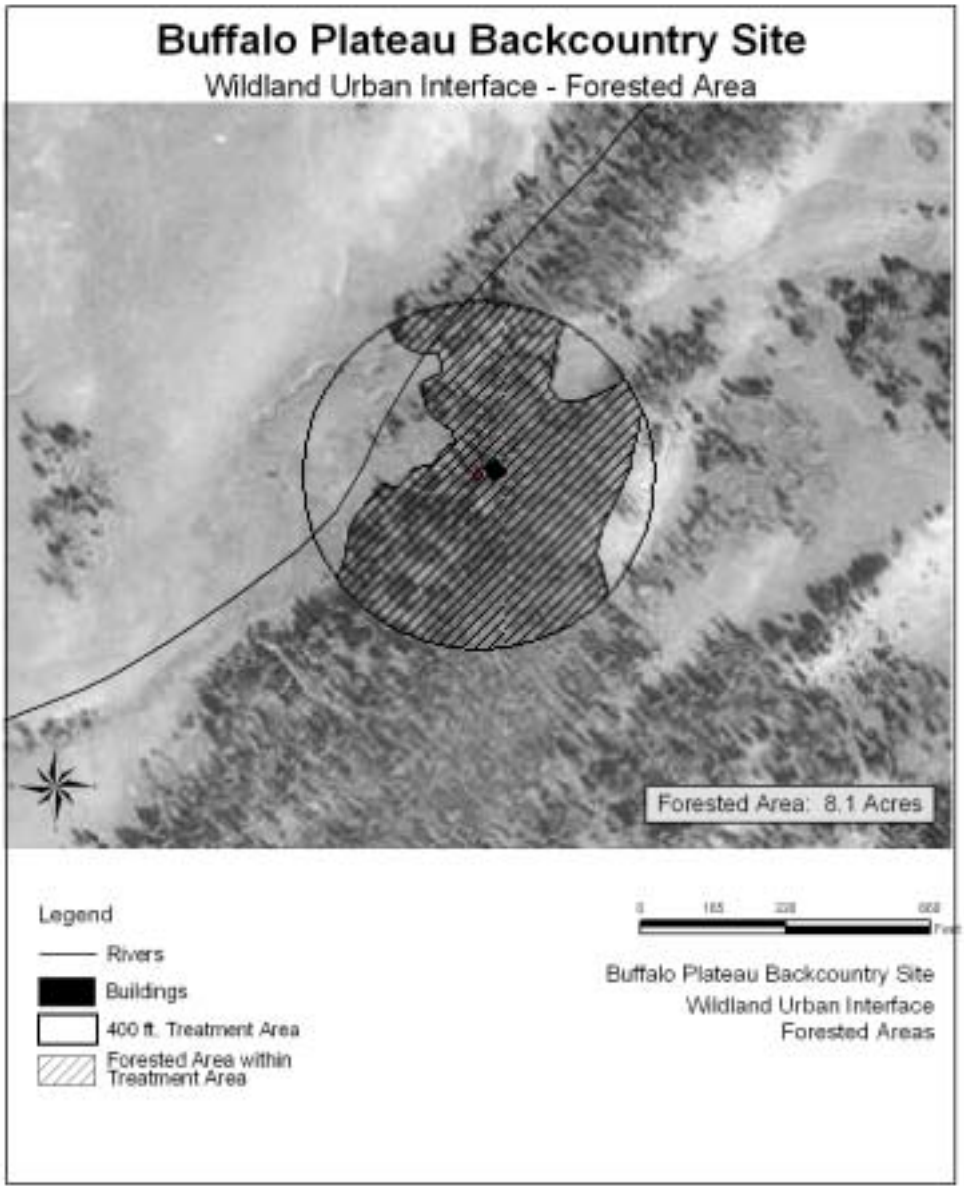
280
560
1,120
Feet
Buffalo Lake Backcountry Site
Wildland Urban Interface
Forested Areas


Buffalo Plateau Backcountry Site
Wildland Urban Interface - Forested Area
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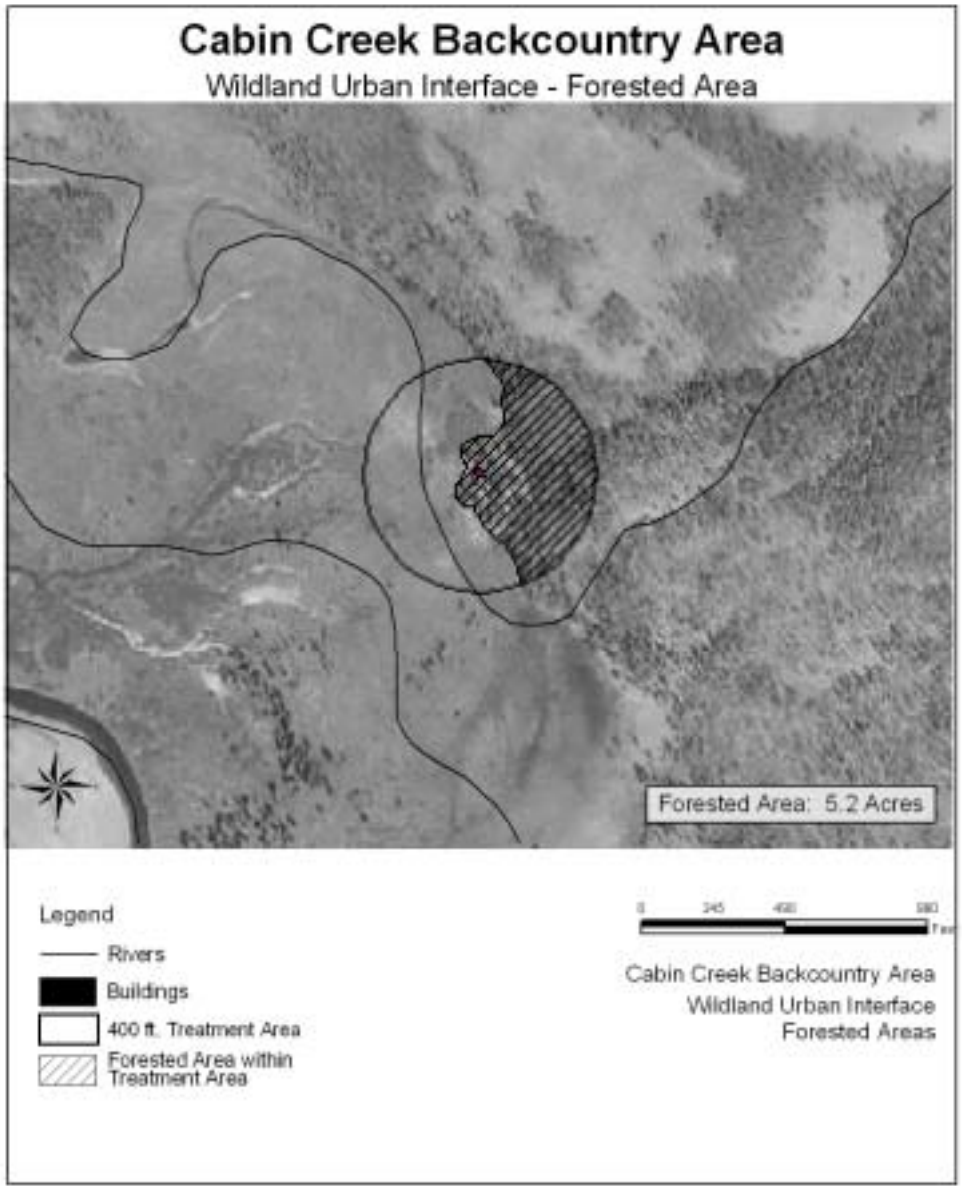
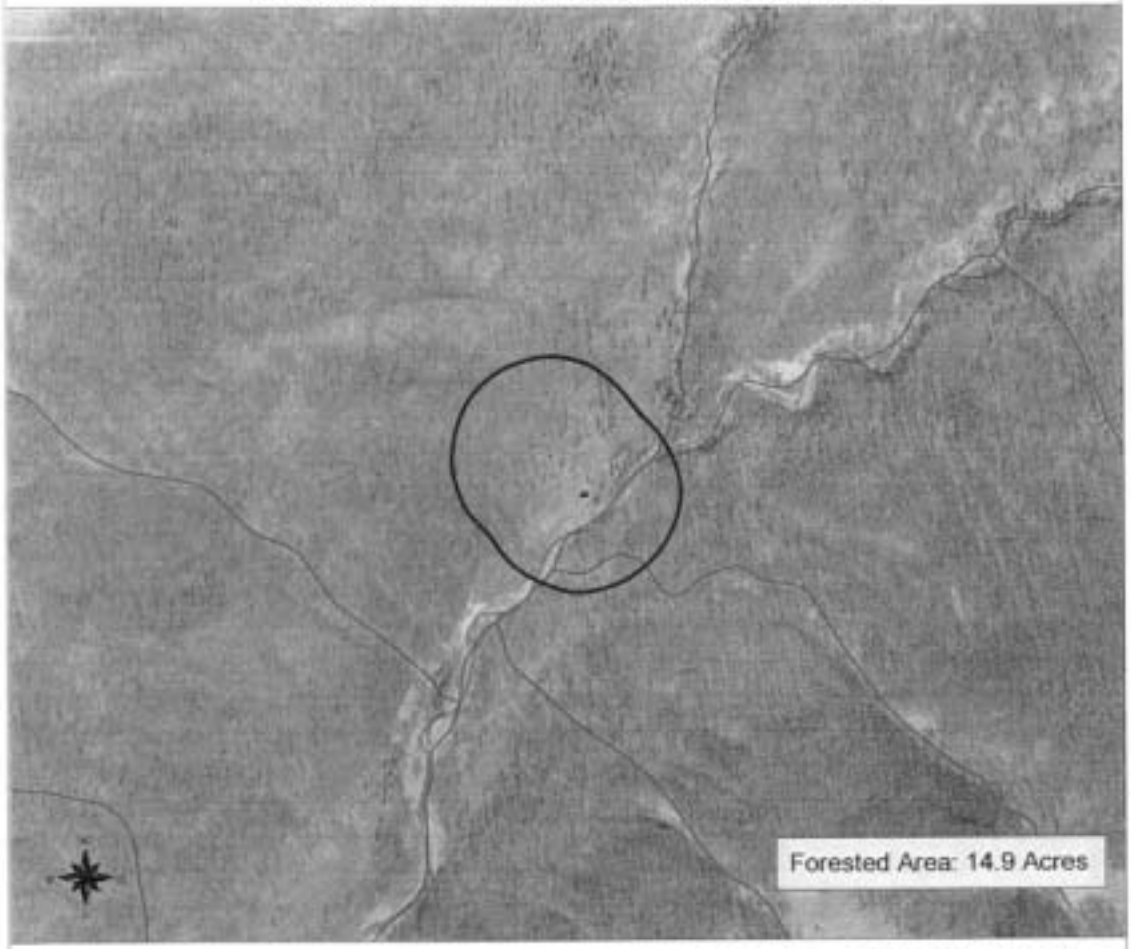
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
Buffalo Plateau Backcountry Site
Wildland Urban Interface
Forested Areas


Cabin Creek Backcountry Area
Wildland Urban Interface - Forested Area
Forested Area: 5.2 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
Cabin Creek Backcountry Area
Wildland Urban Interface
Forested Areas

Cache Creek Backcountry Site

Wildland Urban Interface - Forested Areas



300 0 300 600 900 Feet

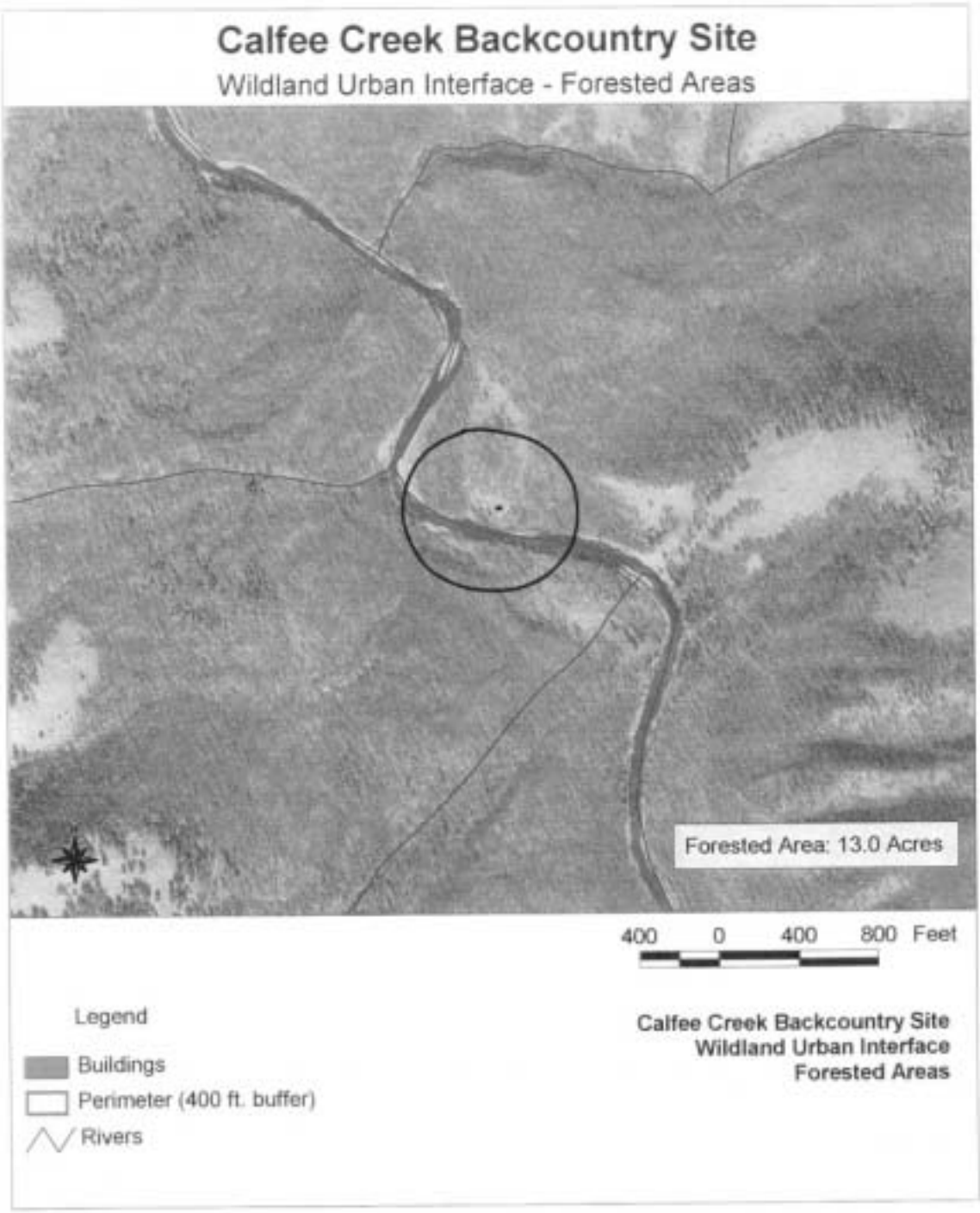
Legend

Buildings

Perimeter (400 ft. buffer)

Rivers

Cache Creek Backcountry Site
Wildland Urban Interface
Forested Areas


Calfee Creek Backcountry Site
Wildland Urban Interface - Forested Areas
Forested Area: 13.0 Acres
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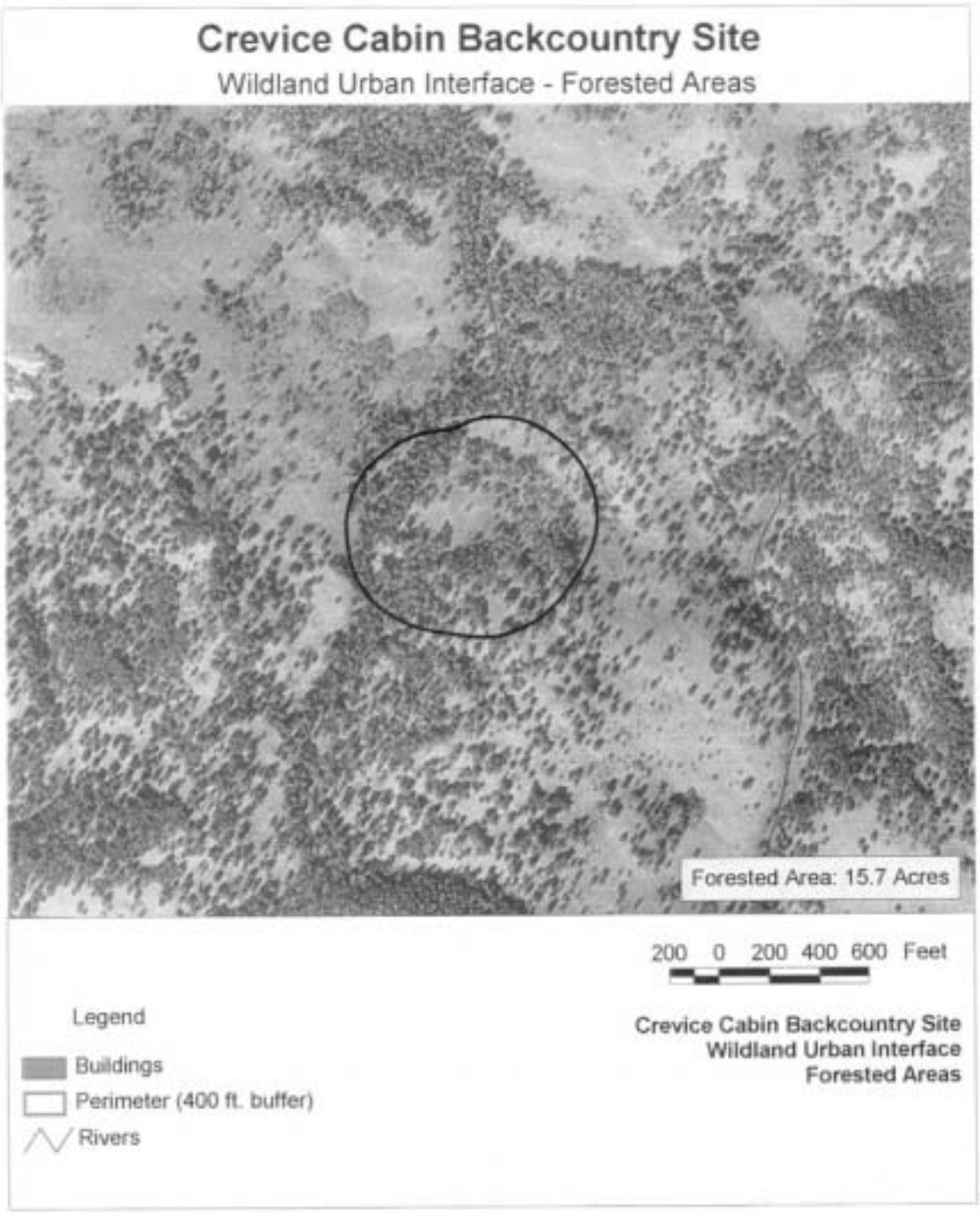
Legend
Buildings
Perimeter (400 ft. buffer)
Rivers
Calfee Creek Backcountry Site
Wildland Urban Interface
Forested Areas


Crevice Cabin Backcountry Site
Wildland Urban Interface - Forested Areas
Forested Area: 15.7 Acres
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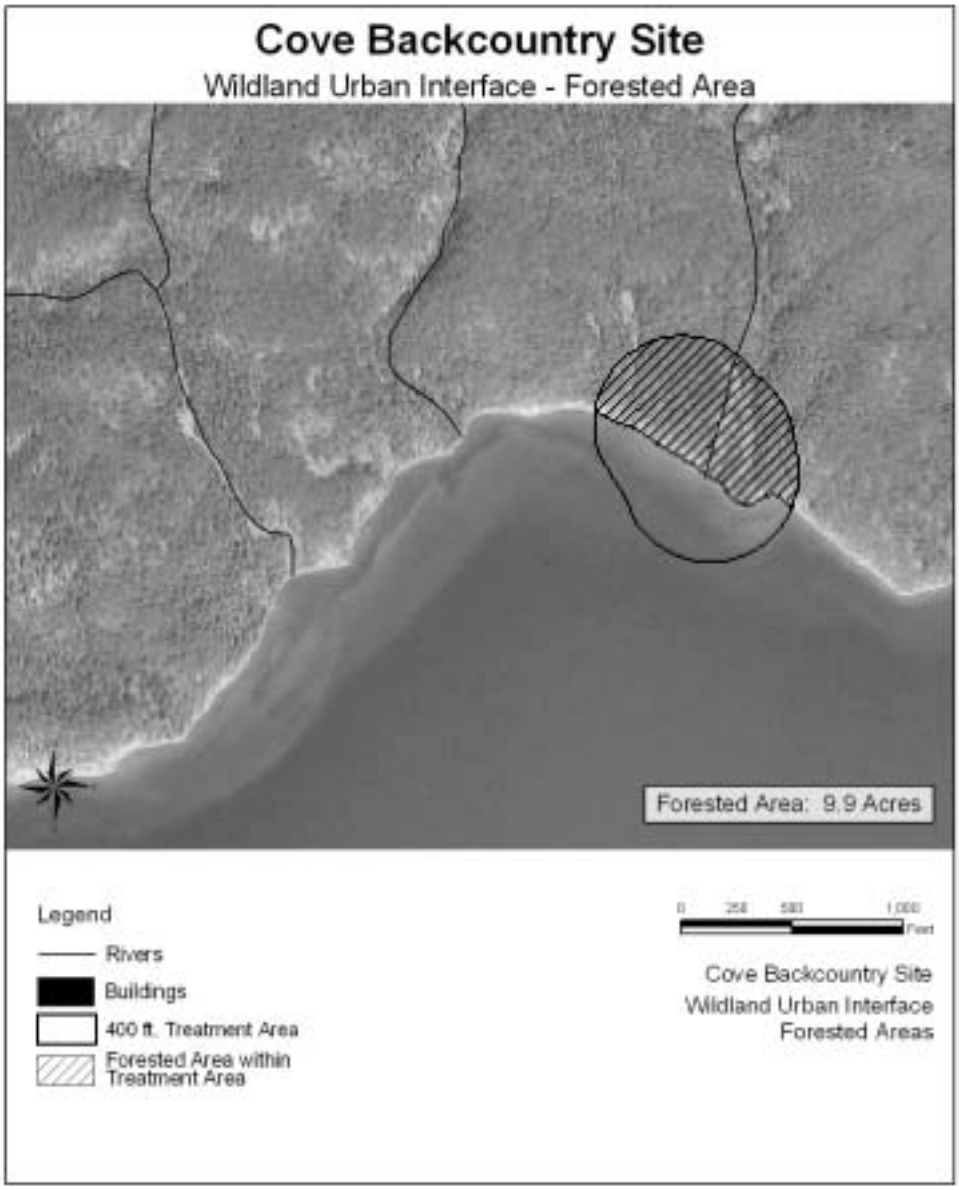
Legend
Buildings
Perimeter (400 ft. buffer)
Rivers
Crevice Cabin Backcountry Site
Wildland Urban Interface
Forested Areas


Cove Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 9.9 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
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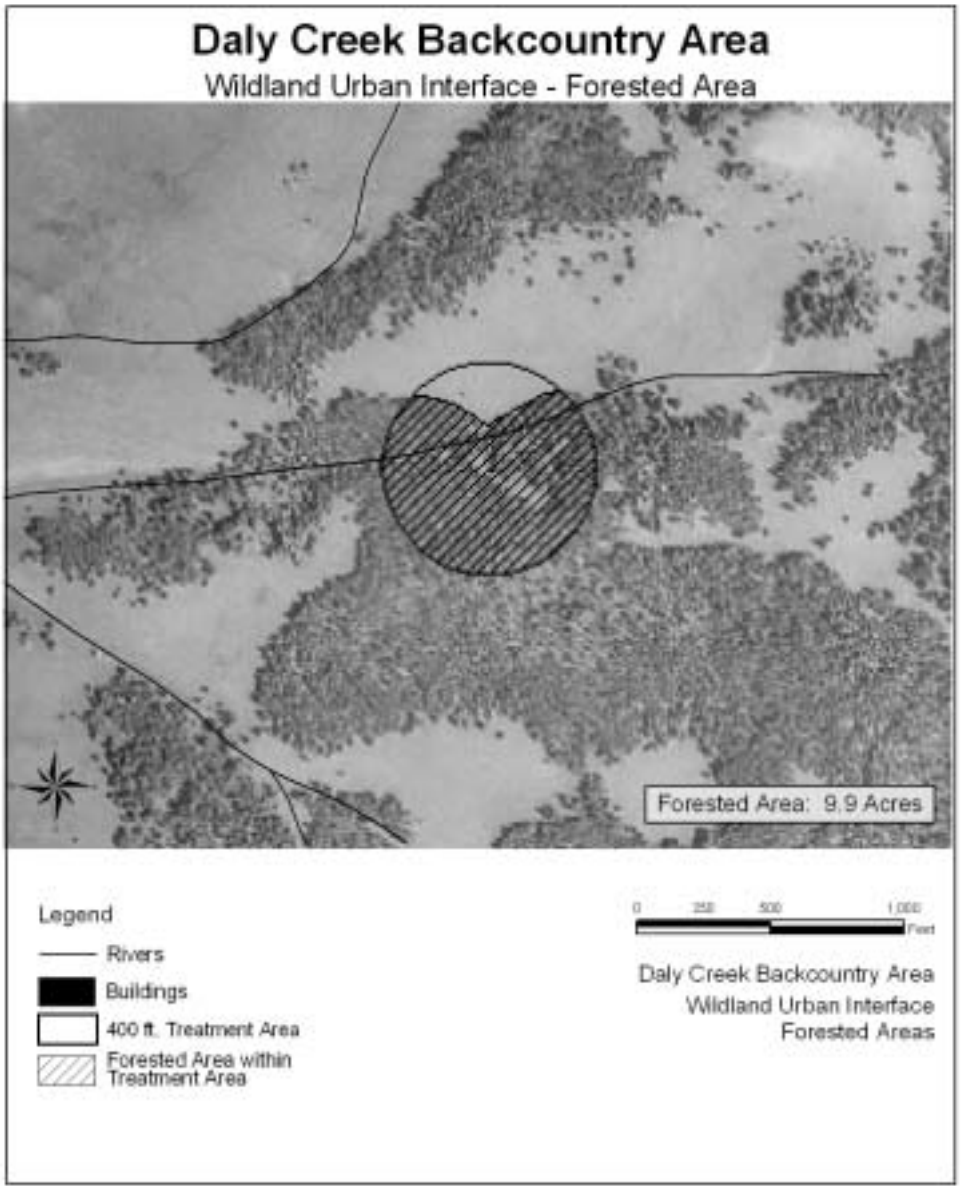
250
500
1,000
Feet
Cove Backcountry Site
Wildland Urban Interface
Forested Areas


Daly Creek Backcountry Area
Wildland Urban Interface - Forested Area
Forested Area: 9.9 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
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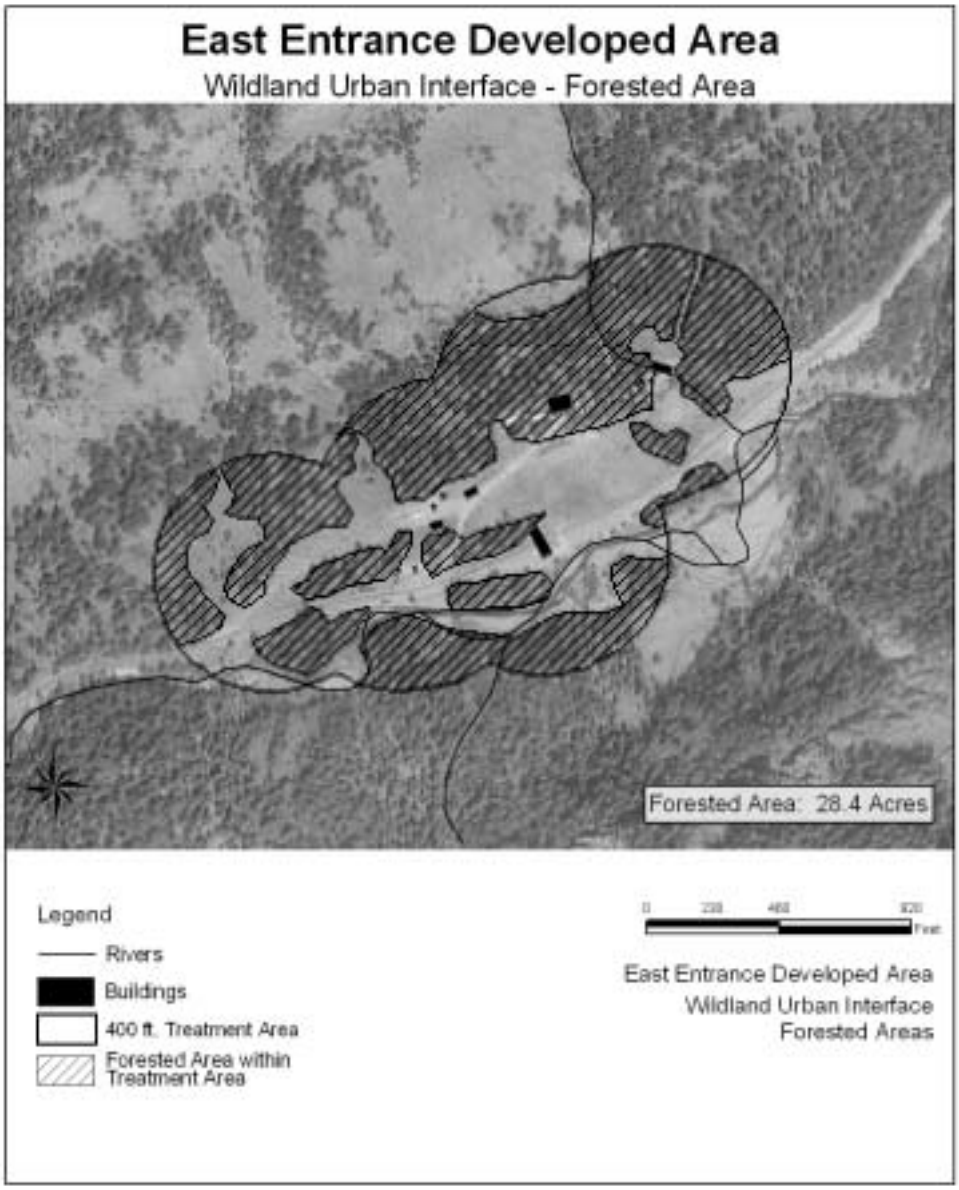
500
1,000
Feet
Daly Creek Backcountry Area
Wildland Urban Interface
Forested Areas


East Entrance Developed Area
Wildland Urban Interface - Forested Area
Forested Area: 28.4 Acres
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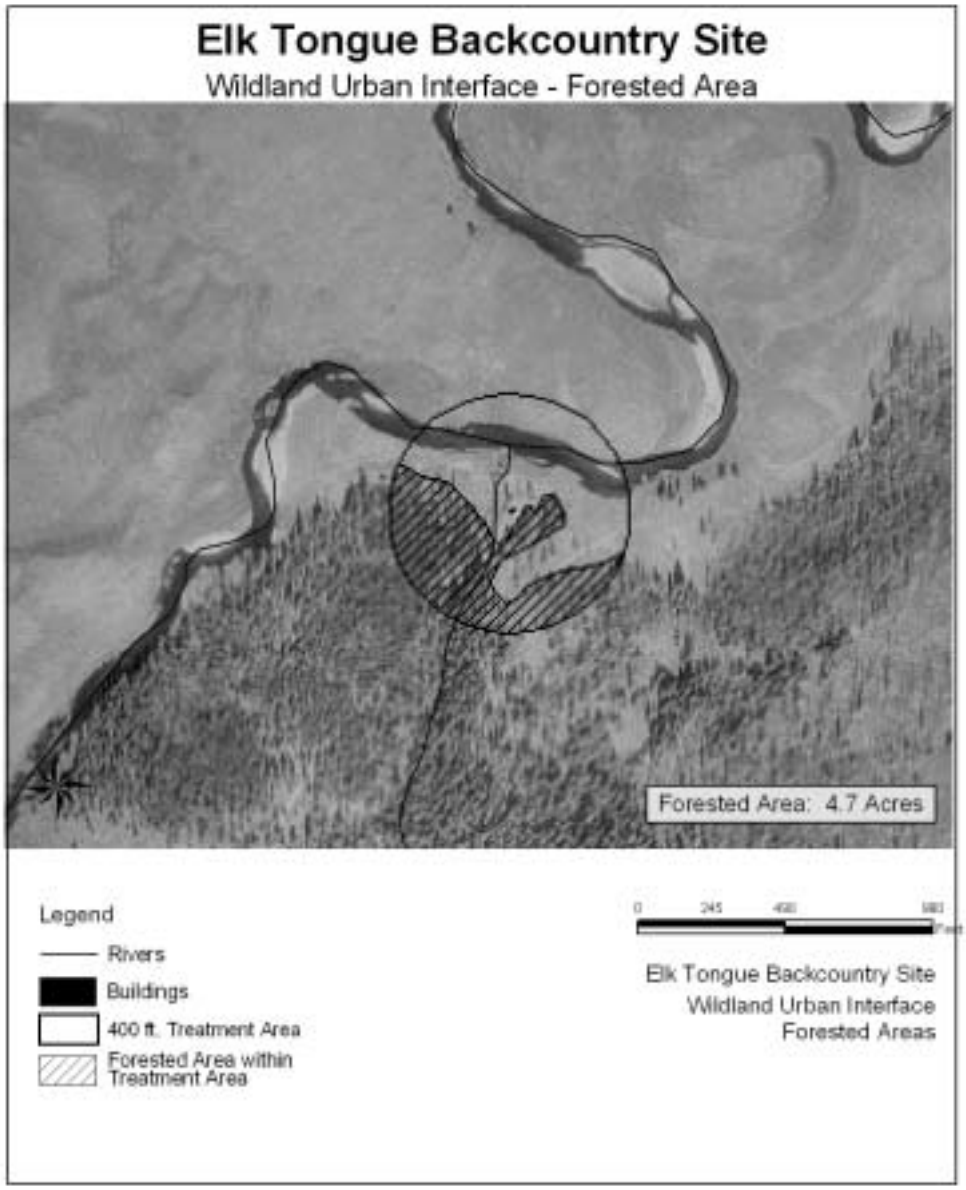
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
East Entrance Developed Area
Wildland Urban Interface
Forested Areas


Elk Tongue Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 4.7 Acres
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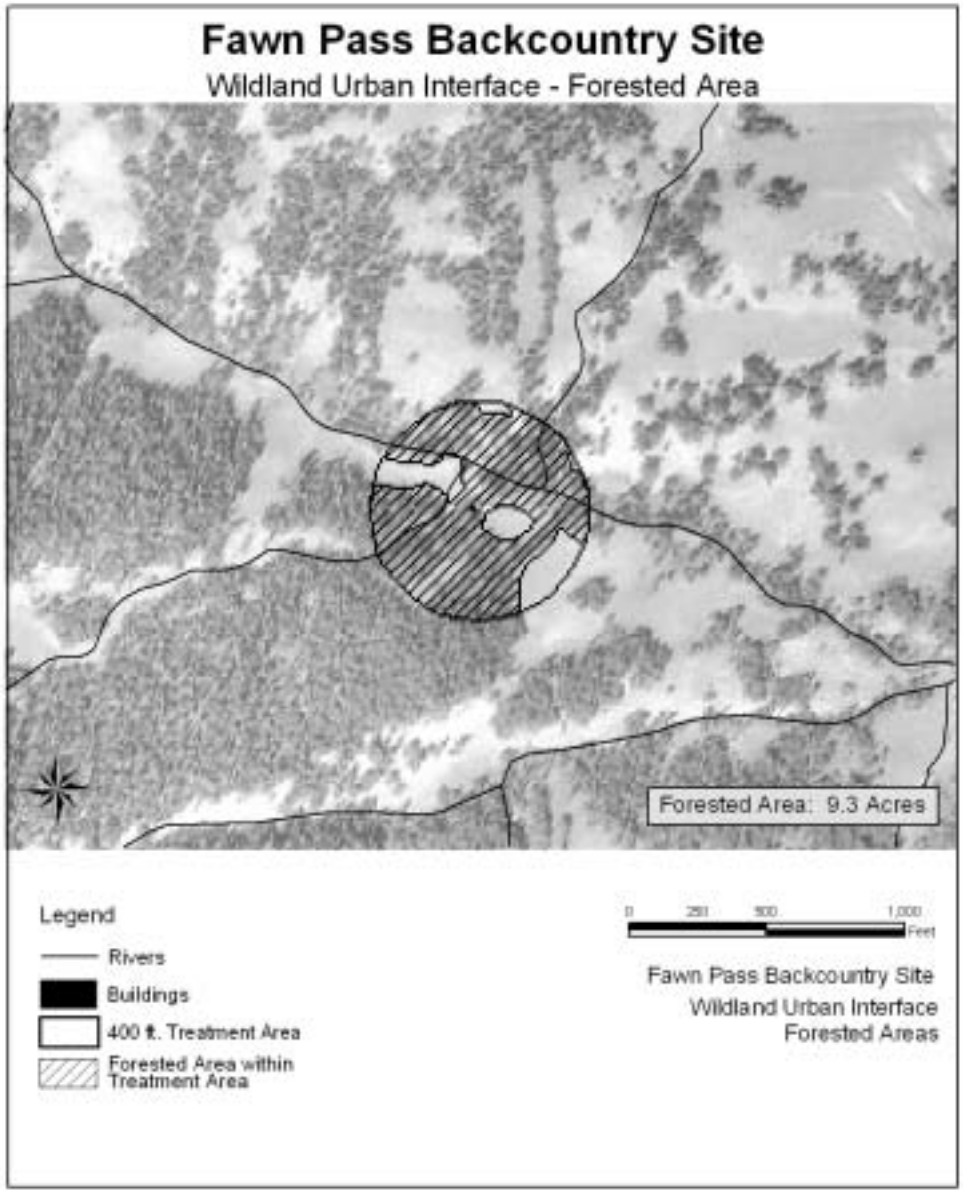
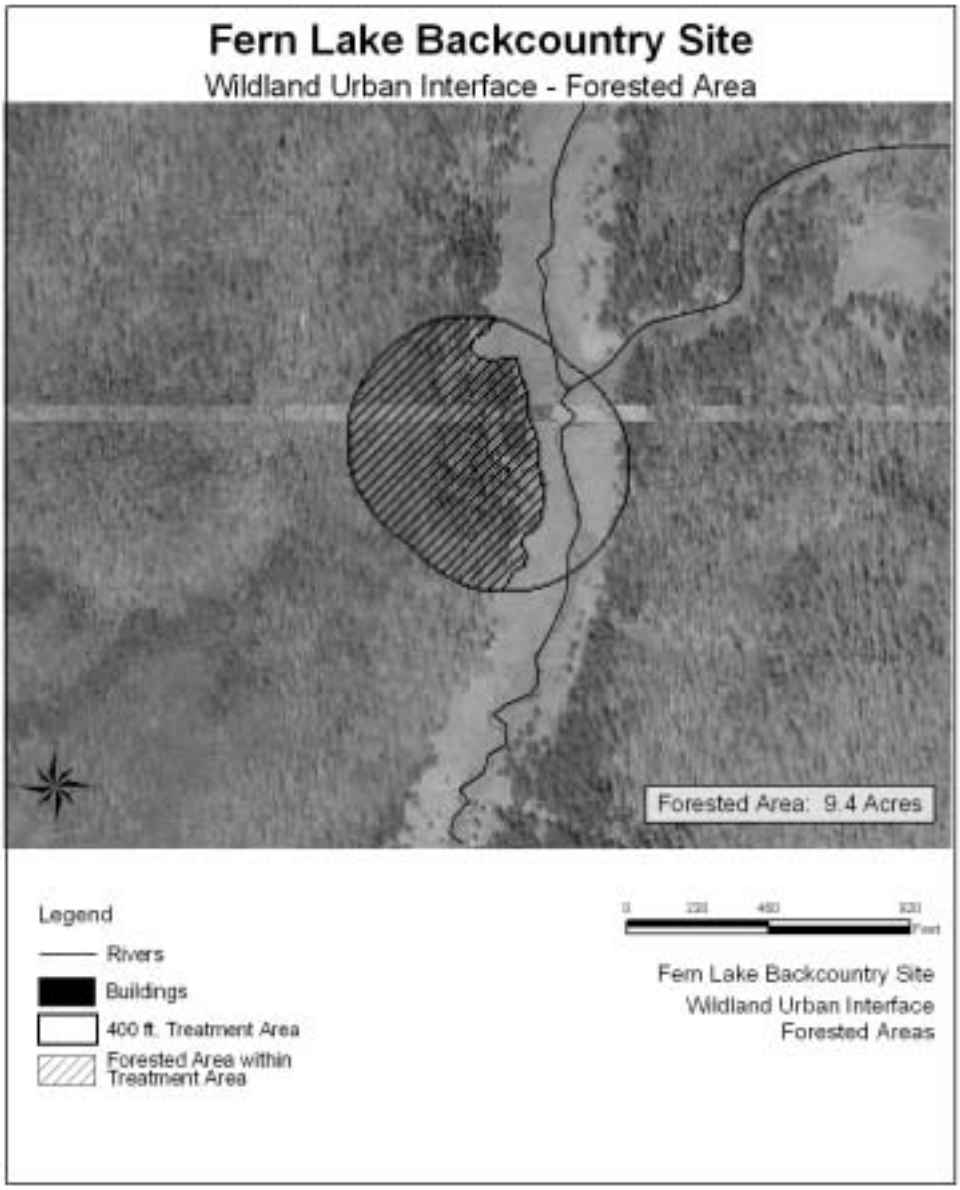
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
245
490
980
Elk Tongue Backcountry Site
Wildland Urban Interface
Forested Areas


Fawn Pass Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 9.3 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0 250 500 1,000
Feet
Fawn Pass Backcountry Site
Wildland Urban Interface
Forested Areas


Fern Lake Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 9.4 Acres
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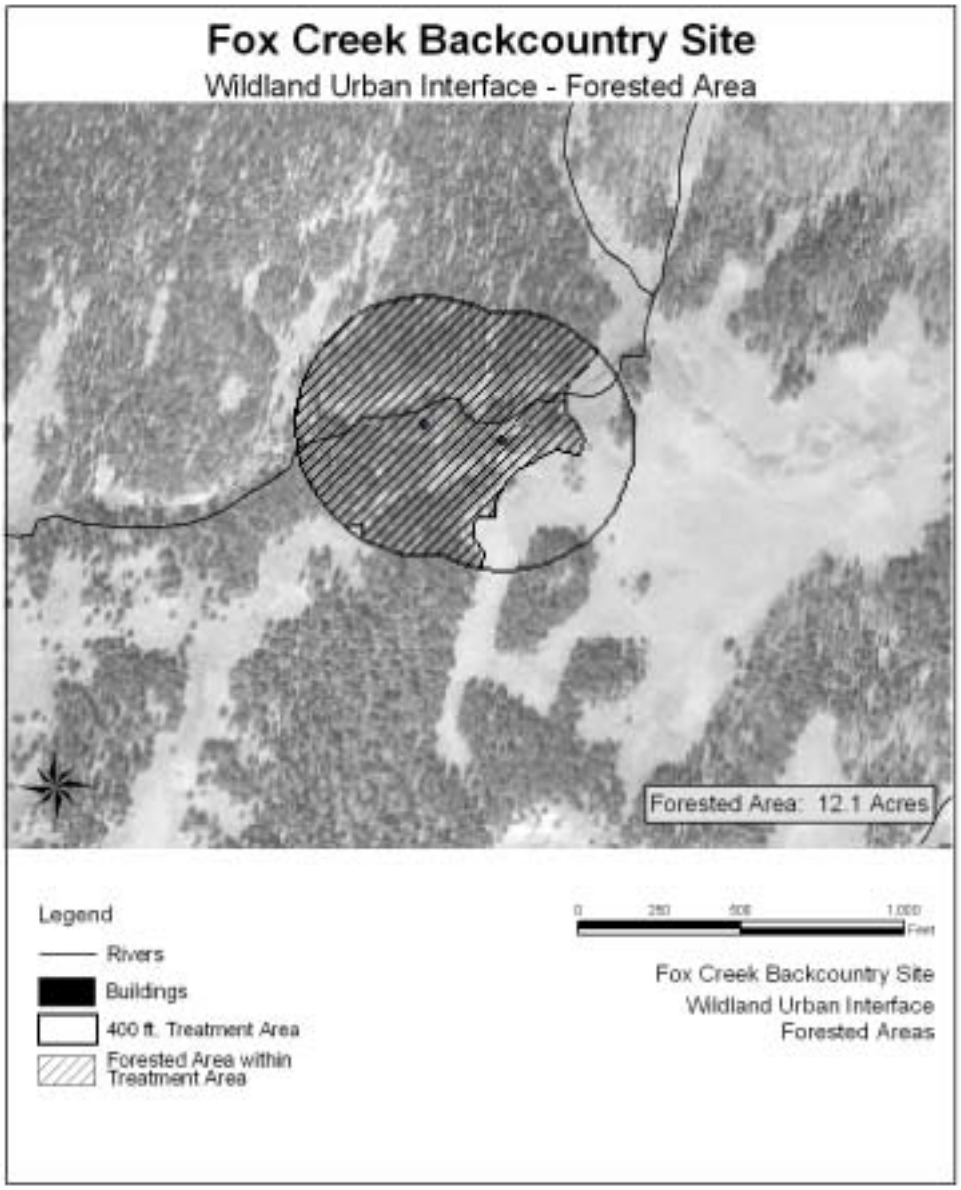
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
Fern Lake Backcountry Site
Wildland Urban Interface
Forested Areas


Fox Creek Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 12.1 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
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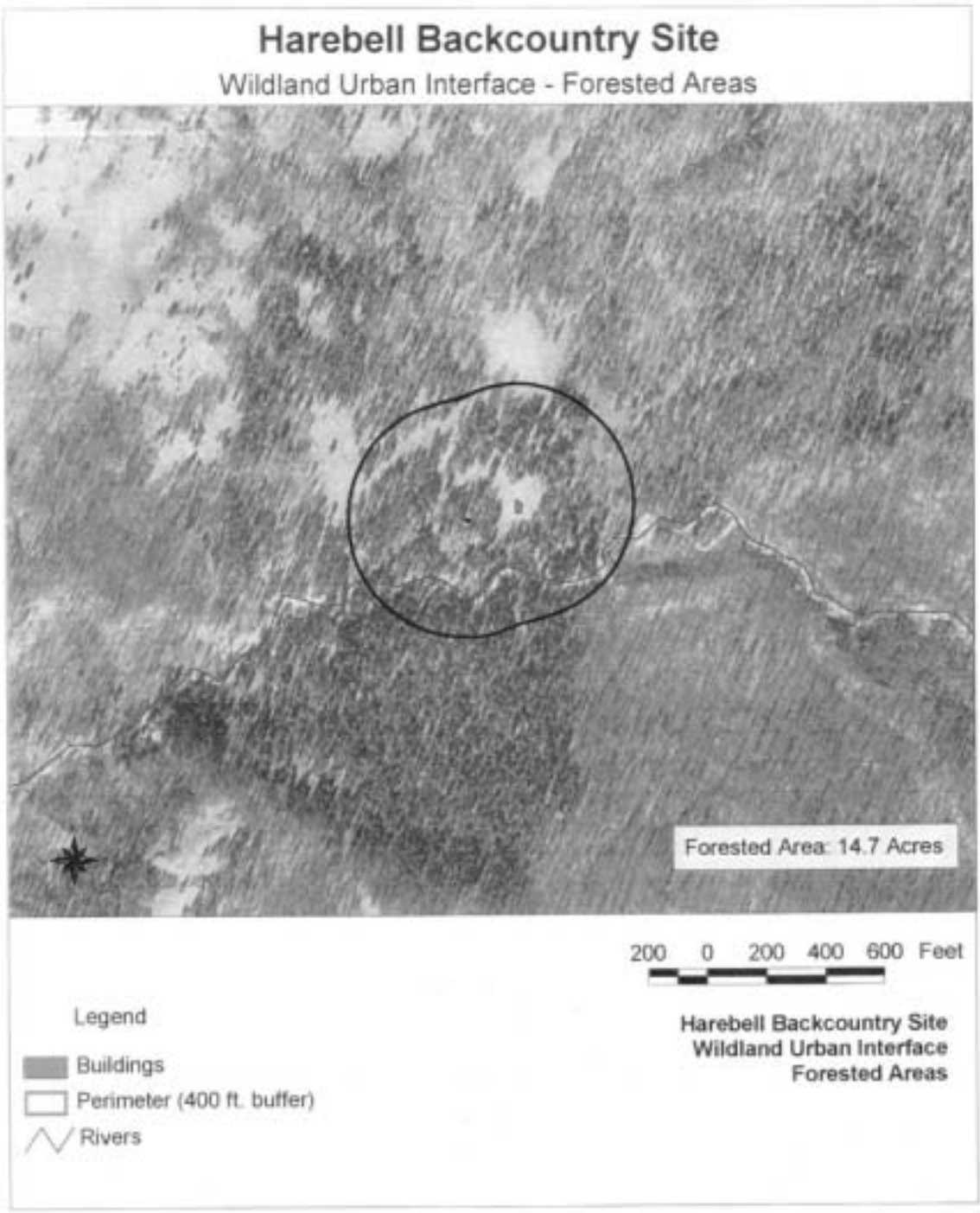
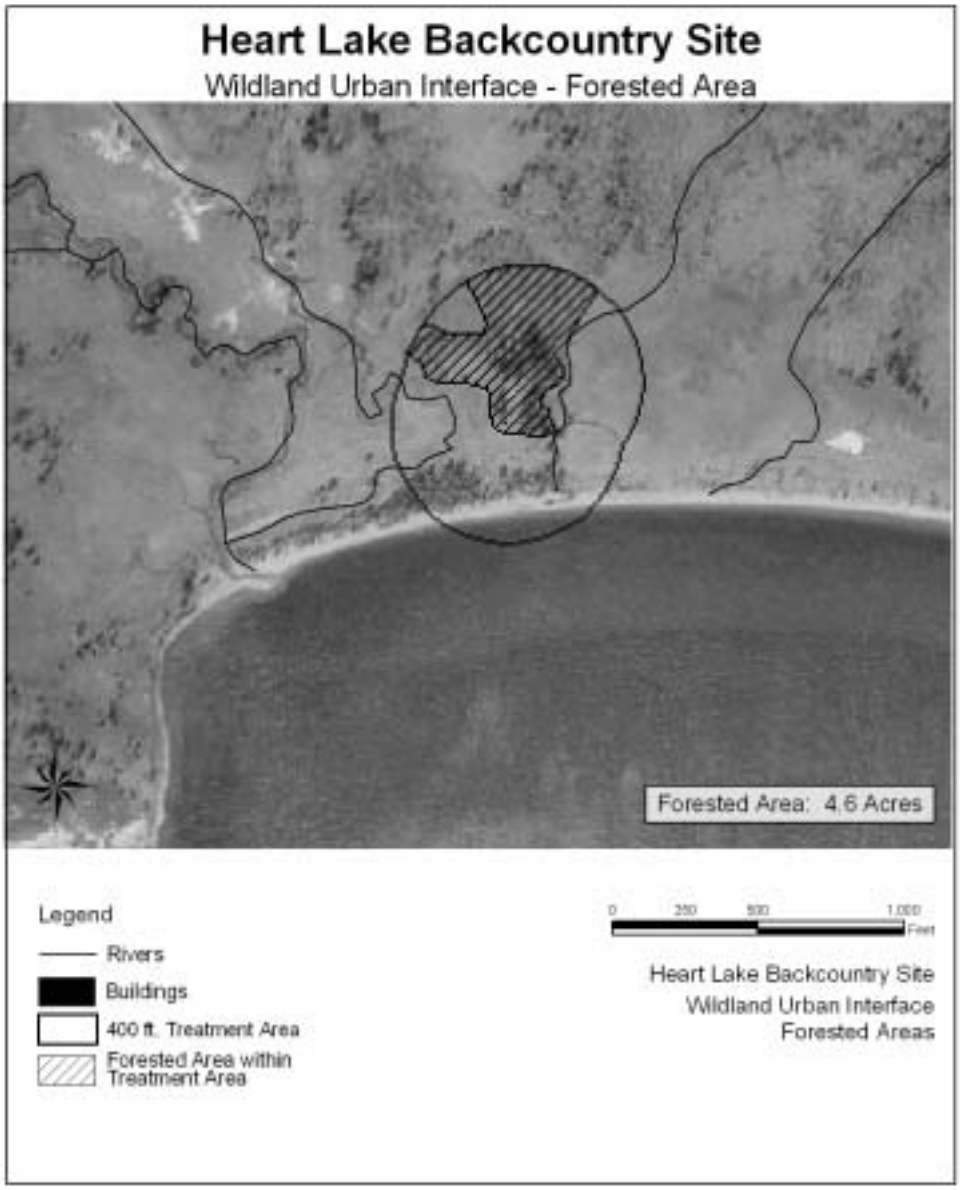
250
500
1,000
Feet
Fox Creek Backcountry Site
Wildland Urban Interface
Forested Areas


Harebell Backcountry Site
Wildland Urban Interface - Forested Areas
Forested Area: 14.7 Acres
200 0 200 400 600 Feet
Legend
Buildings
Perimeter (400 ft. buffer)
Rivers
Harebell Backcountry Site
Wildland Urban Interface
Forested Areas


Heart Lake Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 4.6 Acres
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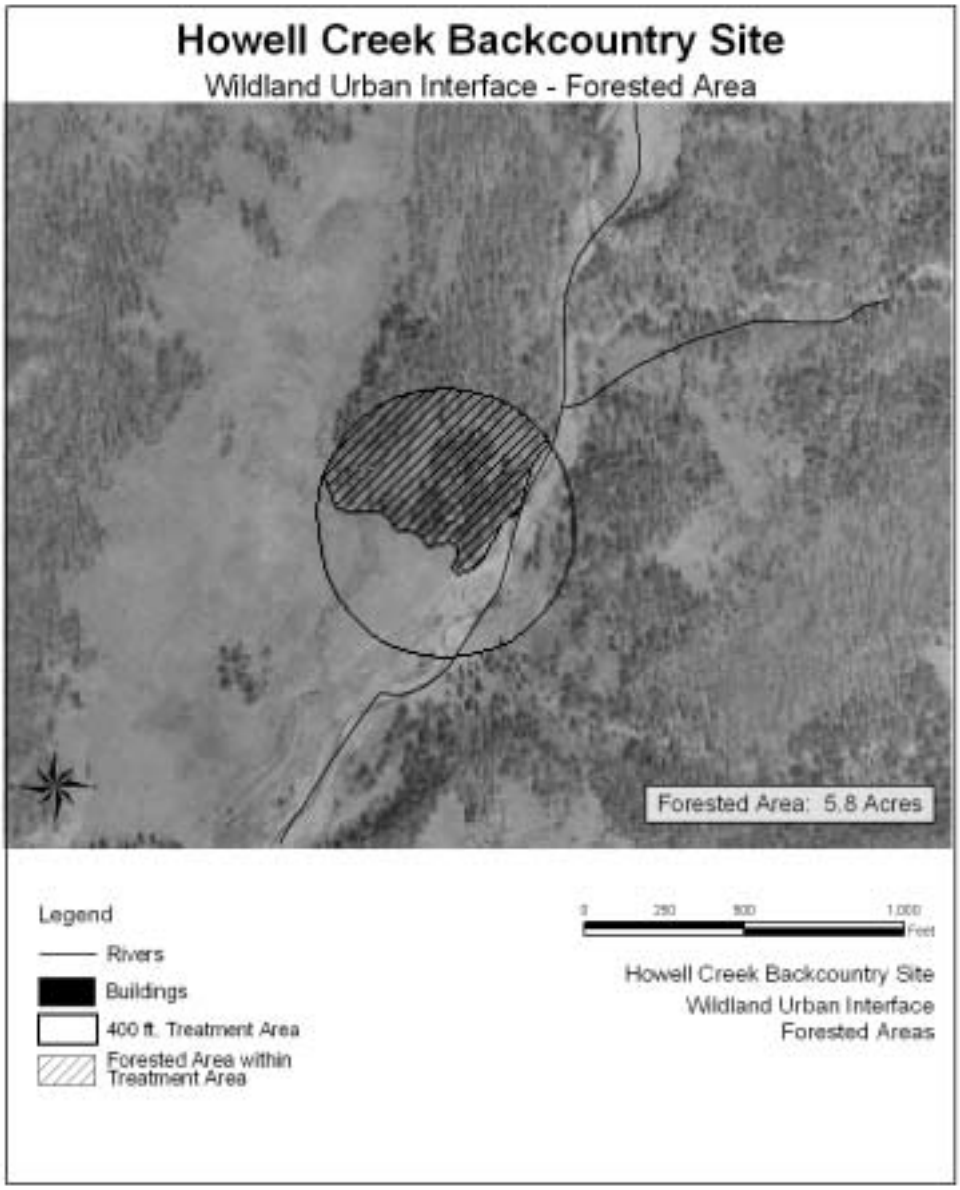
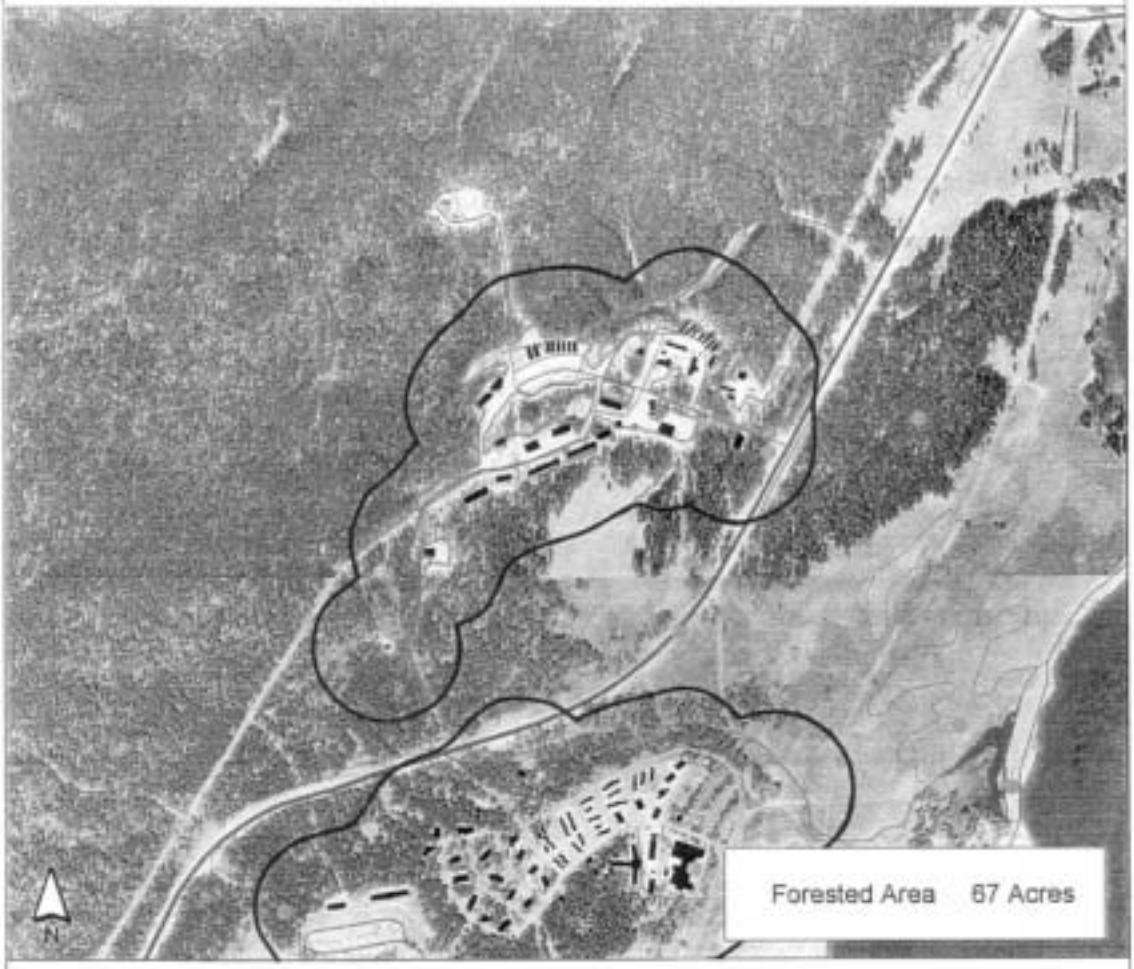
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Heart Lake Backcountry Site
Wildland Urban Interface
Forested Areas


Howell Creek Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 5.8 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Howell Creek Backcountry Site
Wildland Urban Interface
Forested Areas

Lake Utility Area

Wildland Urban Interface--Forested Areas



300 0 300 600 900 1200 Feet

1 : 9,600 1 inch = 800 feet

Buildings

Perimeter (400 ft buffer)

Perimeter Sub-units

Wetlands - NWI Areas

Lakes

Ponds and Marshes

Rivers

Wetlands - NWI Streams

Amphibian Record

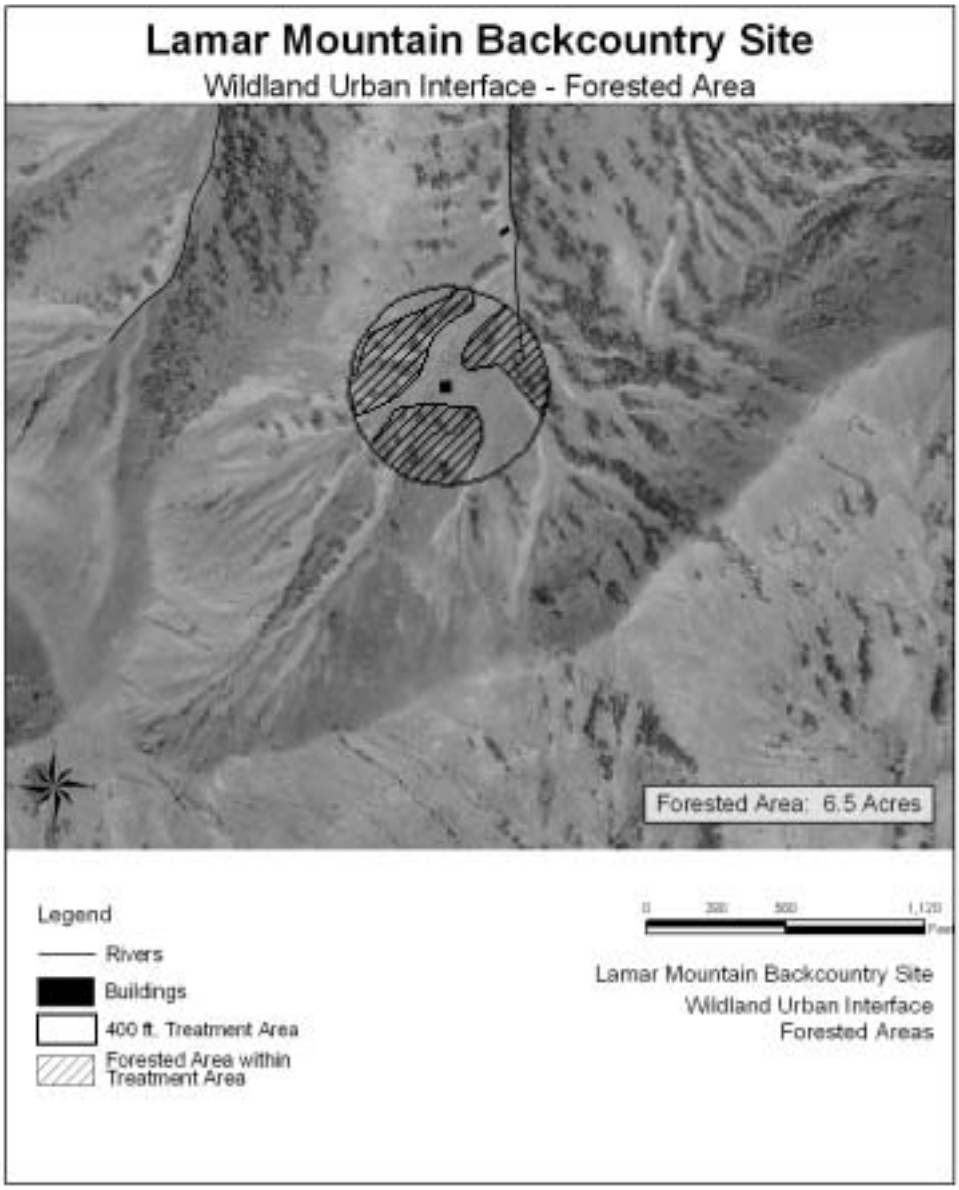
Roads

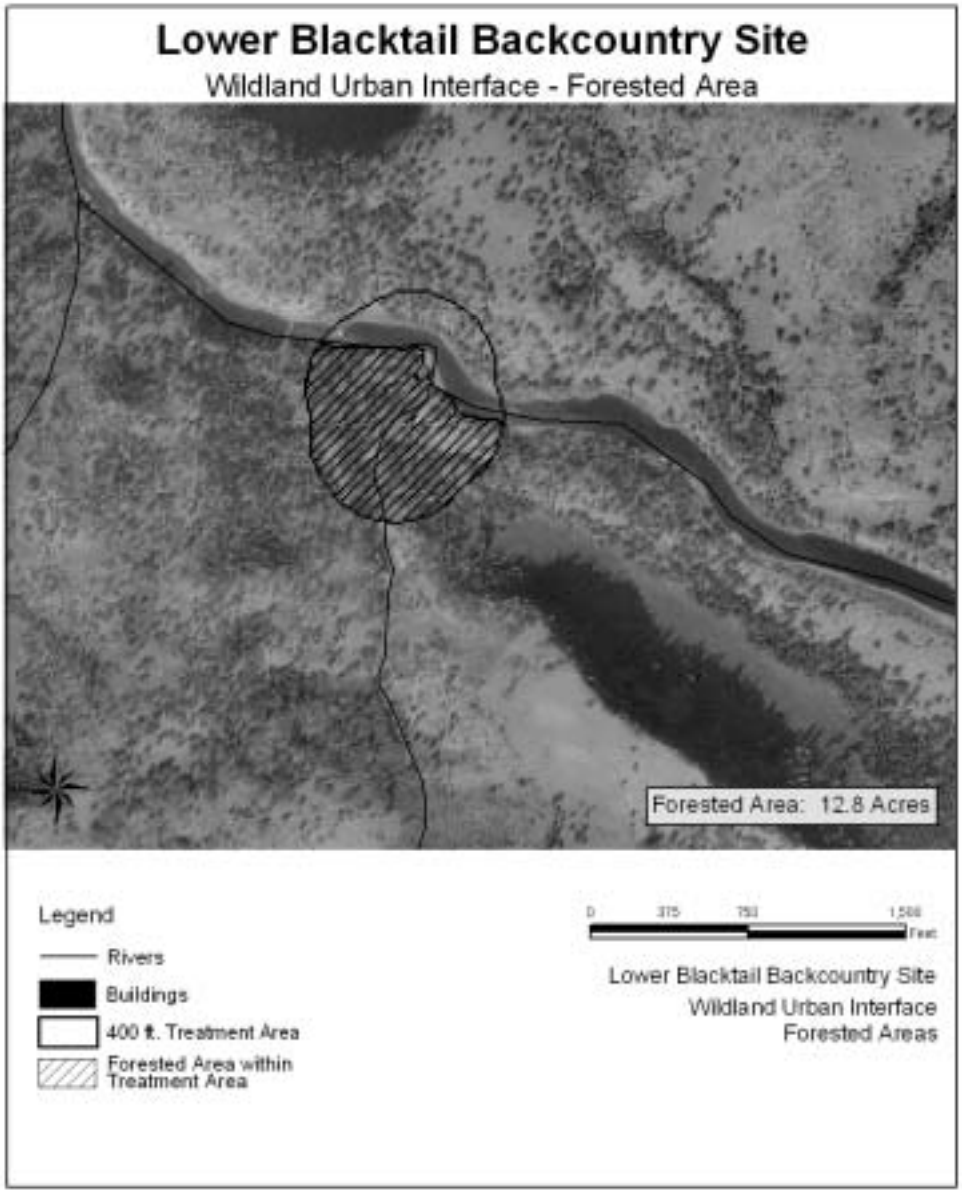
Principal Park Roads

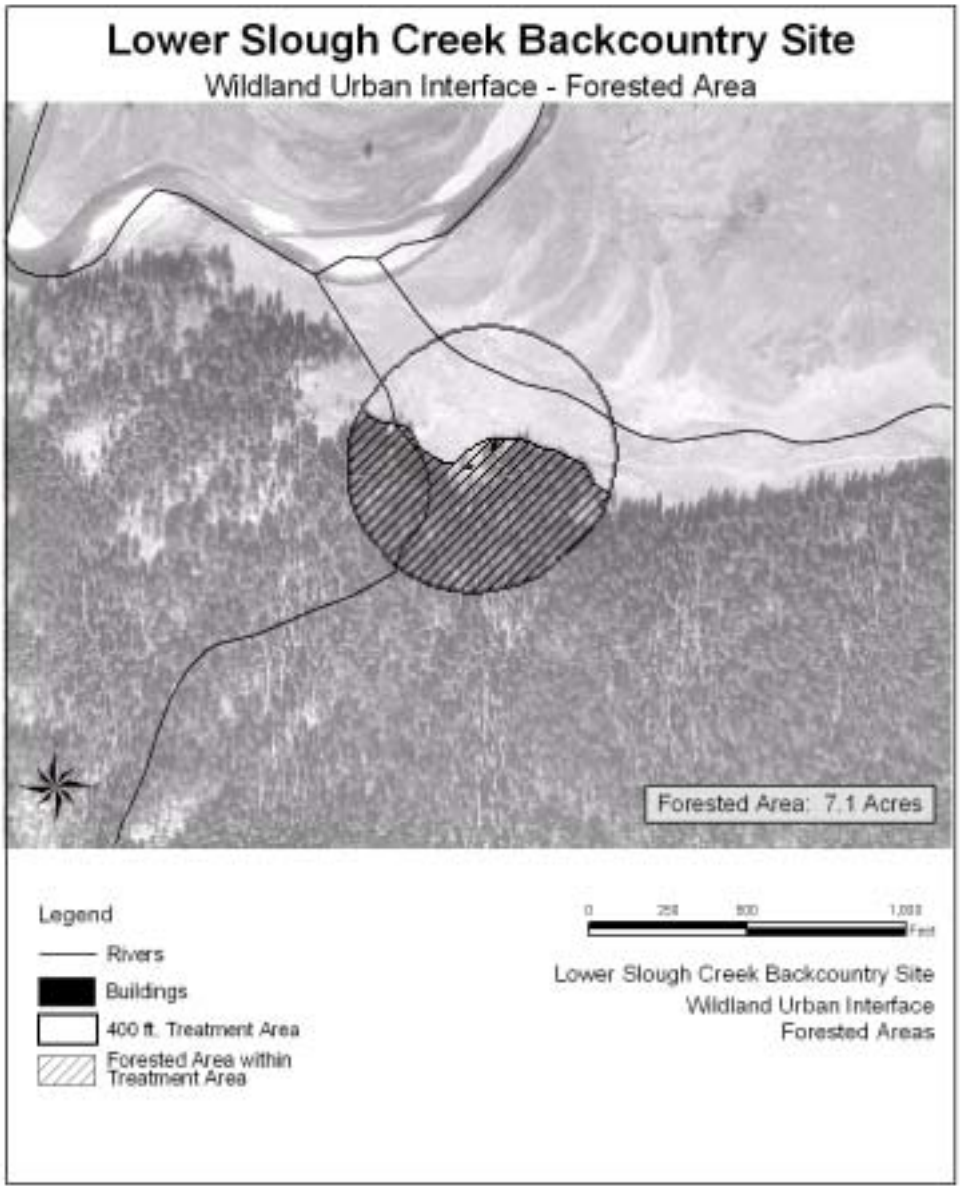
Special Purpose Park Roads

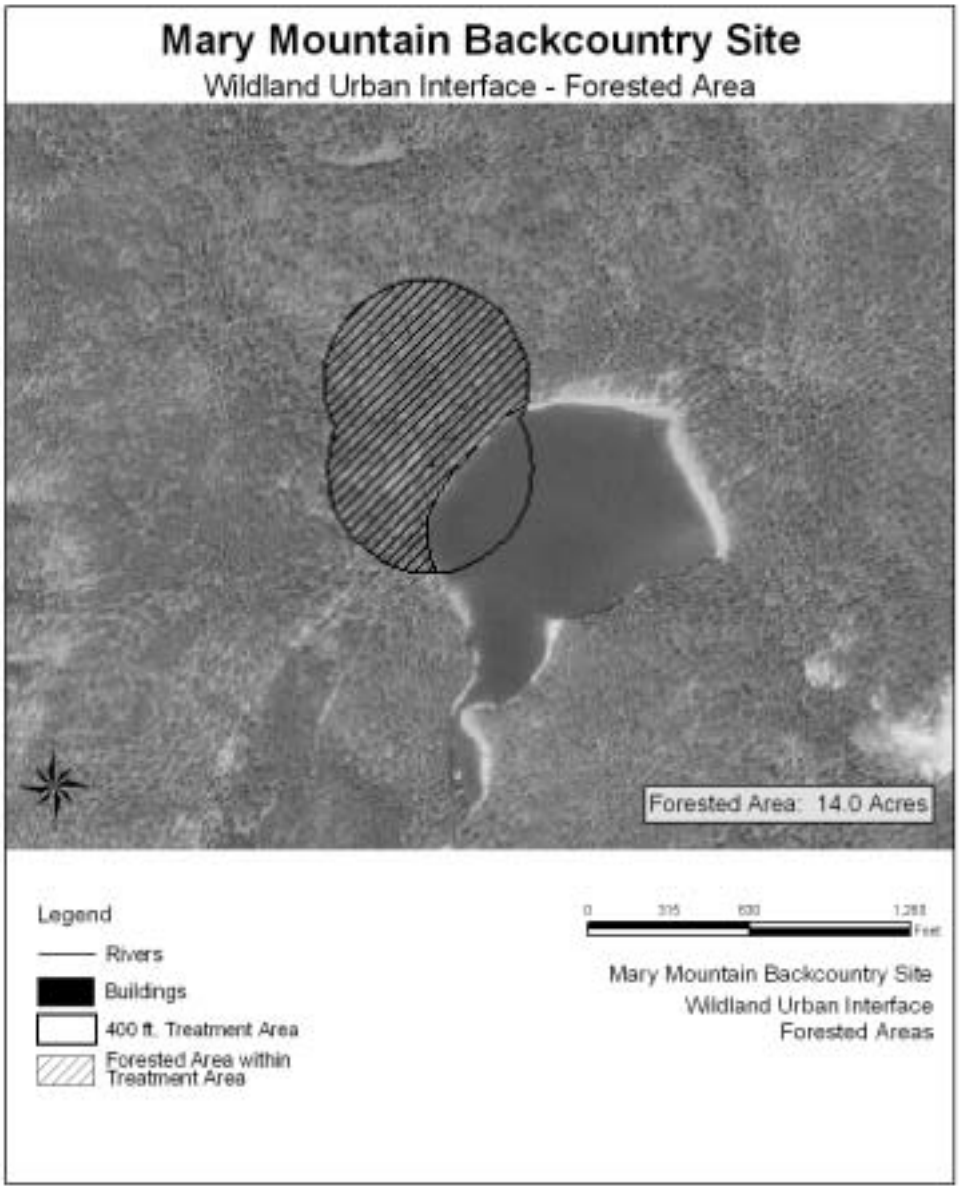
Restricted Roads

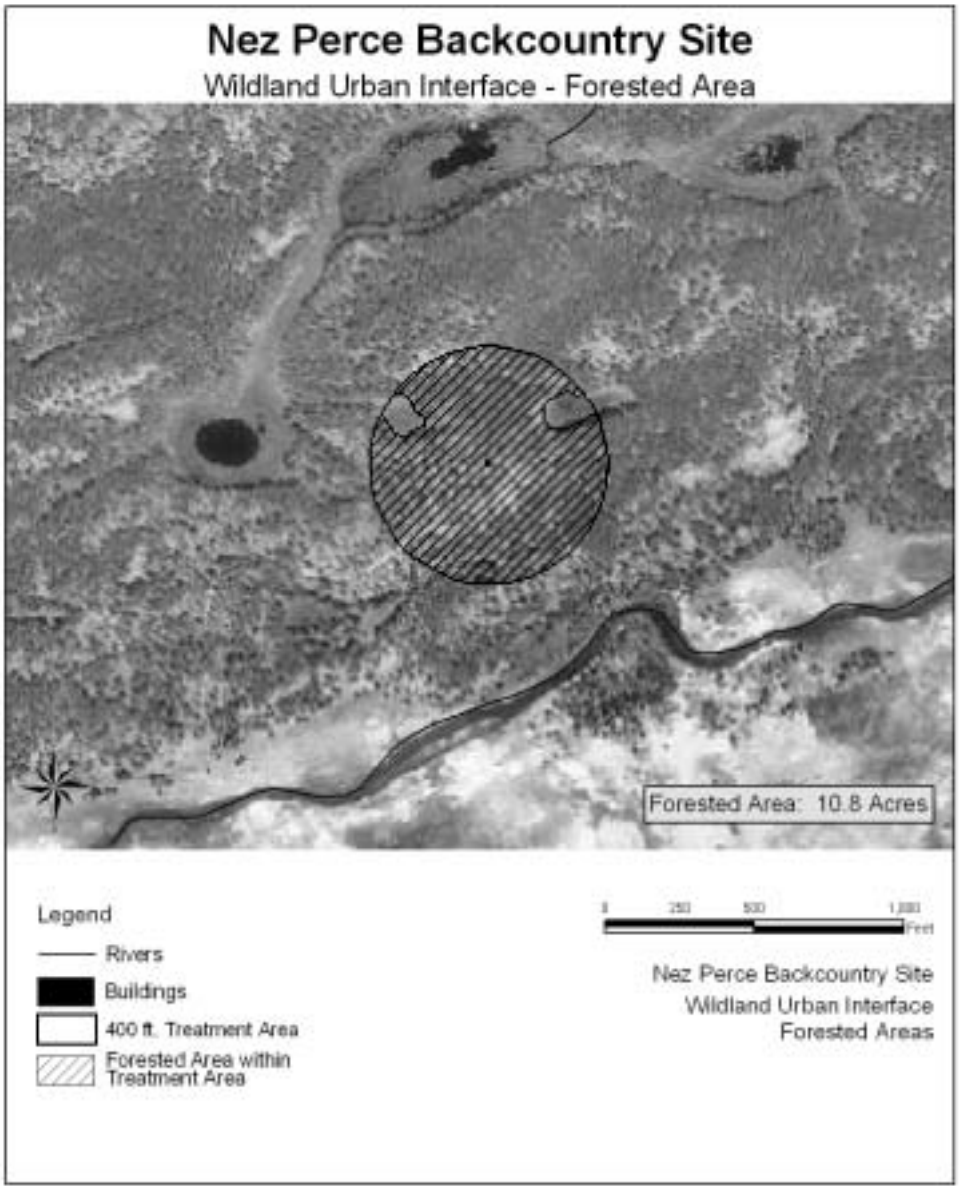
Lake Utility Area
Wildland Urban Interface
Forested Areas


Lamar Mountain Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 6.5 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
500
1,120
Lamar Mountain Backcountry Site
Wildland Urban Interface
Forested Areas


Lower Blacktail Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 12.8 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
375
750
1,500
Feet
Lower Blacktail Backcountry Site
Wildland Urban Interface
Forested Areas

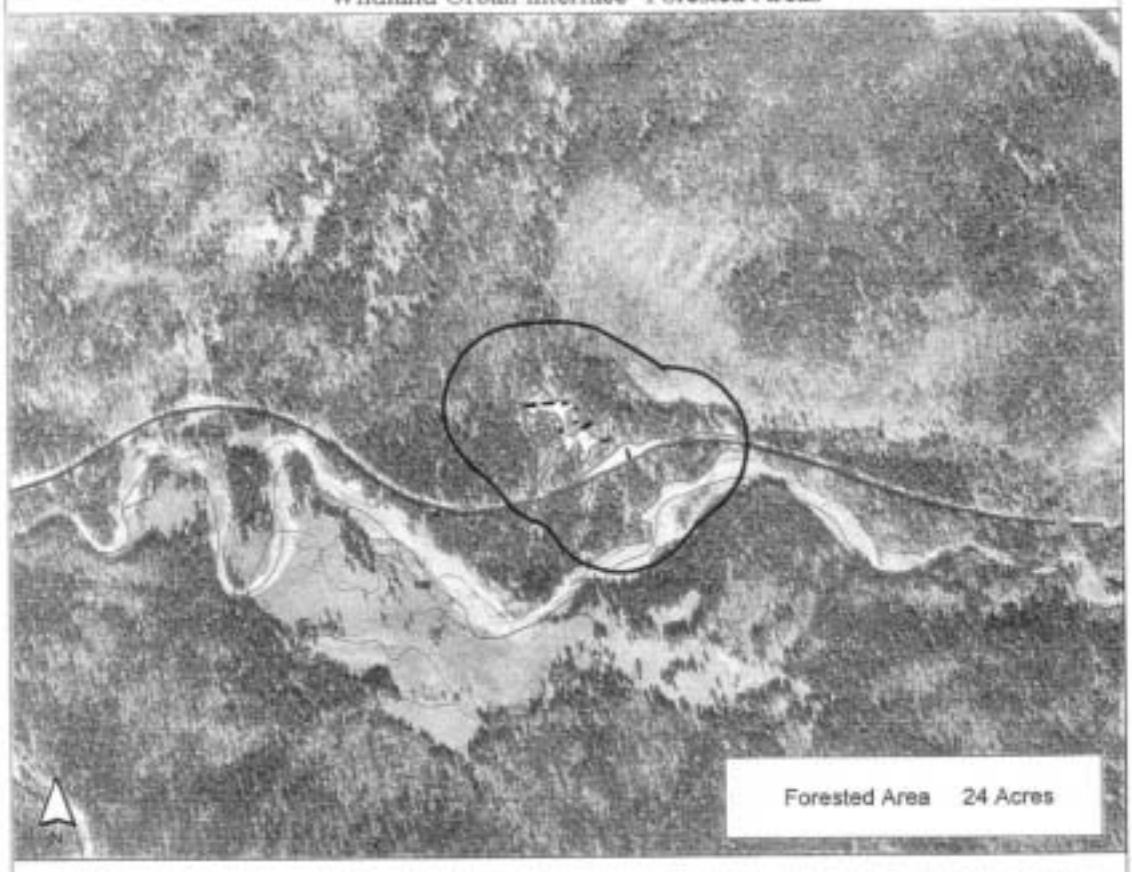

Lower Slough Creek Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 7.1 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Lower Slough Creek Backcountry Site
Wildland Urban Interface
Forested Areas


Mary Mountain Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 14.0 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
315
630
1,260
Feet
Mary Mountain Backcountry Site
Wildland Urban Interface
Forested Areas


Nez Perce Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 10.8 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Nez Perce Backcountry Site
Wildland Urban Interface
Forested Areas

Northeast Entrance Developed Area

Wildland Urban Interface–Forested Areas



Buildings

Perimeter (400 ft buffer)

Perimeter Sole-units

Wetlands - NWI Areas

Lakes

Ponds and Marshes

Rivers

Wetlands - NWI Streams

Amphibian Record

Roads

Principal Park Roads

Special Purpose Park Roads

Restricted Roads

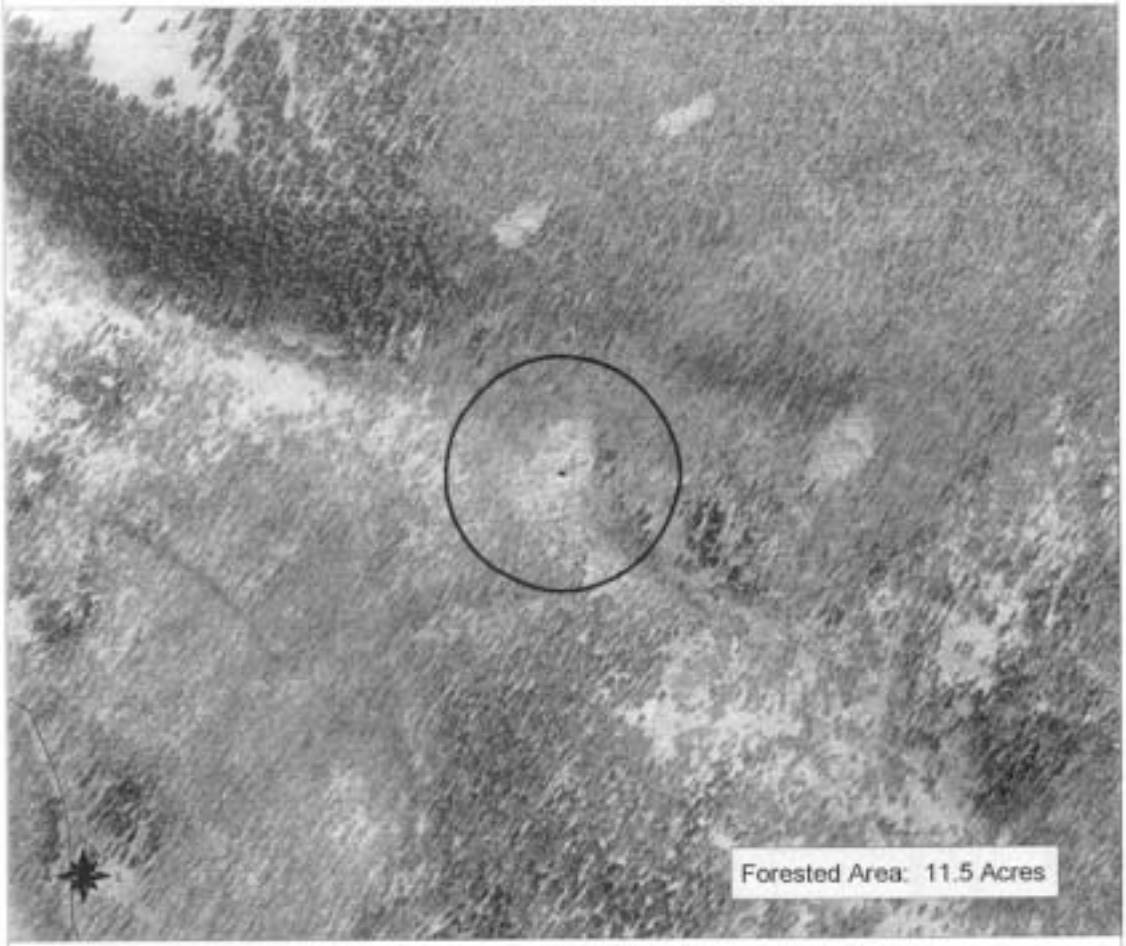
300 0 300 600 900 1200 Feet

1 : 9,600 1 inch = 800 feet

Northeast Entrance Developed Area
Wildland Urban Interface
Forested Areas

Observation Peak Backcountry Site

Wildland Urban Interface - Forested Areas



200 0 200 400 600 Feet

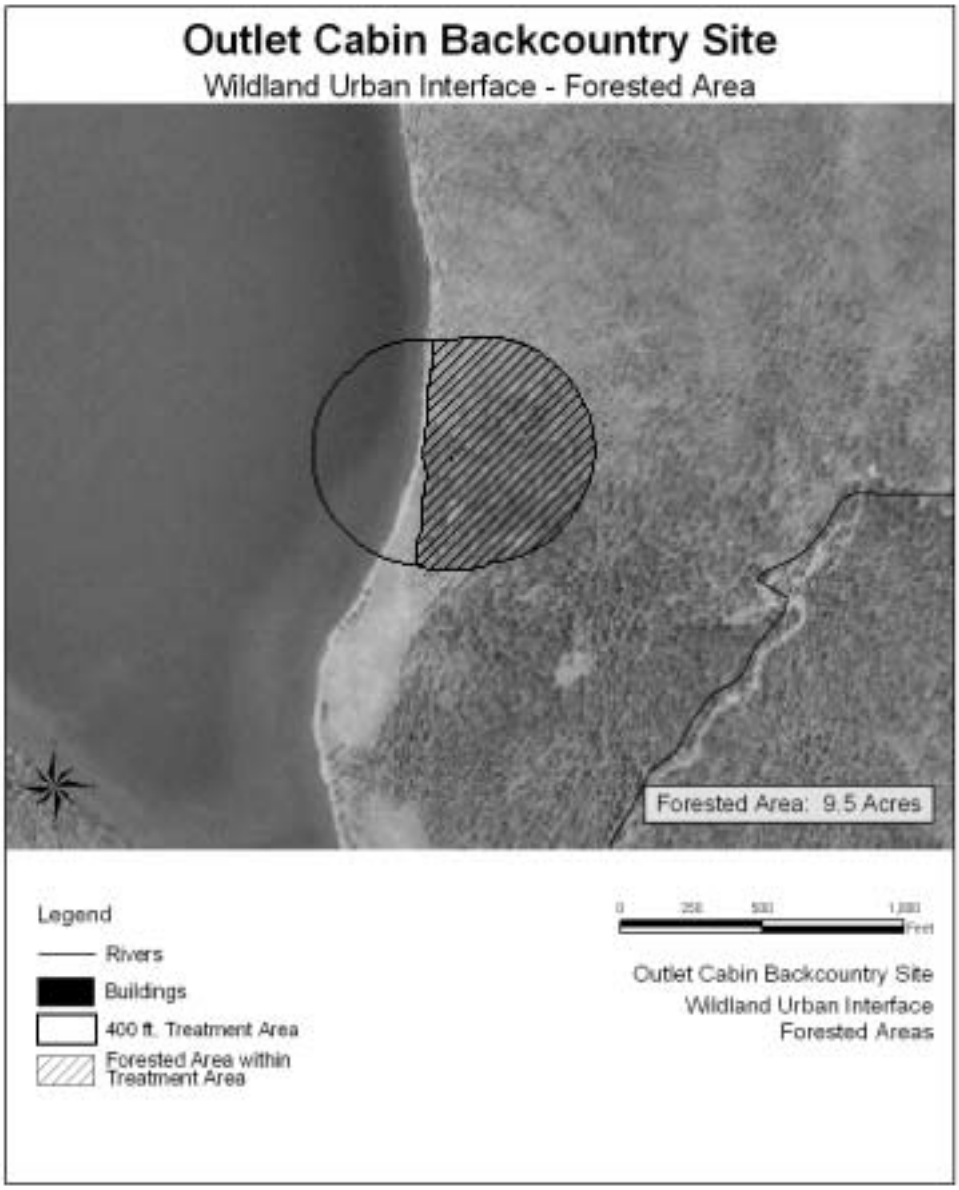
Legend

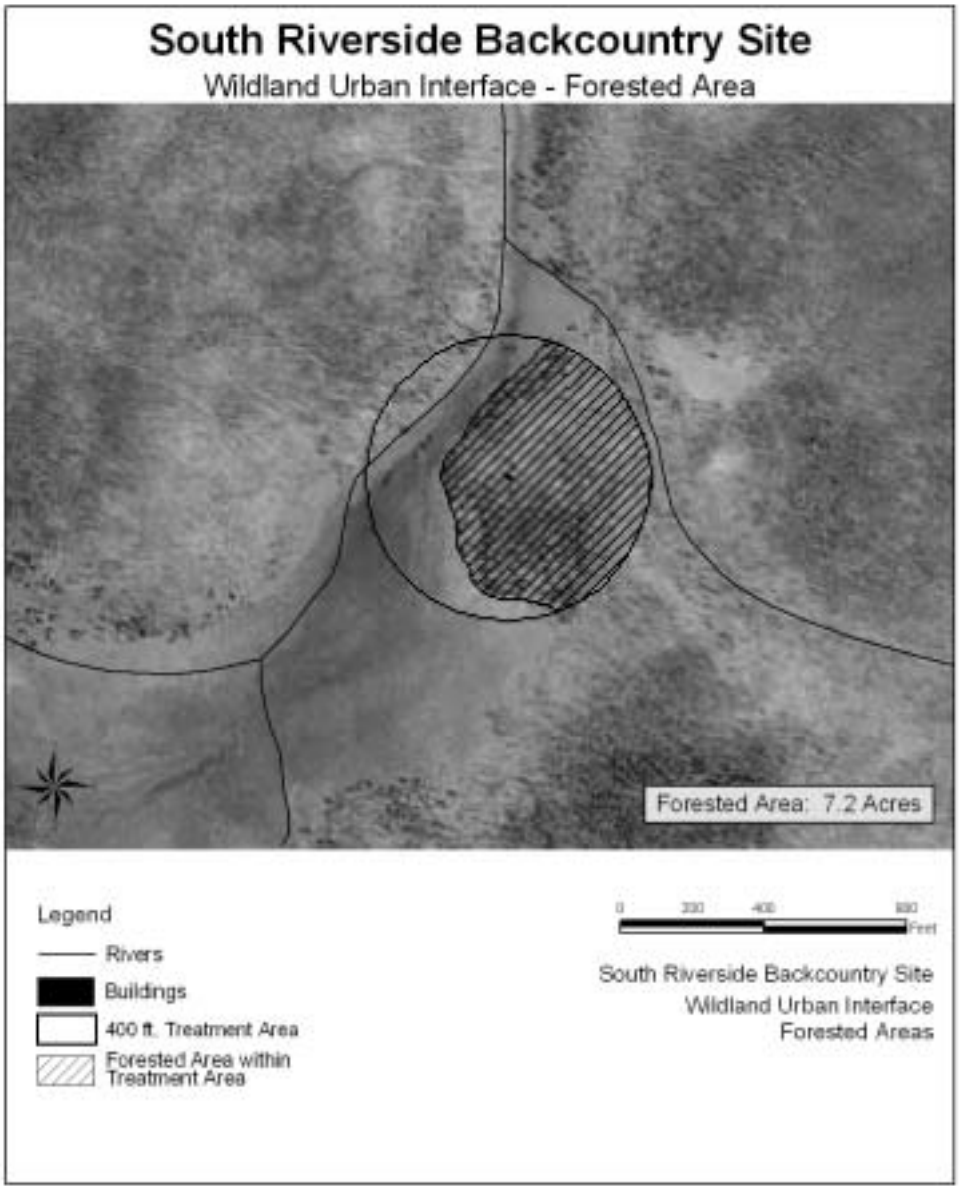
Buildings

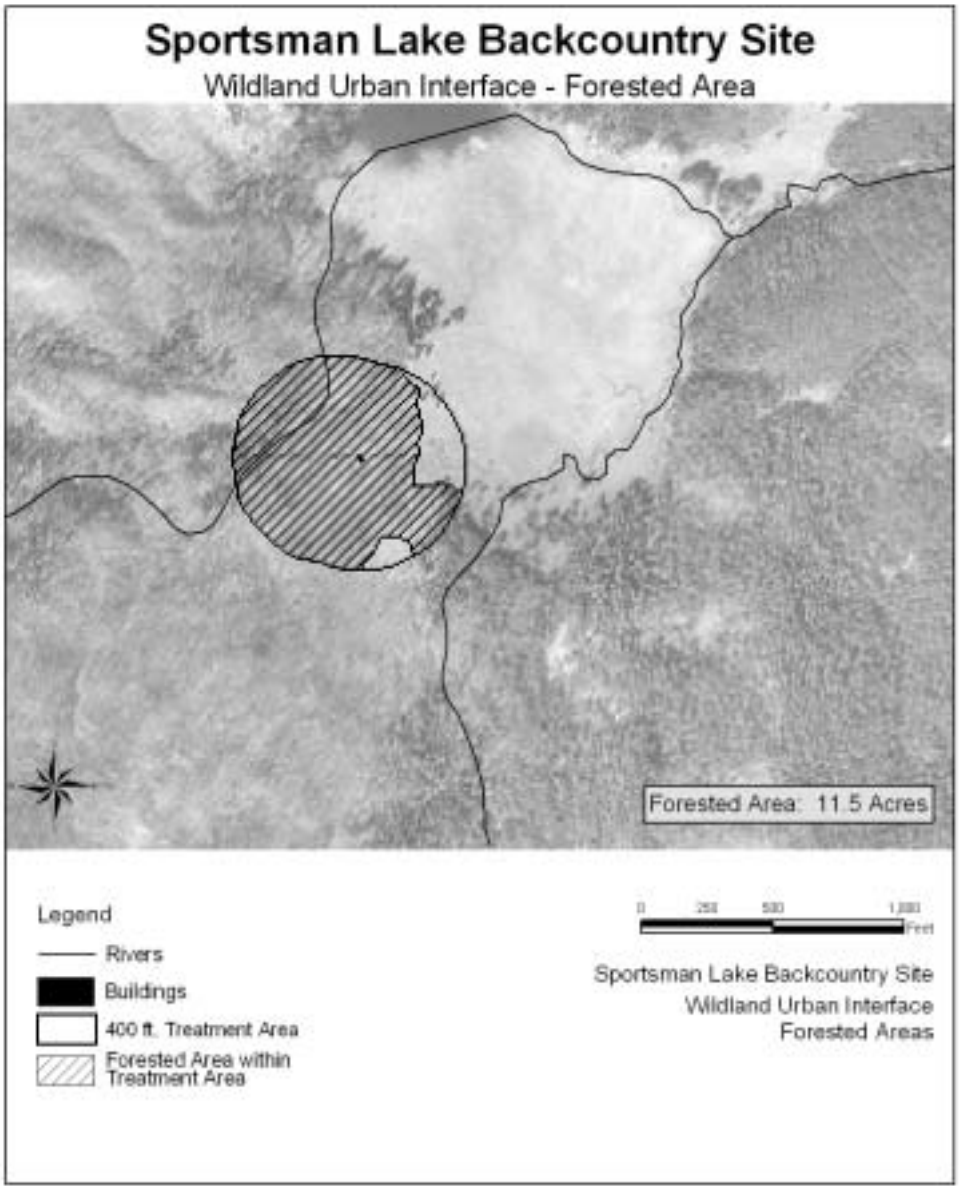
Perimeter (400 ft. buffer)

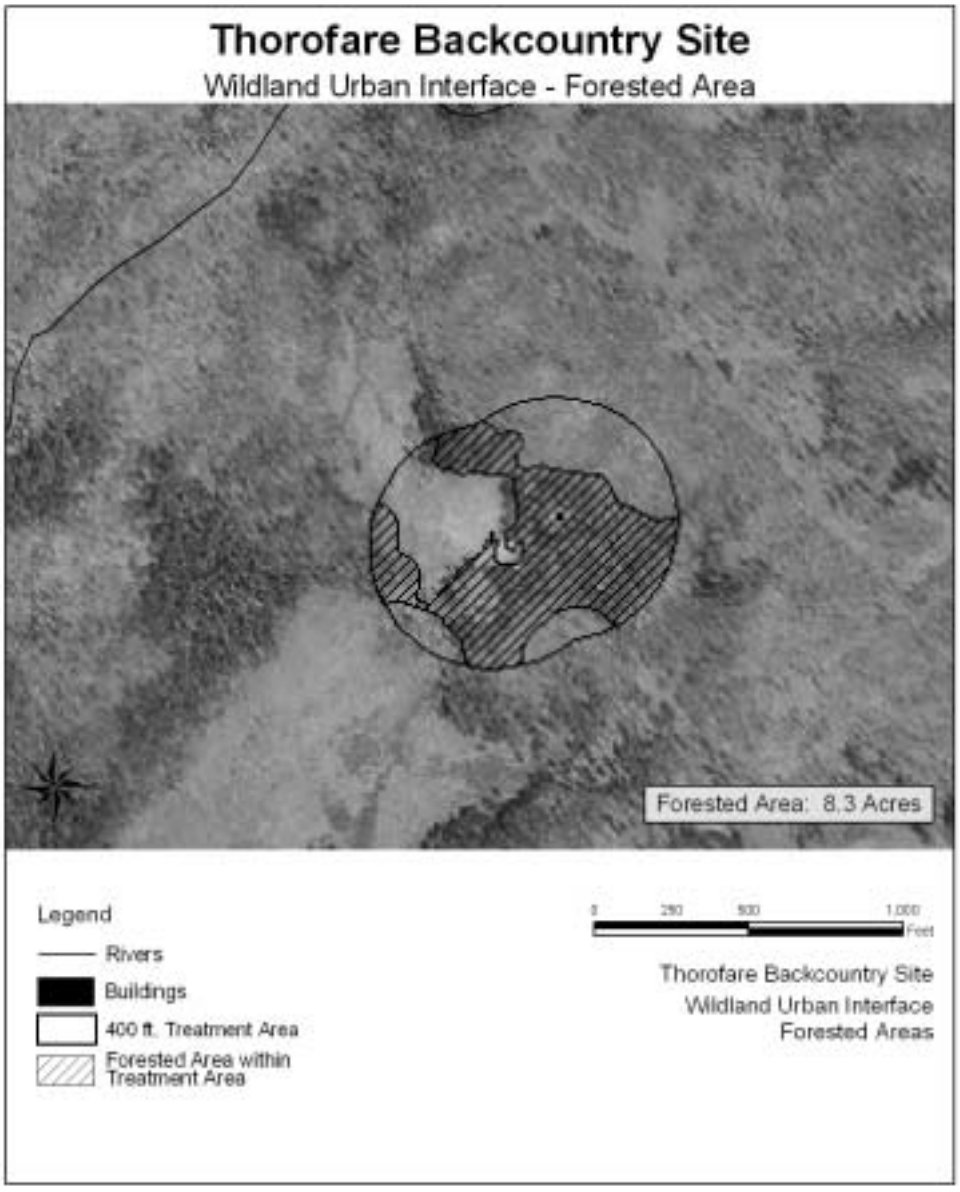
Rivers

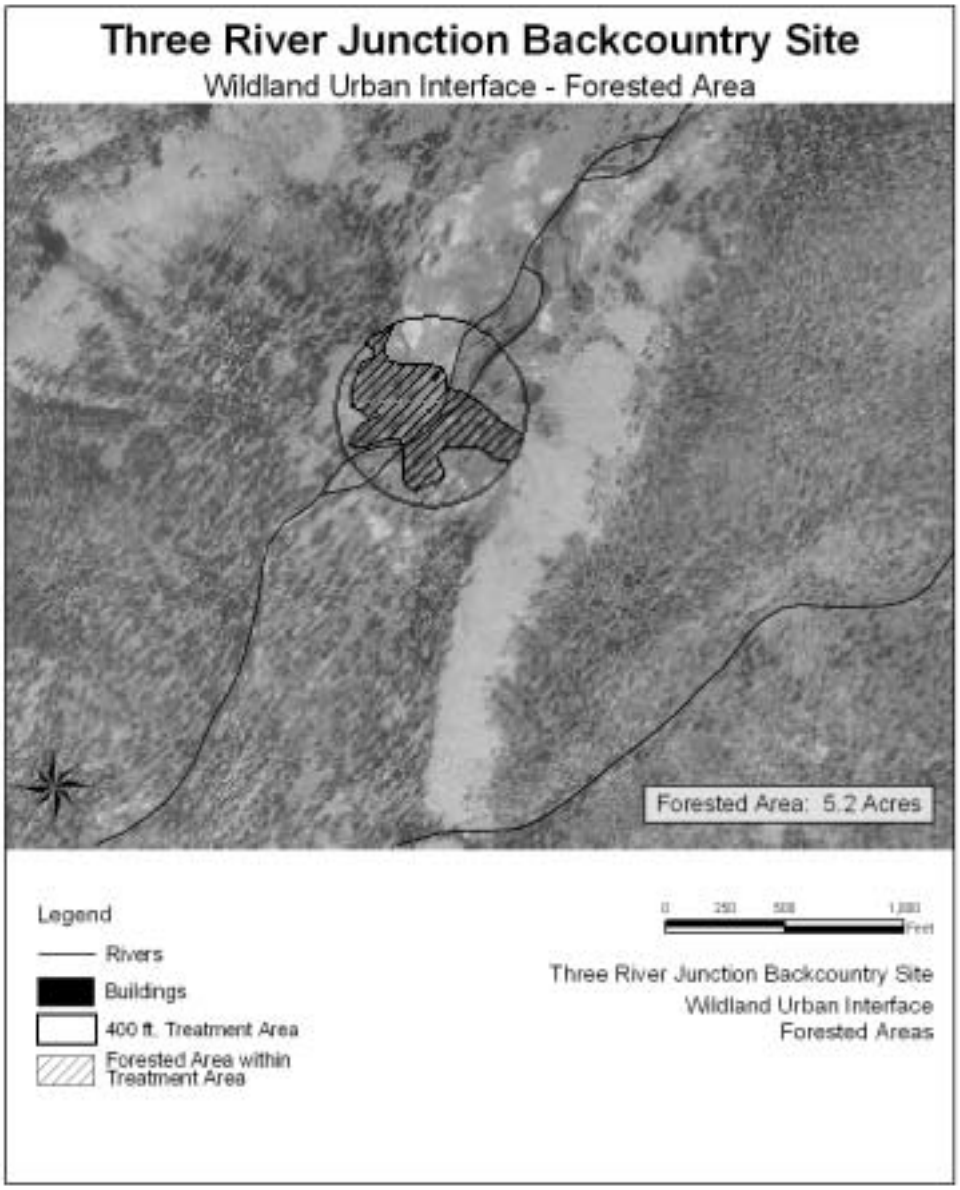
Observation Peak Backcountry Site
Wildland Urban Interface
Forested Areas

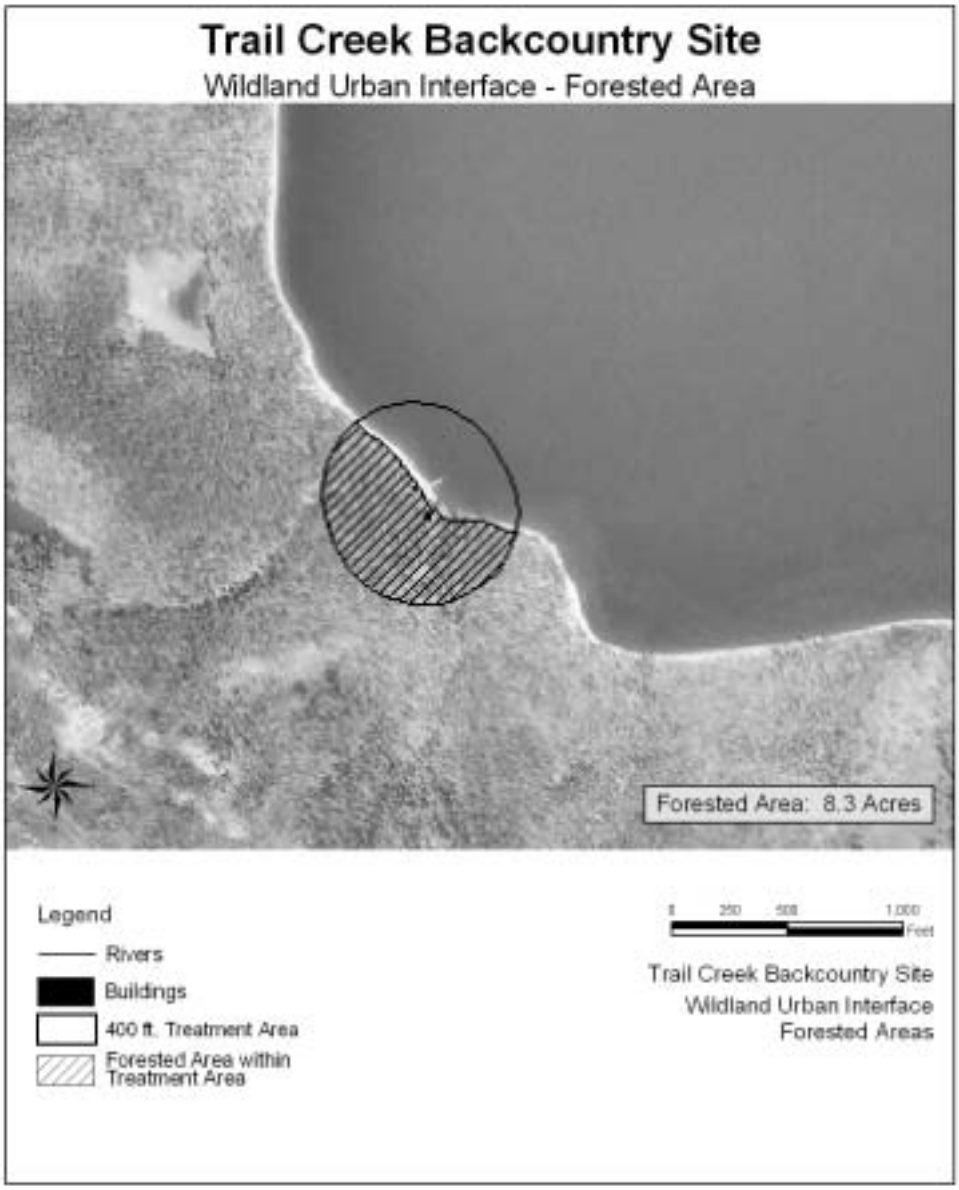

Outlet Cabin Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 9.5 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
Feet
Outlet Cabin Backcountry Site
Wildland Urban Interface
Forested Areas

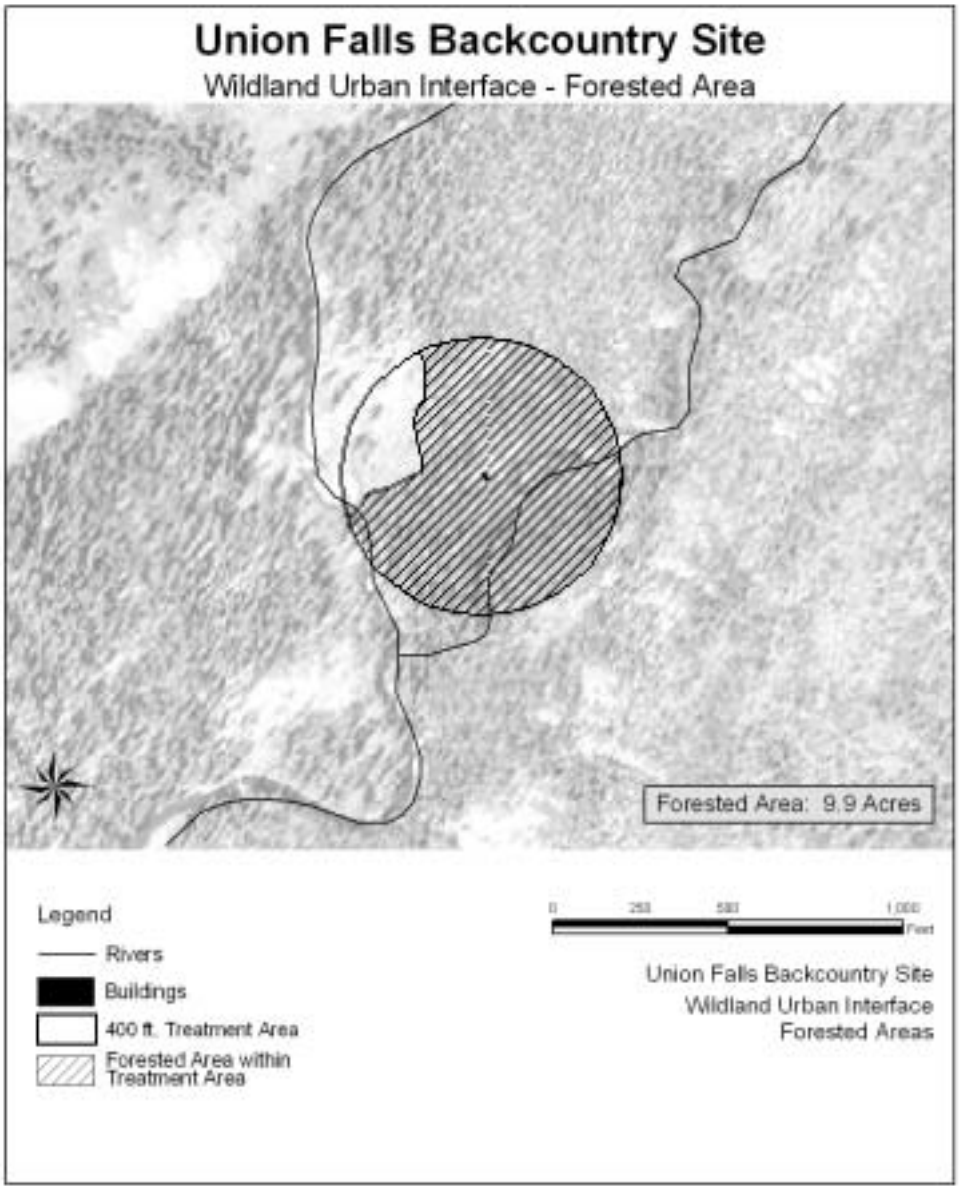

South Riverside Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 7.2 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
200
400
800
Feet
South Riverside Backcountry Site
Wildland Urban Interface
Forested Areas

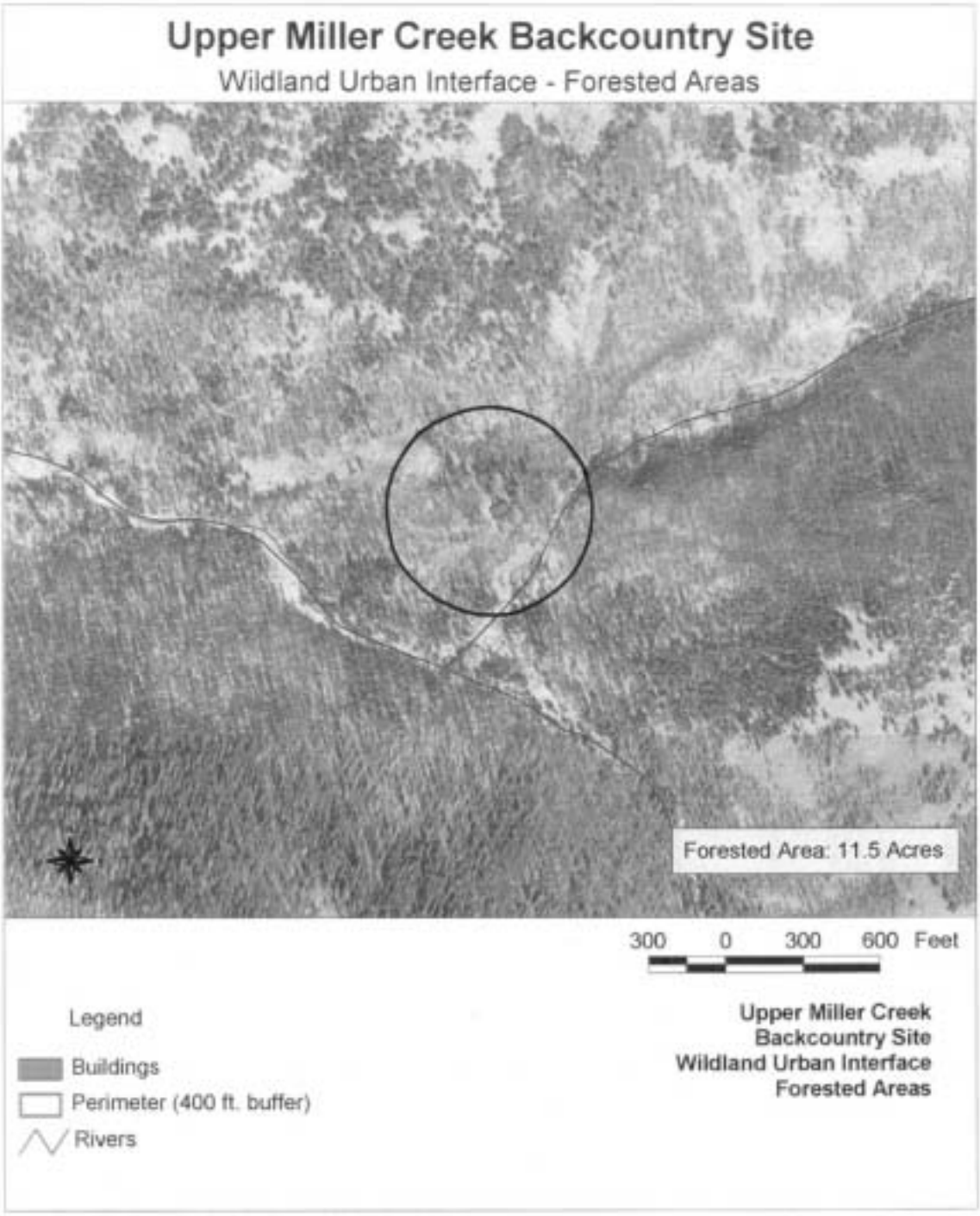

Sportsman Lake Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 11.5 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Sportsman Lake Backcountry Site
Wildland Urban Interface
Forested Areas

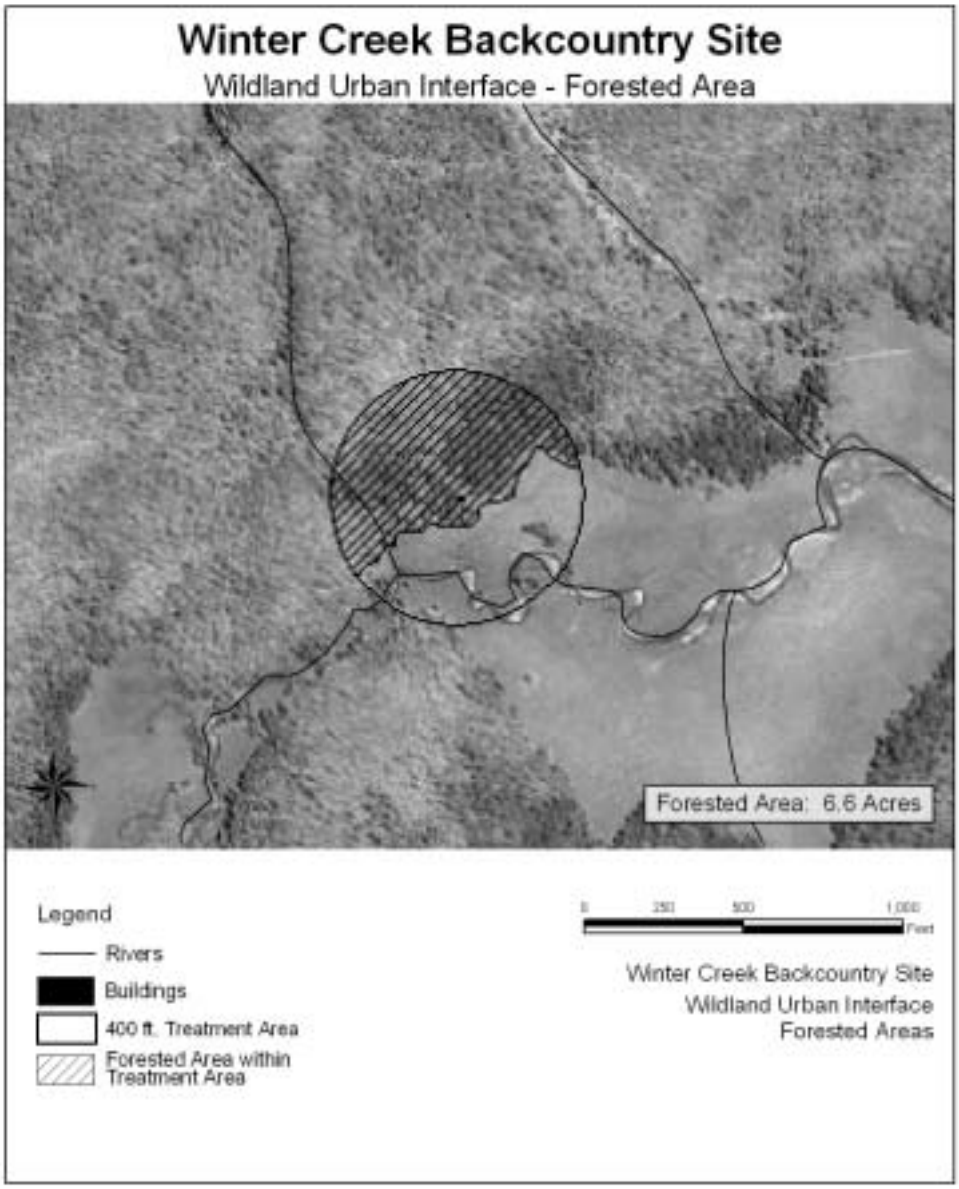

Thorofare Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 8.3 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Thorofare Backcountry Site
Wildland Urban Interface
Forested Areas


Three River Junction Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 5.2 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
Three River Junction Backcountry Site
Wildland Urban Interface
Forested Areas


Trail Creek Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 8.3 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0 250 500 1,000
Feet
Trail Creek Backcountry Site
Wildland Urban Interface
Forested Areas


Union Falls Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 9.9 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Union Falls Backcountry Site
Wildland Urban Interface
Forested Areas


Upper Miller Creek Backcountry Site
Wildland Urban Interface - Forested Areas
Forested Area: 11.5 Acres
300 0 300 600 Feet
Legend
Buildings
Perimeter (400 ft. buffer)
Rivers
Upper Miller Creek
Backcountry Site
Wildland Urban Interface
Forested Areas


Winter Creek Backcountry Site
Wildland Urban Interface - Forested Area
Forested Area: 6.6 Acres
Legend
Rivers
Buildings
400 ft. Treatment Area
Forested Area within Treatment Area
0
250
500
1,000
Feet
Winter Creek Backcountry Site
Wildland Urban Interface
Forested Areas