Appendix I. Programmatic Biological Assessment for Informal Section 7 Consultation Under the Endangered Species Act of 1973.

D18(YELL)

FEB 2 2 2005

Mr. Brian T. Kelly
U.S. Fish and Wildlife Service
Ecological Services
4000 Morrie Avenue
Cheyenne, Wyoming 82001

Re: Request for Concurrence of "May Affect, Not Likely to Adversely Affect" Determinations under Section 7 of the Endangered Species Act for the federally threatened Canada lynx (*Lynx canadensis*), Grizzly bear (*Ursus arctos horribilis*), Grey wolf (*Canis lupus*), and Bald eagle (*Haliaeetus leucocephalus*)

Dear Mr. Kelly:

Enclosed is a programmatic biological assessment (PBA) in submission for informal Section 7 consultation under the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.). The National Park Service (NPS) seeks your concurrence for "may affect, not likely to adversely affect" determinations for the federally threatened Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos horribilis*), gray wolf (*Canis lupus*), and bald eagle (*Haliaeetus leucocephalus*) from the 2004 Update of the 1992 Yellowstone National Park Wildland Fire Management Plan (1992 FMP). The 2004 Update is required by the Department of Interior for Yellowstone to continue implementation of its wildland fire management program.

The 1992 FMP and accompanying National Environmental Policy Act Environmental Assessment identified a preferred alternative for the park's wildland fire management program that included three strategies: *suppression*, *naturally-ignited prescribed natural fire*, and *management-ignited prescribed fire*. These terms have been replaced by *wildland fire suppression*, *wildland fire use*, and *prescribed fire*, and changes have been made in the decision-making process and the wildland fire management boundaries in accordance with interagency policies. An addendum to the 1992 FMP for the park's non-fire management program (i.e., fuels thinning) was completed in 2001 and is a component of the 2004 Update.

Informal Section 7 consultation on the 1992 FMP was completed with the U.S. Fish and Wildlife Service (FWS) in 1992. The FWS concurred that the proposed action would be beneficial to the threatened grizzly bear and at that time, endangered, bald eagle. In addition, the FWS requested that prescribed fires in the future be reviewed for compliance with the Act.

Subsequent to the 1992 FMP, the bald eagle was downlisted to threatened in 1995, the gray wolf was successfully reintroduced into the park in 1995 and 1996 as a non-essential experimental population, and the Canada lynx was listed as threatened in 2000. This PBA analyzes the effects of wildland fire suppression, wildland fire use, and non-fire fuels management, including avoidance and minimization measures, to the four threatened species in Yellowstone. Although the prescribed fire program is a component of the 2004 Update, Section 7 consultation under the Act will be conducted separately for prescribed fire projects in the future. Therefore, this PBA does not include analyses or a determination of effects to listed species from prescribed fire.

We look forward to receiving your concurrence letter within the 30-day timeline for informal Section 7 consultation or earlier if possible. The concurrence letter may be faxed to Julie York at (307) 344-2626. If you require clarification on the PBA or are aware that you will be unable to complete the concurrence letter within the 30-day timeline, please contact Kerry Murphy at (307) 739-3321, or Julie York at (307) 344-2016.

Sincerely,

/s/

Suzanne Lewis
Superintendent

Enclosure: 1

cc:
Ann Bellchman, FWS, Cody, Wyoming, w/enc.

National Park Service
U.S. Department of the Interior

Yellowstone National Park

2004 Update of the 1992 Fire Management Plan

Programmatic Biological Assessment

January 31, 2005

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I. INTRODUCTION

The purpose of this programmatic biological assessment (PBA) is to determine whether the effects of implementing the 2004 Update of the National Park Service (NPS) Yellowstone National Park 1992 Wildland Fire Management Plan (2004 Update) are likely to jeopardize the continued existence of any threatened, endangered or proposed species as required under Section 7(a)(2) of the Endangered Species Act (Act) (16 U.S.C. 1531 *et seq.*). Section 7 directs all federal agencies to use their existing authorities to conserve threatened and endangered species, and in consultation with the U.S. Fish and Wildlife Service (FWS), to ensure that their actions do not jeopardize listed species or adversely modify proposed or designated critical habitat. This PBA follows the standards established in the NPS 1916 Organic Act, NPS Management Policies (NPS 2001*a*), NPS Director's Order 18: Wildland Fire Management (DO- 18) (NPS 2003) and Reference Manual 18: Wildland and Prescribed Fire Management Policy (RM- 18) (NPS 1999*a*), and Yellowstone's Resource Management Plan (RMP) (NPS 1998).

The 1992 Wildland Fire Management Plan (FMP) and accompanying National Environmental Policy Act (NEPA) Environmental Assessment and Finding of No Significant Impact (Appendix 1) identified a preferred alternative for wildland fire management that included three strategies: *suppression*, *naturally- ignited prescribed natural fire*, and *management- ignited prescribed fire* in three delineated zones. The new terminology for these strategies are *wildland fire suppression*, *wildland fire use (WFU)*, and *prescribed fire*. Guidelines for the non- fire fuels management program were developed as an addendum to the 1992 FMP (NPS 2001*b*).

Human casualties and escaped prescribed fires during the 1994 and 2000 fire seasons in the West resulted in regional and federal recommendations for improvements in human safety, interagency coordination, and achievement of resource management objectives. An update of the 1992 FMP is now required by the Department of Interior for Yellowstone National Park (Yellowstone or park) to continue with its wildland fire management program in accordance with the 1995 and 2001 Federal Fire Wildland Fire Policy Review and Updates (USDA/USDI 1995, USDA/USDI 2001), the Wildland and Prescribed Fire Management Implementation Procedures Reference Guide (Implementation Guide) (Zimmerman and Bunnell 1998), NPS 2001 Management Policies, 2004 Interagency Standards and Fire Aviation Operations Manual NFES 2724 (Red Book) (National Interagency Fire Center 2004), and NPS guidelines. The 2004 Update includes procedures for wildland fire suppression, WFU, non- fire fuels management, and prescribed fire.

This PBA analyzes the effects of suppression, WFU, and non- fire fuels management (including avoidance and minimization measures) procedures in the 2004 Update to four federally threatened species in Yellowstone. Although prescribed fires may be implemented within the next 10 years in critical boundary areas at Northeast Entrance and East Entrance, the scope and details are not available at this time to assess effects to the species considered. Compliance with NEPA and Section 7 consultation with FWS under the Act will be conducted separately for any future prescribed fire. Therefore,

this PBA does not include an analysis of effects to listed species from prescribed fire. The project area for this PBA is the entire park.

The park will follow FWS Section 7 Emergency Consultation procedures for determining adverse effects to listed species from wildland fire suppression. Appendix 2 is a June 16, 2004, memorandum from FWS to federal agencies that details Section7 Emergency Consultation procedures for wildland fire suppression. This memorandum also includes an attachment of recommended conservation measures from FWS to avoid and minimize effects to federally listed species during wildland fire suppression activities, which Yellowstone will follow.

The park will submit an annual report to the FWS that documents effects to listed species and their habitat from WFU fires and non- fire fuels management during each fire season and any adverse effects determined under Section 7 Emergency Consultations. This annual report will also identify any areas that may warrant suppression of a WFU fire or avoidance of suppression activities for protection of a federally listed species.

Because the changes in the 2004 Update are considered to be a minor amendment to a previously approved plan (the 1992 FMP), Yellowstone will use a categorical exclusion for compliance with NEPA. The implementation procedures outlined in the 2004 Update and associated NEPA compliance are anticipated to be valid for the next ten to twenty years, provided there are no significant changes in fire management policy, research does not warrant a significant change in fire management strategies, and there are no significant changes in park resource objectives.

II. SPECIES CONSIDERED

The species considered in this PBA are based on the species list issued from the Cheyenne, Wyoming, FWS Ecological Services Office to Yellowstone on March 19, 2004.

Threatened, Endangered, and Proposed Species

Canada lynx (*Lynx canadensis*)	Threatened
Grizzly bear (*Ursus arctos horribilis*)	Threatened
Gray wolf (*Canis lupus*)	Threatened, non- essential experimental, Western Distinct Population Segment
Bald eagle (*Haliaeetus leucocephalus*)	Threatened

Critical Habitat

Critical habitat has not been proposed or designated for any of the species considered.

III. CONSULTATION-TO-DATE

Informal Section 7 consultation on the 1992 FMP was completed with the FWS in 1992. The FWS concurred with Yellowstone's determination that the overall effects from the proposed action would be beneficial to the threatened grizzly bear and at that time, endangered, bald eagle (see Appendix 1). In addition, the FWS requested that prescribed burns in the future be reviewed for compliance with the Act.

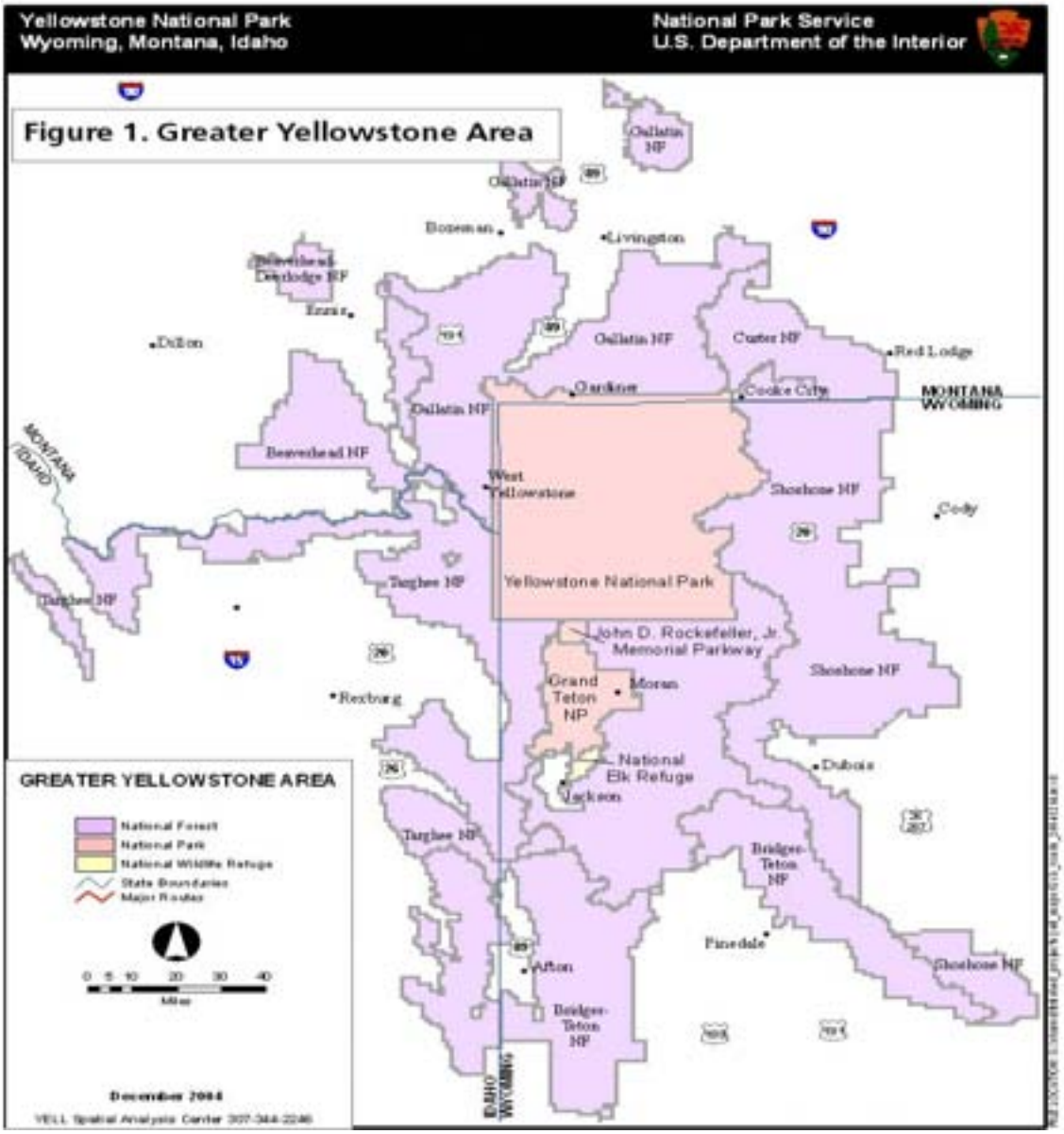
Subsequent to the 1992 FMP, the bald eagle was downlisted to threatened in 1995, the gray wolf was successfully reintroduced into the park in 1995 and 1996 as a non-essential experimental population, and the Canada lynx was listed as threatened in 2000. The update of the 1992 FMP and potential effects to Canada lynx, grizzly bear, gray wolf, and bald eagle were presented at a Level I Northwest Wyoming Streamlining meeting on September 15, 2004, in Cody, Wyoming. Additional discussions were held in a conference call with FWS staff on September 28, 2004, and during a Level I Northwest Wyoming Streamlining meeting on November 9, 2004, in Lander, Wyoming.

The park's non- fire fuels management program is a component of the 2004 Update. Two previous and separate informal Section 7 consultations have been completed with FWS for non- fire fuels treatments within the wildland- urban interface (WUI) and at backcountry patrol cabins. These consultations are detailed in section 5.3. Eight additional WUI projects are proposed within the next 8 to 10 years under the 2004 Update and are included in this PBA and Section 7 consultation.

IV. WILDLAND FIRE AND VEGETATION IN YELLOWSTONE NATIONAL PARK

Yellowstone National Park encompasses 2,219,790 acres (3,472 square miles) and is located primarily in the northwestern corner of Wyoming (Teton and Park counties) with small areas extending into southwestern Montana (Park and Gallatin counties) and southeastern Idaho (Fremont county). Yellowstone is the core of the approximately 12 million acre Greater Yellowstone Area (GYA) (Figure 1), the largest and most nearly intact temperate ecosystem in the contiguous United States.

Natural fires that occurred over time in the Yellowstone ecosystem prior to the arrival of modern humans have had a substantial influence on plant community succession and the ecology of the Yellowstone environment (Romme and Despain 1989). Written fire records in the park date back to 1870, and significant fires are noted in early annual Superintendents' reports. Fire statistics from 1872 through 1899 are very sketchy with only large fires being reported. Record keeping improved somewhat in the early 20th century. From 1900 through 1929, approximately 374 fires burned 11,670 acres. Reliable fire statistics have been kept from 1930- 2004. During those years, 2,334 fires have burned 985,530 acres. Lightning- caused fires numbered 1,573, while 761 fires were human- caused. During the 1988 fire season, 45 fires within Yellowstone and five fires that originated outside the park burned an estimated 793,880 stand- replacement acres, based on mapping of satellite imagery taken in October 1988.



Several fire history studies have been conducted in Yellowstone: (1) mean fire interval of the northern range (Houston 1973); (2) fire and landscape diversity in the Little Firehole River watershed (Romme 1982); (3) subalpine plateau in the southcentral area of the park (Romme and Despain 1989); and (4) fire history on andesitic soils in the northeast portion of the park (Barrett 1994).

Houston's study (1973) occurred on the edge of the lower elevation sagebrush steppe of the park's northern range. This analysis of 34 trees sampled with an average age of 322 years, indicated that the average mean interval between fires was 53- 96 years, with mean intervals for individual trees ranging from 36- 108 years. The mean adjusted fire interval for the study area was 20- 25 years, with eight to ten large fires burning significant acreage over the past 300 to 400 years. Barrett (1994) found a comparable 30- year mean

interval in low elevation Douglas fir communities adjacent to sagebrush/grasslands of the northern range. Fire suppression efforts, coupled with the lack of intentional ignitions often attributed to Native American burning, resulted in a relatively fire- free period from 1886- 1987 on the northern range. The largest fire on the northern range prior to 1988 burned approximately 460 acres.

Romme and Despain's (1989) study of 320,000 acres in Yellowstone's subalpine forests in the south- central area of the park showed fire frequencies of approximately 300 to 400 years. This study also reported that less than 10 percent of the watershed had burned in the previous 350 years; most of the study area was an even- aged stand that had last burned between 1690 and 1740. Barrett (1994), on the other hand, found a 200- year mean fire return interval in lodgepole pine forests underlain by volcanic andesitic soils–nearly half the length found on the less productive rhyolitic soils. These studies suggests that a principal reason for the differences between the fire frequency estimates is fuel accumulation, as influenced by climate and productivity of the underlying soils types.

Anthropogenic fire suppression in Yellowstone over the last 60 years has had little effect on fire frequency and severity (Romme 1982, Turner et al. 2003), with the exception of the northern range. Fire suppression efforts since 1886 may have only postponed the fires of 1988 by a few decades (Romme and Despain 1989). In terms of heat release, flame height, and rate of spread, the fires of 1898 were probably similar to the fires that burned a significant percentage of the subalpine forests in Yellowstone around 1700. The 1988 fires were mainly the result of extremely warm, dry, and windy weather combined with an extensive forest cover of highly flammable fuels, primarily lodgepole pine (Romme and Despain 1989).

Fire Regime

The fire regime for the subalpine forests of interior Yellowstone is characterized by large scale (> 500 ha), but infrequent high- severity fires that are typically stand-replacing, punctuated by small canopy burns (average 60 ha, but most < 1 acre) during intervening years (Turner 2003; Schoennagel et al. 2004; P. Perkins, Yellowstone National Park Fire Management Officer, pers. comm.). Boreal and subalpine forests typically lack fine fuels that support fires at ground level, but have abundant ladder fuels that carry fire into the forest crowns (Schoennagel et al. 2004). Park records kept since 1930 indicate that 22 fires are ignited yearly by lightning on average. Of these, 83% never burn than 0.5 hectare (1.2 acres) in size and 94% never burn more than 40 hectares (100 acres). At a parkwide scale, uniform- age conifer regeneration may dominate the ensuing vegetation patterns for centuries (Agee 2000, Turner et al. 2003). At a local scale, large burns carry strong heterogeneity that contributes to diversity in vegetation composition and age- class diversity (Turner et al. 2003).

The typical fire season in Yellowstone is from June 15 until September 30, when adequate amounts of precipitation fall. Although live, fuel moisture content of all vegetation drops as the season progresses, dead fuel moisture remains high as a result of

frequent precipitation. The majority of fires in the park are started by lightning. Lightning- caused fire starts occur across this fuel moisture continuum, but fire activity is constrained by live and dead fuel moisture content. Depending on the timing and degree of departure from typical moisture conditions, fire spread ranges from short-duration crown runs to independent standing- replacing crown fire.

Exotic Vegetation and Wildland Fire

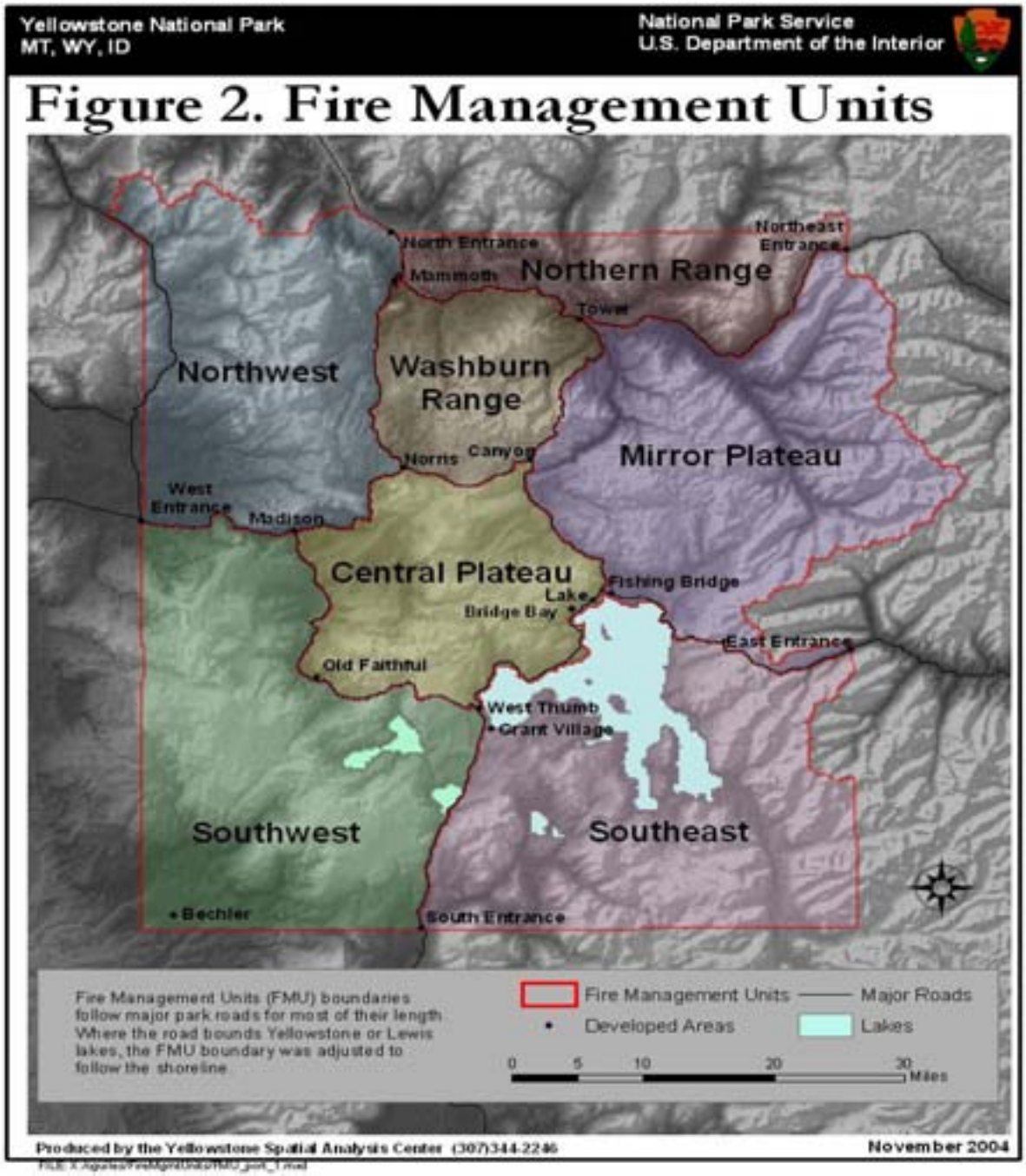
Over 185 exotic plant species have been documented in Yellowstone, representing about 15 percent of the vascular plant species in the park; thirty of these plants are classified as noxious in one of the three surrounding states (Idaho, Wyoming and Montana) (Whipple 2001). Most occurrences are limited to roads, park structures, campgrounds, and trails.

Wildland fires can facilitate exotic vegetation establishment depending on the fire severity, fire patch size, existing seedbank, adjacent seed sources, and weather. The seeds of exotics can also be transported on clothing, vehicles, and equipment used for wildland fire suppression activities, WFU monitoring, and non- fire fuels management. Fire management activities that scarify soils can increase the receptivity to establishment of exotic plants such as Canada thistle (*Cirsium arvense*) and spotted knapweed (*Centaurea maculosa*), by creating bare mineral soils and reducing competition with native species.

Research on effects of wildland fire and exotic vegetation has been conducted in the park; however, the degree to which they have become established in the park is not clear. Post- 1988 research showed that *C. arvense* soon appeared in areas used for wildland fire suppression activities during the 1988 fires and was still increasing in all nine sites of varying burn severities in 1993 (Turner et al. 1994). However, the study did not determine long- term persistence of these species. Over the short- term, Turner et al. (1997) concluded that areas of crown fire provided the best colonization sites for opportunistic species (both native and exotic species that were absent or only incidental before the fires). Two new exotic plants may have been identified at two 1988 burn sites in YNP; however, with the possible exception of *C. arvense*, there is no conclusive evidence that either the wildfires or the corridors created by firelines during the severe 1988 fire season has resulted in the long- term establishment of exotic species in backcountry areas (J. Whipple, Yellowstone National Park botanist, pers. comm.).

V. DESCRIPTION OF THE PROPOSED ACTION

In the 2004 Update, the three fire management zones in the 1992 FMP have been redrawn into 7 fire management units (FMUs) (Figure 2) to facilitate cross-jurisdictional budget planning and wildand fire management. Within these FMUs, there are six major burnable vegetative cover types: lodgepole pine, whitebark pine, Douglas-fir, spruce/fir, grass/sage, and aspen. These total approximately 2,093,000 acres. Approximately 100,961 acres are considered unburnable (i.e., water).



Consistent with the Federal Wildland Fire Management Policy (http://fs/fed/us/land/wdfire.htm), all fires not ignited by park management for specific purposes (i.e., prescribed fire) are considered wildland fires. All wildland fires will have the same classification and receive management actions appropriate to conditions of the fire, fuels, weather, and topography to achieve resource management objectives for the individual fire. These management actions, termed the appropriate management response (AMR), may vary from fire to fire and even along the perimeter of an individual fire so that the full extent of management options is available. The AMR will be selected after comprehensive consideration of the local situation, risk to firefighter and public safety, available funding, management objectives, values to be protected, external concerns, and land use. The AMR allows for each wildland fire to be managed in a manner that ranges from aggressive suppression to managing the fire to accomplish resource benefits as a WFU. Wildland fire suppression, WFU, non- fire fuels management (and prescribed fire) can occur in any one of the FMUs as long as they are managed under the AMR as part of the development of a Wildland Fire Implementation Plan (WFIP). The WFIP is a progressively developed plan that documents the analysis and selection of strategies and describes the AMR for a wildland fire being managed for resource benefits (WFU). A full WFIP consists of Stages I, II and III. Most fires will be completed in Stage I or II. Procedures for the WFIP development are detailed in the Implementation Guide (http://fire.nifc.nps.gov/webterm/fire.asp) and RM- 18.

Under DO- 18 and RM- 18, resource management objectives are to be based on NPS 2001 Management Policies and the park's current RMP/desired future conditions (DFCs). Desired future conditions will be developed in the future for Yellowstone based on the Director's Order 2- 1 (DO- 2- 1), Resource Stewardship Plan, currently under revision by NPS. The DO- 2- 1 will replace the park's 1998 Resource Management Plan (RMP) and portions of the NPS 2001 Management Policies. The park's existing DFC for vegetation types relative to fire management is to maintain all of them in their natural state. Development of DFCs will occur over time based on best available scientific information and will be incorporated into the wildland fire management program planning and implementation.

A. Wildland Fire Suppression

All human- caused fires, unwanted wildland fires and escaped WFU fires will be suppressed emphasizing firefighter and public safety and sensitivity to park resources. Suppression activities that could potentially affect listed species include fireline construction, dozer lines, burnout, patrol, mop- up, firefighter campsites and staging areas, roads, aircraft flights, retardant and foam, and restoration. Unwanted wildland fires and escaped WFU fires will be declared wildfires, a Wildland Fire Situation Analysis (WFSA) form completed under the WFIP, and the appropriate suppression response will be initiated. Once a WFU fire is declared a wildfire, it will never be reclassified as a WFU fire. Prioritization of property and cultural and natural resources will be based on the relative values to be protected, commensurate with firefighter and

public safety and fire management costs. Once the park commits humans to a suppression response, they become the highest value to be protected. Wildfires will be suppressed in the safest and most cost- effective manner possible.

To avoid and minimize impacts to species considered, Yellowstone will adhere to the FWS Conservation Measures (Appendix 2) and the Minimum Impact Suppression Tactics (MIST) based on the National Wildfire Coordinating Group guidelines (Appendix 3). The MIST techniques are those which effectively accomplish wildland fire management objectives with the least cultural and environmental impact, commensurate with firefighter and public safety.

Yellowstone has a comprehensive exotic vegetation management program that includes education, monitoring, mapping, research, mechanical pulling, and herbicide treatment. The park conducts annual surveys of approximately 4,500 acres within a few hundred meters of roads and developed areas to eradicate new infestations of highly invasive target species (Olliff et al. 2001). The park also participates in the Greater Yellowstone Coordinating Committee multi- jurisdictional weed management efforts and cooperates with adjacent state and county Weed Control Boards to share knowledge and technology related to exotic plant detection and control. Natural recovery of native plant species will continue to be the preferred action, except in rare circumstances. Seeding or planting exotic or even native species produces unnatural changes in successional patterns and vegetative communities and should be used only as last resort to prevent erosion damage or to combat invasion of exotic species. When fire rehabilitation cannot be completed with existing wildland fire resources, a Burned Area Emergency Rehabilitation (BAER) plan will be developed and will follow the guidelines outlined in DO- 18, Chapter 12, *Burned Area Emergency Rehabilitation.*

B. Wildland Fire Use

A wildland fire use fire is ignited by natural means (e.g., lightning) and permitted to burn to achieve specific resource management goals. The goal of the WFU program is to allow naturally- ignited fires to burn within ecosystems and perpetuate natural processes where historic fire suppression has not significantly altered fuel loads and forest composition/structure. Where cooperative agreements are in force, fires may be allowed to burn across management boundaries as long as they remain within mutually acceptable conditions to achieve resource benefit.

A Maximum Manageable Area (MMA) designates the ultimate acceptable size for a given WFU fire managed for resource benefits. The MMA defines an area by resource objectives, fire and weather parameters, social needs, political considerations and management capability. An MMA can be pre- determined in a fire management plan or be developed during Stage III of the WFIP. Yellowstone will not pre- determine MMAs but will define them should a wildland fire reaches a WFIP Stage III.

Confinement may be not be implemented as part of an initial attack suppression action to achieve resource management objectives. It can, however, be selected in lieu of WFU to maximize firefighter and public safety, minimize suppression costs of low- valued and commodity resource areas, and to maximize availability of critical suppression and management resources during periods of multiple starts and high fire danger associated with fire in highly- valued resource areas.

Wildland fire use fires are uncommon in Yellowstone because site conditions (e.g., fuel types and fuel moisture), prevailing weather, regional fire fighting resource availability, human safety and property, and political considerations usually limit their use. The average size of WFU fires in Yellowstone is small, about 60 ha. When forest flammability is low, WFU fires typically burn little or no acreage and often involve only single trees. Large WFU burns (2,000 ha) occur at a rate of about 1 per 5 years during normal precipitation years, but may increase to one per year under sustained drought.

The park does not envision a significant increase in the numbers of acres managed as WFU over the next 10- 20 years but will allow as many WFUs as possible to meet resource management objectives.

C. Non-Fire Fuels Management

The park's non- fire fuels management program includes manual and mechanical treatments to remove live or dead fuels within the wildland- urban interface (WUI) of human development and vegetative fuels, and at backcountry structures such as patrol cabins and ranger stations. The goal of the program is to protect life, property and designated park resources should a wildland fire occur. Treatments include thinning and removal of fuels ladders to eliminate the vertical and horizontal continuity of the fuel arrangement, thus reducing the likelihood of spot fire ignition, fire intensity, and the rate of spread. Associated equipment and activities may include chainsaws, skidders, chippers, trailers, ATVs, horse- skidding, winches, helicopters, motor vehicle, debris pile stacking and burning, and establishment of temporary decking and trailer turn- around areas. In accordance with NPS 2001 Management Policies, the "minimum requirement" concept identified in Director's Order #41: Wilderness Preservation and Management (NPS 1999*b*) will be used to determine the equipment used in Yellowstone's recommended wilderness areas.

Yellowstone completed a Hazard Fuel Plan in 1993 (1993 Plan) as an addendum to the 1992 FMP for the park's fuels management program. In 2001, the park replaced the 1993 Hazard Fuel Plan with the *Yellowstone National Park Structure Protection and Firefighter Safety Hazard Fuels Management Guidelines* (2001 Guidelines), which reprioritized the developed areas and backcountry patrol cabins to be treated. Section 7 consultation was not conducted for the 1993 Hazard Fuel Plan or 2001 Guidelines but has been completed prior to implementation of individual treatments. An informal Section 7 consultation was conducted in 2002 for three WUI projects in developed

areas, one backcountry developed area and 30 patrol cabins (*Wildland- Urban Interface Fuels Management Biological Assessment* May 2002). A second informal consultation was completed in 2004 for three frountcountry WUI projects in developed areas (*Wildland-Urban Interface Hazardous Fuels Reduction for Three Frontcountry Developed Areas in Yellowstone National Park: West Entrance, Canyon Village, and South Entrance* July 2004). The FWS concurred with the park's determination of "may affect, not likely to adversely affect" for the Canada lynx, grizzly bear, gray wolf and bald eagle in both consultations, which assessed impacts to a total of 537 treatment acres.

The park has identified approximately 177 acres in eight remaining developed areas that will require non- fire fuels treatments. These developed areas will be maintained in the treatment state over time. Table 1 lists the project location, approximate number of acres to be treated, and corresponding FMU for the eight projects. The FMU map (Figure 2) shows the location of these developed areas. Appendix 4 contains preliminary maps of these areas with a 400- foot maximum perimeter delineated. The park anticipates completion of these projects within the next 8- 10 years.

Table 1. Proposed WUI Fuels Treatments in Developed Areas

Developed Area	Approximate # of Acres in Treatment Site	Fire Management Unit
Norris	18	Washburn Range
Madison	11	Northwest
Old Faithful	50	Central Plateau
Grant Village	50	Southeast
Fishing Bridge	11	Mirror Plateau
Tower-Roosevelt	15	Northern Range
Mammoth	11	Northern Range
Bridge Bay	11	Southeast
Total	**177**	

Based on the 2001 Guidelines and knowledge gained from implementation of fuels management projects in 2003 and 2004, the following current non- fire treatment parameters are intended to remove approximately 30- 40 grams/cubic meter of the crown bulk density of vegetative matter:

- 0- 30 feet of structures: remove all hazardous ground and ladder fuels (seedlings, saplings, downfall, standing dead, and trees;
- 30- 120 feet of structures: remove 70- 90% of pole- sized trees (4- 6 inches diameter breast height (DBH)) including hazard trees, saplings (< 4 inches DBH), seedlings and downfall to achieve an approximate 50- foot bole spacing;
- 120 feet from the edge of the structures to the treatment edge (approximately 250-400 feet): remove 50% of ground and ladder fuels, with the amount of understory left increasing with distance from structure to achieve an approximate 30- foot bole spacing; and
- Remove mature trees (> 6 DBH) from 30 feet of the structures to the treatment edge to achieve a 20- foot crown spacing.

Finished stump heights will be at or near ground level after thinning. Project- related activities would occur during dusk, dawn or nighttime hours. Potential biomass utilization includes firewood sale, firewood use by park residents, and material for trail stabilization and buck and rail fence whenever feasible. Utilization may also include contractor- transported logs to the NPS Golden Spike National Historic Site near Brigham City, Utah, for use as fuel in their steam locomotives. When biomass material can not be efficiently or economically accessed for utilization, on- site disposal methods such as debris piling and burning, scattering, and chipping will be used. Stacked debris piles may need to remain on site for up to two years for curing prior to burning.

In the developed areas and backcountry cabins previously treated under Section 7 consultations, the number of acres in the treatment sites was smaller than the acres calculated under the maximum 400- foot perimeters. The actual number of acres to be treated at each of the proposed eight WUI project sites will be determined during cultural and natural resource assessments and fuels requirements conducted prior to each project. The effects to the species considered in this PBA are based on the estimated total of 177 acres to be treated.

D. Emergency Consultation

Emergency consultation actions under Section 7 include disaster, “acts of God,” casualties, national defense or security emergencies, etc., and the response activities that a federal agency must take to prevent imminent loss of human life or property. A wildland fire is considered a disaster or “act of God,” and Section 7 consultation is not required for the wildland fire itself (Appendix 2). Initiation of informal Section 7 is required if the park determines that wildland fire suppression activities may affect a federally listed species. The park’s designated Resource Advisor serves as the field contact for coordination with FWS. Formal consultation with the FWS may occur after the park response action to the emergency action is completed to determine if adverse effects to listed species occurred. Procedures for emergency consultation with FWS are described in the Chapter 8 of the Section 7 Consultation Handbook (FWS/NMFS 1998).

Emergency consultations should include an understanding of the action agency's critical mission while ensuring that anticipated actions will not violate sections 7(a)(2) or 7(d) of the Act. Emergency consultations may contain conservation recommendations to help protect listed species and their habitats in future emergency situations or initiate beneficial actions to conserve the species. Such recommendations from FWS are strictly advisory and are to be implemented at the discretion of the federal emergency response personnel. Emergency response personnel should not wait for "approvals" from FWS before implementing actions they believe are necessary to protect human lives. Firefighter and public safety is the primary consideration for every fire.

E. Avoidance and Minimization Measures for Species Considered

The following measures will be implemented as part of the proposed action to avoid and minimize impacts to listed species considered during suppression activities, WFU fires, and non- fire WUI fuels treatments:

1. Planning During the Non- Fire Season for Suppression and Wildland Fire Use

Fire management personnel will annually incorporate information from the appropriate species biologists on sensitive locations to protect during suppression activities and WFU fires (including monitoring) prior to June 1 of each year. This information will be based on the best available science, research, surveys conducted in the park, and knowledge gained during previous fire seasons. Sensitive locations may include known active den, rendezvous or nest sites, or prime/high quality habitat.

The goal of Yellowstone's WFU program is to allow naturally- ignited fires to burn in the park to achieve natural processes. Quantification of adverse effects from WFU fires to the species considered cannot be determined prior to each fire season; however the types of effects can be predicted and areas identified that may warrant suppression of a WFU fire in the future. Although park biologists have not identified locations or areas that warrant suppression of a WFU fire to protect listed species at this time, the park is aware that resource conditions may change over time and/or research may demonstrate that suppression of a WFU fire is necessary to protect a listed species.

This information will be coordinated by the Fire Strategy Working Group, which meets several times throughout the year to discuss compliance and implementation of fire management projects and will be included in the Pre- Attack Plan as one of the priorities for determining suppression and/or allowing WFU fires to continue, along with firefighter and public safety, minimization of suppression costs, and protection of other identified park resources. The Pre- Attack plan is a comprehensive compilation of essential fire management information, which must be available in the park's fire management and/or dispatch offices. It will be reviewed annually prior to the fire season and revised as necessary by the Fire Management Committee and maintained by the Fire Management Officer (FMO). The Fire Management Committee consists of the Chief Ranger, Assistant Chief Ranger, FMO, Assistant FMO, Research Representative, and the affected District Ranger. A Resource Advisor may be assigned to provide information and advice to the Fire Management Committee on managing natural and cultural resources during wildland fire suppression, WFU fire, or a prescribed fire event. Technical expertise from other individuals may be requested by the Committee at any time. The Fire Management Committee will ensure that sensitive information on federally listed species stated in the Pre- Attack Plan are protected from inappropriate dissemination.

2. Fire management personnel will consult with the appropriate species biologist or resource manager when planning suppression activities and WFU fires during the fire season to avoid and minimize effects to listed species.

3. The park will adhere to the attached MIST and FWS Conservation Measures. The park's Resource Advisor will be the field contact for implementing the MIST and the FWS Conservation Measures.

4. Conservation Measures Specific To Each Listed Species

Canada lynx

- Avoid and/or minimize helicopter activity associated with suppression activities, monitoring of WFU fires, and WUI fuels reduction treatments within 1.6 km (1 mile) of known active lynx den sites and/or suspected denning areas May 1- July 31.
- Within LAUs, minimize size of linear openings created as fuel breaks and soil disturbances.
- Locate backcountry firefighter camps > 1.6 km (1 mile) from known active lynx dens.
- Leave clumps of dense lodgepole pine, shrubs, and woody debris to the maximum extent possible to provide cover for snowshoe hares within fuels treatment sites.
- Avoid implementation of non- fire fuels treatments within 1.6 km (1 mile) of known active lynx den sites and/or suspected denning areas between May 1 and July 31.
- Incorporate seasonal timing of denning and kitten mobility projected burn size, speed, pattern, and intensity, and terrain characteristics, as they relate to requirements of lynx and snowshoe hares fire history and existing vegetation structure in the area during planning for WFU fires.

Grizzly bear

- Avoid low- level aircraft flights in occupied grizzly bear habitat and open alpine meadows used by grizzly bears when possible.
- No firearms will be allowed.
- All grizzly bear/human confrontations will be reported to the Yellowstone Center for Resources, Mammoth Hot Springs, Wyoming, and the Resource Advisor.
- Avoid removal/thinning of whitebark pine trees in WUI fuels reduction treatments.
- Avoid WUI fuels reduction treatments within 1.6 km (1 mile) of known grizzly bear den sites between November 15 and April 15.
- Design Burned Area Emergency Rehabilitation Plans to avoid and minimize attracting grizzly bears to reclamation areas in developed and high- risk areas.
- Monitor for occurrences and establishment of exotic vegetation invasions following fuels treatments and suppression activities, if sufficient funding is available.
- Continue with the park's management practice of hazing bears out of developed areas to reduce the potential for conflicts with people including bear attacks.
- All proposed WUI fuels treatment projects will adhere to the park's Bear Management Area seasonal restrictions to avoid displacement of bears from prime food sources and minimize bear/human habituation and injuries.

Gray wolf

- Avoid low- level aircraft flights within 1.6 km from known active den or rendezvous sites between April 15 and August 1.
- Avoid WUI fuels reduction treatments within 1.6 km (1 mile) of known active gray wolf den or rendezvous sites between April 15 and August 1.
- Locate backcountry firefighter camps > 1.6 km (1 mile) from known active gray wolf den or rendezvous sites between April 15 and August 1.

Bald eagle

- Avoid and/or minimize low- level helicopter activity associated with suppression activities, monitoring of WFU fires, and WUI fuels reduction treatments within 0.5 miles of known active bald eagle nests between February 1 and August 15.
- Avoid WUI fuels management treatments within a 0.5 mile radius from a known active nest trees between February 1 and August 15.
- WUI treatments will not affect known nest trees (active and inactive) and adjacent trees whose crowns touch the nest trees.
- Yellowstone will continue to abide by the 1996 Bald Eagle Management Plan for the Greater Yellowstone Ecosystem.

5. The park will conduct Section 7 emergency consultation with the FWS in the event a fire management action may affect or is likely to adversely affect a listed species.
6. Yellowstone will submit a brief (2- 3 page) annual report to FWS after each fire season and prior to May 1 of the subsequent fire season that includes the following information:
    - Number of acres of mapped Canada lynx suitable habitat within LAUs affected by wildland fire suppression activities, WFU fires, non- fire fuels management, and Section 7 emergency consultations in the previous fire season;
    - Proposed WUI fuels treatments for the upcoming fire season and quantification of impacts to habitat quality, if requested by the FWS;
    - Any recommended locations/areas for suppression of a WFU fire to protect listed species.

VI. STATUS OF THE SPECIES

A. Canada lynx

Biology

The Canada lynx (*Lynx canadensis*) is a medium- sized felid with long legs and large feet–adaptations that facilitate travel through deep snow (Koehler and Aubry 1994). The species is primarily associated with boreal forests in Canada and Alaska, but its southerly range extends into the northern portion of the continental U.S. In the Rocky Mountains, including the GYE, Canada lynx are primarily associated with scattered patches of boreal- like subalpine forests that support heavy snow pack and snowshoe

hares (*Lepus americana*), their principal prey (Legendre et al. 1978). Snowshoe hares seek out dense conifer and deciduous shrub thickets for food, thermal insulation, and cover from predators (Mowat et al. 2000). On a continental scale, snowshoe hares comprise 35–97% of Canada lynx diets, with tree squirrels and mice also important prey (McCord and Cardoza 1982, Koehler and Aubry 1994).

Lynx are solitary carnivores that typically exist at low densities relative to similar- sized animals at lower trophic levels. In Washington State, Canada lynx densities were estimated at 2.6/100km^2, but numbers reached 30–45/km^2 in Canada and Alaska (Koehler 1990, Mowat et al. 2000). Across most of their range, lynx numbers and population dynamics are strongly tied to the distribution and abundance of snowshoe hare, which may fluctuate in Alaska and central Canada 2–200 fold during a 10–year cycle (Brand and Keith 1979, Koehler and Aubry 1994). In response, Canada lynx may exhibit dramatic fluctuations, up to 13 fold, with a 1- to 2- year time lag following peaks in snowshoe hare numbers (Brand et al. 1976, Breitenmoser et al. 1993, Mowat et al. 2000).

Kittens are born in May or early June after a 60–74 day gestation period, and typically remain with their mothers until about 10 months age (McCord and Cordoza 1982). Food availability (i.e., snowshoe hare numbers) directly correlates with natality and the survival of offspring (Nellis et al.1972, Brand and Keith 1979). During food shortages, females may not reproduce and few kittens survive (Koehler 1990, Mowat et al. 2000). Growth in populations is associated with high fecundity, high kitten survival, and low adult mortality (Mowat et al. 2000). Canada lynx living at the southern extremity of their range (i.e., the lower 48 states) have larger home ranges than individuals living at more northerly latitudes (Koehler and Aubry 1994, Squires and Laurion 2000). Average sizes of lynx home ranges in Montana and Wyoming ranged 54- 104 km^2 for females and 114- 231 km^2 for males (Brainerd 1985, Squires and Laurion 2000). Typically, home ranges of males and females overlap (Brainerd 1985, Squires and Laurion 2000).

Daily movements of Canada lynx in Montana and Wyoming range 0.2–7.1 km in summer (Squires and Laurion 2000). Exploratory movements of resident Canada lynx outside their home ranges are common in North America and have been documented in Montana and Wyoming (Mowat et al. 2000, Squires and Laurion 2000, J. Squires, U.S. Forest Service Biologist, pers. comm.). Canada lynx offspring are capable of dispersals as long as 930 km and adults may move as far as 1,000 km in response to declining prey densities (Koehler and Aubry 1994, Poole 1997). Dispersal movements are most frequent in March–June (Slough and Mowat 1996, Apps 2000). Canada lynx are largely nocturnal or crepuscular, but recent research findings in Northwest Montana suggest that their activity is diurnal as well (Saunders 1963, Parker et al. 1983).

Lynx and Snowshoe Hare Habitats

At the landscape scale, Canada lynx principally forage in variable- age forest mosaics that support snowshoe hares and other small prey (Nellis et al. 1972, Brand et al. 1976, McCord and Cordoza 1982). At the stand level, Canada lynx prefer regenerating forests, but microsites with the heaviest cover favor snowshoe hares (Mowat et al. 2000). In Wyoming, lynx occur primarily in spruce- fir and lodgepole pine forests, on 8–12° mountain slopes, and at 8,000- 9,600 feet elevation (Reeve 1986). Aspen (*Populus tremuloides*) stands and forest edges are also used. Canada lynx may also be associated with shrub- steppe habitats near (< 40 km) subalpine or cool montane forests, particularly when alternate prey such as ground squirrels (*Spermophilus* spp.) are abundant.

For denning and nursery sites, lynx prefer forests with abundant downfall and woody debris that provide security and thermal cover (McCord and Cardoza 1982, Koehler 1990, Mowat et al. 2000, Squires and Laurion 2000). Canada lynx do not appear constrained by type (age and dominant species) of forest stand. Rather, stand structure provided by wind- felled trees, roots, and live vegetation seems to be most important (Mowat et al. 2000).

Travel corridors that provide linkage for individuals between local foraging areas and between populations may be important for maintaining viable populations of Canada lynx in the lower 48 states (Koehler and Aubry 1994, Ruediger et al. 2000). Although not identified by studies, travel corridors in Yellowstone that are used by Canada lynx likely are habitat patches with abundant conifer cover that bridge larger acreages of habitat, particularly where terrain such as ridges and ravines naturally channel animal movement. In general, cover requirements for traveling individuals include coniferous or deciduous vegetation > 2 m in height with a closed canopy (Brittell et al. 1989, cited in Koehler and Aubry 1994). Canada lynx prefer to move through continuous forest to hunt, using high terrain afforded by ridges and saddles, and may also hunt along edges (Brand et al. 1976, Koehler 1990, Mowat et al. 2000). Although Canada lynx may occasionally cross large (> 100 m) openings and disperse across large rivers, and lakes, open areas that are natural or human- made discourage Canada lynx use and disrupt movement (Koehler and Aubry 1994, Poole 1997, Apps 2000, Mowat et al. 2000).

Preliminary results of habitat and abundance studies conducted from 2002 to present by University of Montana researchers Drs. Karen Hodges and Scott Mills indicate that snowshoe hares respond strongly to understory structure in the park (Hodges and Mills 2004). Hares require dense cover close to the ground or to snow level. Quality of hare habitat is enhanced by thick overstory cover. Their studies also suggest that snowshoe hares are not abundant in the park. Typically, hares occur at densities < 0.5 individuals per ha, and most forest stands in the park show no evidence of hare presence. The best stands in Yellowstone support far fewer hares than occur further north in the Rocky Mountains or in the boreal forests of Canada and Alaska.

In Yellowstone, subalpine forests, including some climax stands dominated by lodgepole pine, support the highest relative numbers of hares in the park. Some dense, young regenerating lodgepole pine (age 15 years) and some mid- aged lodgepole pine and Douglas fir stands provide good habitat as well.

Listing Status

The FWS listed the Canada lynx as threatened in April 2000 identifying a single population segment in the lower 48 states (FWS 2000). The sole reason for listing was inadequate regulatory mechanisms, primarily the lack of guidance in U.S. Forest Service (USFS) land management plans on how to provide for the ecological needs of Canada lynx. Critical habitat, however, was not designated or proposed.

A coordinated, interagency Canada lynx conservation effort between the FWS, USFS, and Bureau of Land Management (BLM), and NPS was initiated in March 1998. In January 2000, a *Canada Lynx Conservation Assessment and Strategy* (CLCAS) was completed and approved by the FWS, USFS, and BLM (Ruediger et al. 2000). The FWS uses the CLCAS to evaluate potential effects of projects proposed by action agencies. Although not a signature to the CLCAS, Yellowstone uses CLCAS standards and guidelines to evaluate the extent discretionary park activities affect lynx populations and their habitats.

Status and Distribution of Lynx

The historical range of the lynx in the contiguous United States includes forested portions of the Northeast, Great Lakes, Northern Rocky Mountains/Cascades, and the Southern Rocky Mountains, principally fragmented subalpine forests and/or cool, moist montane forests in the western United States and mixed coniferous and deciduous forests in the east (Aubry et al. 2000, FWS 2000). Canada lynx are highly adapted to and typically associated with heavy snow- pack that accumulates in these environments (Koehler and Aubry 1994, Ruggiero and McKelvey 2000).

Lynx occur in portions of Idaho, Montana, and Wyoming (FWS 1998). Both Montana and Idaho classify the lynx as a furbearer, but no longer allow trapping. Well established populations occur in portions of northwest Montana (Squires and Laurion 2000). In Idaho, a 1990 survey indicated that the population was stable or declining (FWS 1998), but recent confirmed records are scarce and Idaho lynx are considered rare. Since 1973, the lynx in Wyoming has been listed as a protected non- game species (no trapping season) and is considered rare (FWS 1998). The lynx is listed as a Class II Species of Special Concern by the Wyoming Game and Fish Department. No estimates of population size are available for ecosystems in the U.S. Rocky Mountains.

Canada lynx occur at low levels in the GYE, but they have been detected outside Yellowstone in 7 locales since 2000 using DNA- based methods (Murphy et al. 2004). Numerous other sightings of Canada lynx or their tracks, without DNA support, have also recently occurred in the GYE outside the park (Yellowstone National Park files). Canada lynx were detected using hair snares near Cooke City and Jardine, Montana, north of the Yellowstone Park boundary, during summer 2003 (Murphy et al. 2004).

B. Grizzly bear

Biology

Grizzly bears are solitary opportunistic omnivores except during breeding, cub rearing, and in areas where food is super- abundant, such as trout streams. They occur in all habitat types throughout the park. They require energy- rich carbohydrates and/or protein to survive seasonal pre- and post- denning requirements. Grizzly bear distribution, movements, habitat use, and food habits in the Yellowstone ecosystem have been extensively studied and reported (Blanchard and Knight 1991, Mattson et al. 1991, Mattson 2000, Schwartz et al. 2002). Army cutworm moths (*Euxoa auxilaris*), whitebark pine (*Pinus albicaulis*) nuts, ungulate carrion, and cutthroat trout are the highest quality food items available to grizzly bears in the GYE. Grizzly bear food habits are influenced by annual and seasonal variation in available foods. Grizzly bears are active primarily during nocturnal and crepuscular (dawn and dusk) time periods. The abundance of whitebark pine nuts is positively correlated with increased grizzly bear fecundity (Mattson et al. 1992). Approximately 4,452 acres or 5% of whitebark pine stands in the GYE have been affected by mortality from the mountain pine beetle (Haroldson et al. 2003).

Grizzly bears breed from May to July; den excavation and entry vary from October to mid- November on moderately steep, forested slopes with northern exposures (6,500-10,000 feet). Embryonic implantation occurs around December and cubs are born from January to early February. Adult males first emerge in mid- March and are followed by subadult males. Solitary females emerge late March to early April; females with cubs-of- the year emerge by mid- April.

Listing Status and Management

Between 1850 and 1950, grizzly bears (*Ursus arctos horribilis*) were extirpated from approximately 98% of their historic range in the contiguous United States by human-caused mortality (FWS 1993). By 1974, scientists estimated that fewer than 200 grizzlies remained in the GYE (Craighead et al. 1974). In 1975, Grizzly bears were listed as threatened under the Act. Recovery zones and population goals were subsequently established under Grizzly Bear Recovery Plans (FWS 1982; 1993). The plans established six grizzly bear recovery zones in the contiguous United States, one of which encompasses a portion of the GYE, including all of Yellowstone. The revised Grizzly

Bear Recovery Plan established measurable population parameters as indicators of population status for the GYE (FWS 1993). The FWS will consider removing the Yellowstone ecosystem population of grizzly bears from the threatened species status when the following demographic recovery goals are met:

- The documented presence of 15 adult females with cubs- of- the- year over a running six- year average; inside the recovery zone and/or within a 10- mile area immediately surrounding it;
- Sixteen of 18 Bear Management Units (BMUs) occupied by females with young, calculated as a six- year running sum of verified sightings and sign, and no two adjacent BMUs unoccupied;
- Known human- caused mortality not to exceed four percent of the minimum population estimated from the most recent three- year sum of females with cubs; and
- No more than 30 percent of the four percent mortality limit shall be females for any two consecutive years.

Habitat- based recovery criteria, a conservation strategy, and state plans (Idaho, Montana, and Wyoming) for management of the GYE grizzly bear population have been completed. The FWS will likely propose to delist the GYE grizzly bear population in 2005 subject to public review (C. Servheen, U.S. Fish and Wildlife Service Wildlife Biologist, pers. comm.).

Prior to listing, the GYE grizzly bear population was estimated at 136 bears (Craighead et al. 1974). After the 1975 listing, grizzly bear population estimates in the GYE continued to decline through the late 1970s. Starting in the mid- 1980s, annual minimum population estimates increased (Haroldson et al. 1998, Haroldson and Frey 2001), largely due to lower numbers of human- caused grizzly bear mortalities, especially adult females. Absolute minimum population estimates for grizzly bears in the GYE, based on counts of adult females with cubs- of- the year, have increased from a low of 99 in 1979 (Haroldson et al. 1998) to a high of 416 in 2002 (Haroldson and Frey 2003). Eberhardt et al. (1994) evaluated population trends based on reproductive and survival rates and estimated a rate of increase of 4.6 percent annually since the mid- to late- 1980s. In 1996, the Yellowstone Ecosystem grizzly bear population was estimated at 280 to 610 bears (Eberhardt and Knight 1996). Grizzly bears have expanded their range by 48% over the last two decades (Schwartz et al. 2002). Under current management, grizzly cub production and survival have been high and human- caused mortality has been low. In 2002, 52 unduplicated females produced 102 cubs, the highest summer count in the GYE (Haroldson 2003). In 2003, 38 unduplicated females produced 75 cubs (Haroldson 2004). In 1994, all population recovery parameters were achieved for the first time. However, grizzly bear mortality limits were exceeded from 1995- 97. All population recovery parameters were achieved again from 1998- 2003.

Under the Grizzly Bear Recovery Management Program and 1996 Interagency Grizzly Bear Committee guidelines, management of grizzly bears in Yellowstone has been highly

successful in promoting grizzly bear recovery and reducing bear- human conflicts (e.g., property damages, incidents of bears obtaining human food, bear- inflicted human injuries) and human- caused bear mortalities in the park (Gunther 1994, Gunther and Hoekstra 1998, Gunther et al. 2000***a*** and 2000***b***, Gunther et al. 2004). Under current practices and policies in Yellowstone, recreational and administrative facilities, human activities, and human waste (garbage and sewage) are effectively managed and few human- caused grizzly bear mortalities occur (Gunther 1994, Gunther et al. 2000***a***).

C. Gray wolf

Biology

The gray wolf (*Canis lupus*) is the largest member of the Canid family, with adults weighing between 40- 175 pounds. They are highly social animals and form packs of between 2 and 20 animals. Packs are family groups that typically comprise a breeding pair, their pups from the current year, offspring from the previous year, and occasionally an unrelated wolf. A breeding pair is defined as an adult male and female that successfully raise at least 2 pups until December 31 of the birth year. Packs defend large territories (20- 214 mi^2) from other packs and individual wolves. Normally, only the alpha male and female in each pack breed. Litters are born from early April- May and produce 4- 6 young on average. Yearling wolves sometimes disperse far from their natal pack; dispersal movements of 500 miles are documented. Gray wolves are primarily nocturnal predators of medium and large mammals such as elk, deer and bison, but also take small mammals, birds and large invertebrates.

The gray wolf historically ranged from Alaska and Canada through the lower 48 states to southern Mexico, with the exception of arid deserts and portions of California and the southeast. Predator control by local, state, and federal governments in the late 1800s and early 1990s resulted in the extirpation of the gray wolf from the GYE and most of the lower 48 states by the 1930s. Wolves persisted in small numbers in northern Minnesota and Isle Royale, Michigan, and possibly in northern Michigan and the southwest. Wolves occasionally dispersed south from Canada into Montana and Idaho.

Listing Status

In 1974, the FWS listed the Northern Rocky Mountain wolf subspecies (*Canis lupus irremotus*) as endangered in Montana and Wyoming, the eastern timber wolf (*Canis lupus lycacon*) as endangered in Minnesota and Michigan and the Mexican wolf (*Canis lupus baileyi*) as endangered in Mexico, Arizona, New Mexico and Texas. Due to taxonomic concerns, the wolf was relisted in 1978 as endangered at the species level (*Canis lupus*) in the lower 48 states and Mexico, with the exception of Minnesota, where it was listed as threatened. The FWS also designated critical habitat for the eastern timber wolf in Isle Royale National Park, Michigan, and portions of Minnesota. During the 1980s and 1990s, Northern Rocky Mountain wolves recolonized portions of

northwest Montana; population sizes also increased in Minnesota, Michigan, and Wisconsin.

The 1987 FWS recovery plan for the Northern Rocky Mountain wolf established recovery criteria of maintaining at least 30 breeding pairs, comprising at least 300 wolves within three recovery areas (GYE, central Idaho, and northwest Montana). When 30 established pairs, equitably distributed across recovery areas, reproduce for three successive years, the gray wolf will be eligible for delisting from the Act.

In 1990, Congress directed the appointment of a Wolf Management Committee to develop a plan for wolf reintroduction to Yellowstone and FS lands within central Idaho. The FWS completed an EIS and final rule for the reintroductions in 1994. Reintroduction to Yellowstone began in 1995 when 14 wolves captured from British Columbia were released. In 1996, an additional 17 wolves were captured from British Columbia and released inside Yellowstone.

Wolves reintroduced into the park and central Idaho are classified as "nonessential experimental" populations according to section 10(j) of the Act. Within the National Wildlife Refuge System and the NPS system, nonessential experimental populations are treated as a threatened species, and all provisions of the Act apply (50 CFR 17.83(b)). Wyoming wolves outside the park are classified as nonessential experimental.
In 2003 the Northern Rocky Mountain wolf population met the recovery criteria. The final rule to reclassify and delist the gray wolf in portions of the lower 48 states was published in the Federal Register on April 1, 2003. The anticipated biological recovery and delisting date is in 2004 or 2005. Responsibilities for wolf management will then be turned over to state agencies and tribes, providing that FWS approves state management plans and is assured that wolves will be able to sustain themselves within protections provided under the Act. The FWS has approved the Montana and Idaho management plans, but not that of Wyoming.

Wolf management in Yellowstone consists of monitoring wolf population dynamics and gathering ecological data relevant to the wolf's return to the GYE. To determine territory sizes and locate dens, collared wolves are monitored using both ground- based and aerial telemetry. Birthing dates and number of pups are estimated by observing dens. Wolf deaths are detected and investigated using telemetry- based methods. Wolf- prey relationships are documented by observing wolf predation directly and recording characteristics of wolf prey at kill sites.

D. Bald eagle

Biology

The Bald eagle is a large raptor weighing 6- 14 pounds and has a wingspread of 7- 8 feet. Nearby food, suitable perches, and security from human activities are important habitat components for both nesting and roosting sites. Bald eagle habitat in Yellowstone varies from riparian/lacustrine nesting areas in summer to riparian/sagebrush steppe in winter. Their summertime prey is primarily fish and waterfowl; winter food items include waterfowl, carrion, and fish. Immature and sub- adult eagles typically leave the park during winter and many migrate west to occupy coastal and interior winter habitat in northern California and Oregon. Some adult Bald eagle pairs in the park spend the entire winter in close proximity to their nesting territories in thermally influenced areas or near the Yellowstone and the Firehole rivers that remain ice- free. Other pairs move to lower elevations north of Yellowstone Lake to feed on winter- killed ungulates on the Northern Range or gut piles associated with the fall and winter hunts outside of the park near Gardiner, Montana. During winter, large numbers of migratory eagles often join resident eagles, with up to a 45% influx reported in some years (Stangl 1994).

By February, Bald eagle pairs return to their nesting territory. The Bald eagle first breeds at 4 or 5 years of age and may live up to 30 years in the wild. Bald eagles in Yellowstone nest exclusively in large conifers located close to or within 0.25 miles of rivers or lakes. The nesting season is generally from early February to late May. Eagles form pair bonds, often for life, and lay a clutch of one to three eggs in flat portions of tree tops in late March to early April, followed by a 35- day incubation period (Swensen et al. 1986, Harmata and Oakleaf 1992, Stangl 1994). The eggs hatch asynchronously and fledglings leave the nest between late June and late July.

Listing Status

The Bald eagle historically ranged throughout North America, except in extreme northern Alaska and Canada and southern Mexico. An estimated one- quarter to one-half million existed at the time Europeans arrived in North America in the early 1600s. By the early 1960s, only 417 nesting pairs remained.

In 1978, the FWS listed the species as endangered in all of the lower 48 states except Michigan, Minnesota, Oregon, Washington and Wisconsin, where it was designated as threatened. Loss of nesting and foraging habitat and the use of organochlorine pesticides such as DDT were the principal reasons for its decline. With the ban of DDT and increased protection of nesting habitat, the species subsequently increased throughout much of the lower 48 states (Stangl 1994). In 1995, the FWS downlisted the Bald eagle from endangered to threatened, due to significant population increases made over the last three decades. In July 1999, the FWS proposed to delist the Bald eagle. However, no final action on that proposal occurred and the species remains listed as

threatened. The FWS has not designated critical habitat for the species. The Bald eagle is an NPS Species of Special Concern, and is also afforded protection under the Lacey Act, Migratory Bird Treaty Act of 1918, and the Bald Eagle Protection Act of 1940.

The Pacific States Bald Eagle Recovery Team was formed as a result of the 1978 listing and a recovery plan completed (FWS 1986). Yellowstone is within Zone 18 of the Greater Yellowstone Recovery Area in the recovery plan. Yellowstone abides by the 1996 Bald Eagle Management Plan for the Greater Yellowstone Ecosystem.

Throughout North America, most Bald eagle populations are experiencing robust increases. Some population segments in the Great Lakes region and riparian zones of the desert southwest, however, are not completely recovered due to heavy metal contamination problems, and habitat encroachment from development, respectively.

VII. ENVIRONMENTAL BASELINE

A. Canada lynx

Historical information suggests that lynx were present but uncommon in Yellowstone from 1880 to 1980 (Murphy et al. 2004). Consolo- Murphy and Meagher (1999) documented 50 sightings and/or track reports of lynx (unknown reliability) in Yellowstone from 1893 to 1995. Most sightings and records of tracks occurred after 1930. In the 1990s, numerous researchers conducted studies to document the presence of rare carnivores in the northern portion of Yellowstone, but none detected lynx (Harter et al. 1993, Gehman et al. 1994, Gehman and Robinson 1998, and K. Murphy, unpublished data). During 2000 and 2001, researchers documented that a lynx in the southern GYA made extended extra- territorial forays during summer into Yellowstone and vicinity (Squires et al. 2003). During August 2004, a Canada lynx translocated from British Columbia to Colorado in 2004 made an extensive northerly movement through Grand Teton and Yellowstone toward north- central Montana. From 2001–2004, the status and distribution of Canada lynx was documented in spruce- fir and lodgepole pine forests in Yellowstone National Park using snow tracking and hair- snare surveys (McKelvey et al. 1999, Murphy et al. 2004). Ten Canada lynx detections, including three based on DNA evidence, were made in the central and east- central portion of the park (Middle Creek and Clear Creek LAUs; Central Plateau area; Murphy et al. 2004). These two LAUs and the Central Plateau area are within three FMUs: Mirror Plateau, Southeast, and Central Plateau. Cumulative detections represented at least four individuals, including two kittens born in two different years (Murphy et al. 2004). The proportion of dispersing individuals among the four individuals was unknown, although the presence of offspring indicated that resident, breeding individuals were present. Reproducing Canada lynx females are typically resident, as opposed to nomadic or transient (Brainerd 1985, Koehler 1990, Squires and Laurion 2000).

Status of Lynx Habitat in Yellowstone

In accordance with the CLCAS, Yellowstone park habitats dominated by mesic subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmanni*), and lodgepole pine (*Pinus contorta*) stands, as described in Despain (1990), were mapped as primary Canada lynx habitat (Table 2). Zeric lodgepole pine and Douglas fir habitat types were excluded because they lacked sufficient understory cover at nearly all successional stages to support snowshoe hares (Ruediger et al. 2000). Wet Douglas fir *(Psuedotsuga menziesii*), whitebark pine (*Pinus albicaulis*), or willow (*Salix sp*.) stands adjacent to primary habitat were mapped as secondary habitat (Ruediger et al. 2000).

Table 2. Habitat Types Classified as Primary, Secondary, and Non-Habitat for Canada lynx

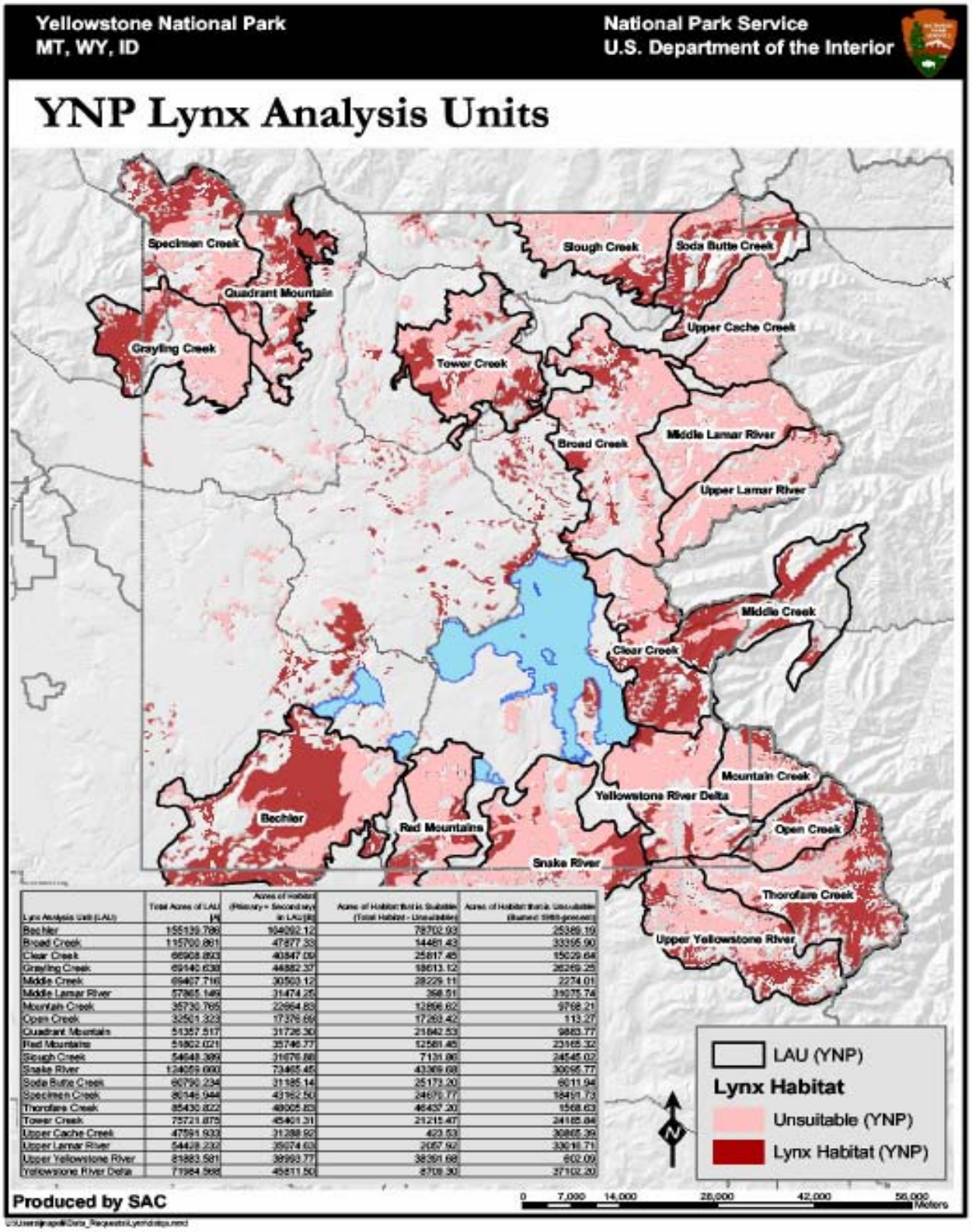
Classification	Habitat type	Vegetation Type
Primary Habitat	Subalpine fir/Globe Huckleberry-Globe Huckleberry Phase	Forest
Primary Habitat	Subalpine fir/Twinflower Habitat-Grouse Whortleberry	Forest
Primary Habitat	Subalpine fir/Western Meadowrue	Forest
Primary Habitat	Subalpine Fir/Grouse Whortleberry-Whitebark Pine Phase	Forest
Primary Habitat	Wet Forests	Forest
Secondary Habitat	Douglas-fir/Mallow Ninebark	Forest
Secondary Habitat	Douglas-fir/Shiny-leaf Spirea	Forest
Secondary Habitat	Pitchstone Plateau Complex	Forest
Secondary Habitat	Whitebark Pine/Grouse Whortleberry	Forest
Secondary Habitat	Willow/Sedge	Forest
Non-habitat	Subalpine Fir/Ross's Sedge	Forest
Non-habitat	Subalpine Fir/Elk Sedge	Forest
Non-habitat	Subalpine Fir/Pinegrass	Forest
Non-habitat	Subalpine Fir/Grouse Whortleberry-Grouse Whortleberry	Forest
Non-habitat	Subalpine Fir/Grouse Whortleberry-Pinegrass Phase	Forest
Non-habitat	Subalpine Fir/Grouse Whortleberry-Ross's Sedge Phase	Forest
Non-habitat	Whitebark Pine/Elk Sedge	Forest
Non-habitat	Douglas-fir/Snowberry	Forest
Non-habitat	Douglas-fir Pinegrass	Forest
Non-habitat	Lodgepole Pine/Bitterbrush	Forest
Non-habitat	Lodgepole Pine/Elk Sedge	Forest
Non-habitat	Bluebunch Wheatgrass/Sandberg's Bluegrass-Needle-and-	Forest
Non-habitat	Idaho Fescue/Tufted Hairgrass	Non-forest
Non-habitat	Idaho Fescue/Bearded Wheatgrass	Non-forest
Non-habitat	Idaho Fescue/Bearded Wheatgrass- Sticky Geranium Phase	Non-forest
Non-habitat	Idaho Fescue/Bluebuch Wheatgrass	Non-forest

Twenty LAUs were identified by overlaying the primary and secondary habitat coverage on watershed boundaries defined by current hydrologic unit codes (Table 3; Figure 3). LAUs contained > 8,097 ha (20,000 acres) of primary habitat, ranged from 13,360–62,750 ha (33,000–155,000 acres) in size, and were primarily associated with andesitic and sedimentary- based soils common in northern and eastern areas of the park (Despain 1990). No LAUs were identified in central/west- central areas where dry lodgepole pine stands predominate at successional climax.

Table 3. Characteristics of Lynx Analysis Units in Yellowstone National Park, 2003.

Name of Lynx Analysis Unit	LAU size (ha)	Lynx Habitat (ha)	Lynx Habitat Currently in Unsuitable Condition(%)[1]
Bechler	62,810	42,143	24
Broad Creek	46,842	19,383	70
Clear Creek	27,089	16,537	37
Grayling Creek	27,992	18,171	59
Middle Creek	28,100	12,349	7
Middle Lamar River	23,427	12,743	99
Mountain Creek	14,466	9,176	43
Open Creek	13,158	7,035	1
Quadrant Mountain	20,792	12,845	31
Red Mountains	20,972	14,472	65
Slough Creek	22,125	12,825	77
Snake River	50,227	29,743	41
Soda Butte Creek	24,611	12,626	19
Specimen Creek	32,448	17,475	43
Thorofare Creek	34,587	19,436	3
Tower Creek	30,657	18,381	53
Upper Cache Creek	19,268	12,668	99
Upper Lamar River	22,036	14,200	94
Upper Yellowstone River	33,151	15,787	2
Yellowstone River Delta	29,144	18,547	81

[1] Calculated using Canada lynx habitat as a basis.



Lynx Analysis Unit (LAU)	Total Acres of LAU [A]	Acres of Habitat (Primary + Secondary) in LAU [B]	Acres of Habitat But in Subtitle (Total Habitat - Unsuitable)	Acres of Habitat that is Unsuitable (Burned 1988-present)
Bechler	155139.766	104092.12	78702.93	25389.19
Broad Creek	115700.881	47877.33	14481.43	33395.90
Clear Creek	66908.893	40847.05	25817.46	15029.64
Grayling Creek	69140.638	44882.37	18613.12	26269.25
Middle Creek	69407.716	30503.12	28229.11	2274.01
Middle Lamar River	57865.149	31474.25	368.51	31075.74
Mountain Creek	35730.765	22664.83	12896.62	9768.21
Open Creek	32501.323	17376.69	17263.42	113.27
Quadrant Mountain	51357.517	31726.30	21842.53	9883.77
Red Mountains	51802.021	35746.77	12581.45	23165.32
Slough Creek	54648.389	31676.86	7131.86	24545.02
Snake River	124059.000	73465.45	43369.68	30095.77
Soda Butte Creek	60790.234	31185.14	25173.20	6011.94
Specimen Creek	80146.944	43162.50	24670.77	18491.73
Thorofare Creek	85430.822	48005.83	46437.20	1568.63
Tower Creek	75721.875	45401.31	21215.47	24185.84
Upper Cache Creek	47591.933	31288.92	423.53	30865.39
Upper Lamar River	54428.232	35074.63	2057.92	33016.71
Upper Yellowstone River	81883.581	38993.77	38391.68	602.09
Yellowstone River Delta	71984.598	45811.50	8709.30	37102.20

Figure 3. Lynx Analysis Units.

The park also partitioned acreage into Canada lynx habitat (primary and secondary combined) currently in a "suitable" and "unsuitable" condition. Habitat in an unsuitable condition is defined as Canada lynx habitat in early successional stages due to fire or vegetation management that has not sufficiently developed to support snowshoe hares on a yearlong basis (Ruediger et al. 2000). We mapped unsuitable habitats as conifer forest stands burned since 1977 or stands modified by non- fire reduction of fuels (i.e., conifer thinning).

Within LAUs, the fraction of lynx habitat currently in an unsuitable condition ranges from 1–99% (Table 3). Major fires burned approximately 43% of Yellowstone forests in 1988, setting large acreages of forest, principally habitats dominated by lodgepole pine, back to early successional stages and increasing coverage of lynx habitat in an unsuitable condition. For LAUs already supporting > 30% of Canada lynx habitat in an unsuitable condition, no further reduction of suitable habitat to unsuitable condition through vegetation management activities is allowable, a programmatic planning standard set by the CLCAS (Ruediger et al. 2000). In addition, timber management actions should not convert > 15% of lynx habitat within a LAU to an unsuitable condition within a 10- year period (Ruediger et al. 2000).

Non- fire fuels treatments are considered to be vegetation management activities; WFU fires are not (J. Claar, U.S. Forest Service Wildlife Biologist, J. Bush, U.S. Fish and Wildlife Service Assistant Field Supervisor, pers. comm.). Acreages of lynx habitat reduced to habitat currently in an unsuitable condition by any disturbance agent will be added to the cumulative total for the appropriate LAUs, with future vegetation management activities subject to the 15%- 10 year and 30% limits.

The CLCAS also provides a project planning standard related to lynx denning: 1) within LAUs, maintain denning habitat in patches exceeding 5 acres, and 2) where denning habitat currently accounts for < 10% coverage of LAUs, no further management actions should delay development of denning habitat structure. Although we have not mapped denning habitat for lynx in the park, it is probably not limiting lynx reproduction. Other than thinning for reduction of hazardous fuels, direct vegetation management such as timber cutting and pre- commercial thinning do not occur in Yellowstone. Woody debris associated with windfall, avalanches, local insect infestations, and fire provide ample sites for denning in LAUs, as do dense shrubfields (avalanches) and talus/boulder fields (Tinker and Knight 2001, Turner 2003). Although herbaceous cover, shrub cover, and conifer regeneration on burned sites are usually inadequate to support lynx denning up to 10 years following a stand- replacing fire, fires typically leave 50% coverage of unburned forest within burn perimeters (P. Perkins, pers. comm.), which is likely to provide lynx dens, nurseries, and cover for newly- mobile kittens.

Most human activity in the park is limited to developed areas and major roads that occur outside mapped lynx habitat. Currently, only the Middle Creek and Clear Creek LAUs are occupied by lynx. Both LAUs are transected by the East Entrance road, an

improved (asphalt) 2- lane road. The remainder of these two LAUs is pristine. Based on two recent sightings along roads, the Central Yellowstone Plateau may also be occupied (not part of an LAU). A recent DNA- based detection on neighboring Gallatin National Forest, near Cooke City, MT, suggests that the Soda Butte LAU could be occupied as well. These latter two areas are also largely pristine, except for visitor traffic along improved 2- lane park roads. Lynx are generally tolerance of human presence, but may be deterred from crossing improved roads and other linear, anthropogenic features (Staples 1995, Apps 2000).

Fire management in the form of suppression and use of WFU fires is the principal anthropogenic activity that affects lynx, chiefly through effects on vegetation structure. Fire effects on vegetation extend over long time frames (up to 400 years) and sometimes over large (up to 3,600 ha) spatial scales.

Other Factors Affecting the Canada lynx Environment

In addition to fire management and other natural resource- related actions, activities of park staff include maintenance, operation, construction, and improvements to staff housing, visitor facilities, roads, trails, and backcountry patrol cabins. Ongoing visitor activities in the park that may affect lynx include car or snowmobile traffic; foot traffic at natural and cultural sites; and light, dispersed recreation in the backcountry that is largely confined to trails. Vehicle traffic is highest during the spring–fall period. During mid summer (July–August), traffic along the busiest park roads should be considered moderate–heavy (> 1500 vehicles per day) (U.S. Department of Interior, National Park Service records).

B. Grizzly bear

The GYE has minimum estimate of 658 bears; 416 are estimated to occur within the park. Grizzly bears currently occupy approximately 7,574,244 acres in the GYE (Schwartz et al. 2002). Yellowstone comprises approximately 29% (2,197,729 acres) of this area. However, on average the park annually accounts for approximately 39% of the adult female grizzlies observed with cubs annually and 40% of the total number of counted cubs counted each year, but for only 5% of the grizzly bear- human conflicts and 7% of the human- caused grizzly bear mortalities occurring in the ecosystem. Thus, the park accounts for a greater than expected proportion of total number females with producing cubs and total cub production, and a less than expected proportion of grizzly bear- human conflicts and human- caused bear mortalities. Grizzly bears inhabit all of the habitat types within the seven delineated FMUs. Denning sites are not limited in the GYE and are well- distributed throughout the ecosystem (Podruzny et al. 2002).

In 1983, the park implemented a Bear Management Area program which restricts recreational use in areas with seasonal concentrations of grizzly bears. The types of restrictions include area closures, trail closures, minimum part size and limited daytime

and location travel. The park is delineated into 18 Bear Management Units for management purposes under the Grizzly Bear Recovery Plan.

Whitebark pine seeds are a primary food source for grizzly bears, particularly in late summer and fall, because of their large size, digestibility, and high fat content. Grizzly bears raid red squirrel middens that contain cached seeds prior to hibernation. In Yellowstone, whitebark pine usually occurs as a minor component of lodgepole climax forests at elevations of 2,100- 2,400 m on steep, south- facing slopes with poor soils. It occurs in mixed conifer stands above 2,400 m. Approximately 2% of the whitebark pine stands in the park are pure (Despain 1990) and occur at 2,600- 3,200 m on cold, dry, south or west- facing slopes that are wind- exposed (Franke 2000).

Pure whitebark pine stands are not high quality red squirrel habitat because they do not provide alternate food sources during most years (Reinhart and Mattson 1989); however, squirrels may occupy pure whitebark pine stands in large cone production years (Kendall 1981). On average, when annual cone production exceeds 23 cones per year, grizzly bears forage almost exclusively on pine seeds (Mattson et al. 1992). In the GYA, moderate to heavy cone crops occur twice to three times per decade (USFS, 2003). Poor cone crop years are positively correlated with increased bear- human conflicts (Mattson et al. 1992).

High- intensity, stand- replacing fires create open, exposed mineral soil that may facilitate whitebark pine regeneration. Frequent, low- intensity fire in mixed conifer forests may reduce competition with the more shade- tolerant subalpine fir and Engelmann spruce (Morgan and Bunting 1989). Fuel loads are generally not heavy in pure whitebark pine stands which are more open and do not generally support crown fires. The fire return interval is highly variable due to variance in microclimates and fuel conditions and ranges from 50 to 300 years (Lasko 1989). However, high winds can dry them out enough to support low- intensity, low- severity wildfires. Lightning is the most frequent ignition source at this elevation, but lower elevation fires from a variety of causes may burn up into this elevational zone on occasion.

Mixed whitebark pine and lodgepole pine with a younger component of fire and spruce and in lower elevations have heavier fuels loadings and more frequent fire frequencies. While the common understory shrub grouse whortleberry is not especially flammable, the highly- flammable spruce- fir component provides sufficient ladder fuels to support crownfire in this habitat type (Lasko 1989).

Other Factors Affecting the Grizzly Bear Environment

In addition to fire management and other natural resource- related actions, activities of park staff include maintenance, operation, construction, and improvements to staff housing, visitor facilities, roads, trails, and backcountry patrol cabins. Ongoing visitor activities in the park that may affect grizzly bear include car or snowmobile traffic; foot traffic at natural and cultural sites; and light, dispersed recreation in the backcountry that is largely confined to trails. Vehicle traffic is highest during the spring–fall period. During mid- summer (July–August), traffic along the busiest park roads should be considered moderate–heavy (> 1,500 vehicles per day) (U.S. Department of Interior, National Park Service records).

C. Gray wolf

At the end of December 2003, at least 174 wolves in 14 packs occupied Yellowstone, representing a population increase of approximately 17% from 2002 when 148 wolves in 14 packs lived in the park. One more pack was documented in May 2003 (Buffalo Fork pack). Of these 15 packs, 13 currently count toward the breeding pair objective for the Yellowstone Recovery Area. Figure 4 shows the 14 wolf pack territories based on 95% minimum convex polygons in the GYA.

Eight packs (96 wolves) reside on the northern range and seven (78 wolves) live throughout the rest of the park. Pack sizes ranged from 5 (Gibbon group) to 20 (Swan Lake pack) and averaged 11.3. Pack size was not different between the northern range and the rest of the park. One new pack formed and one was lost in 2003.

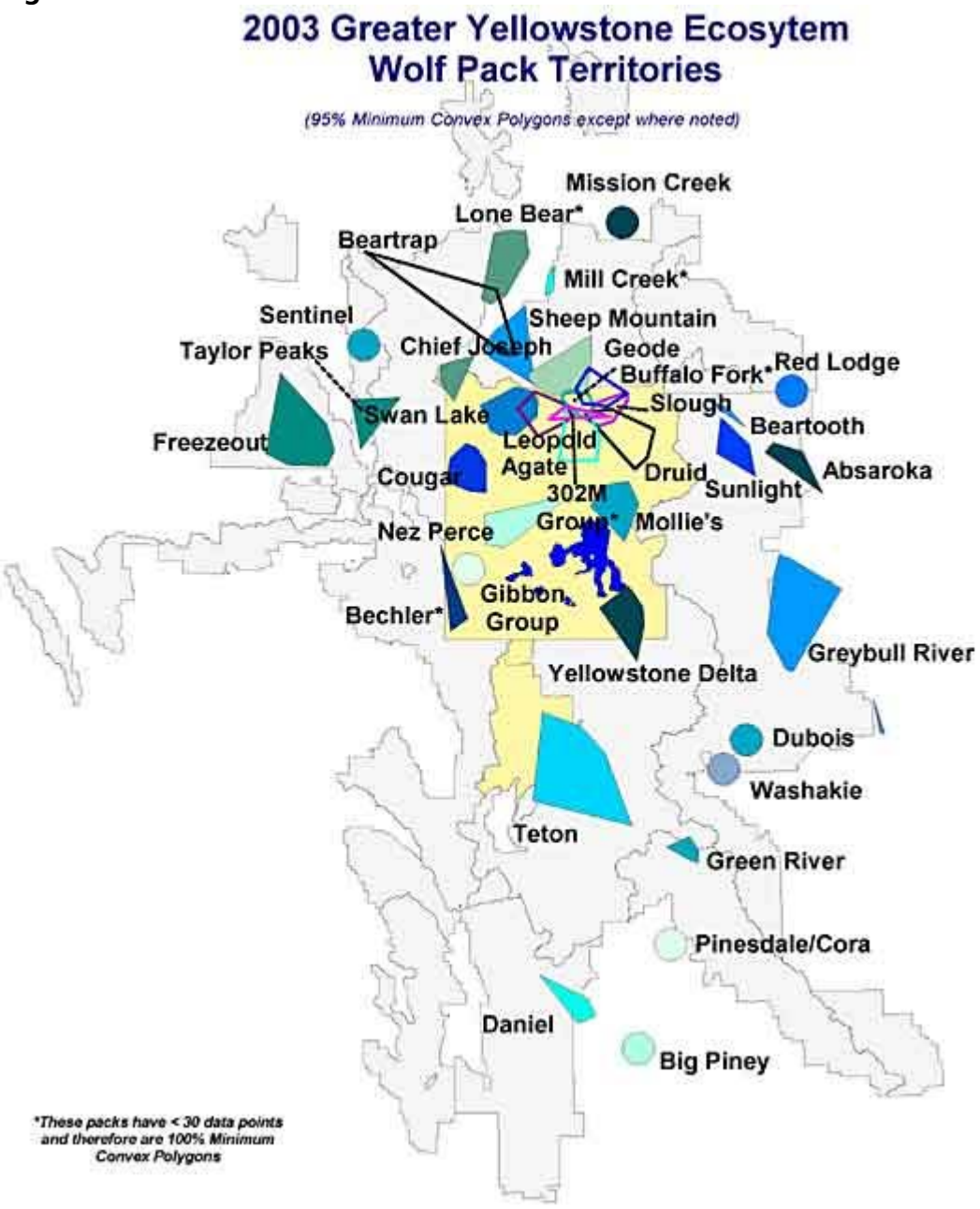
Wolf distribution and movements were largely the same for 2003 as in 2002. Most packs on the northern range showed a typical seasonal distribution: low elevation in winter and the denning season and high elevation for foraging in summer. Summer wolf territories were slightly larger than winter wolf territories, but this difference was not significantly different. Average territory size for all packs residing in Yellowstone was 223 square kilometers (km). Territory size has gradually declined over time.

In 2003, at least 75 pups were born; 59 survived in 15 wolf packs. Twelve wolf dens were visited in 2003 summer to measure den characteristics and collect scats for food habits. Not counting packs denning for the first time, 7 (64%) of 11 packs reused old densities. Sixteen wolves died in Yellowstone during fiscal year 2003, all of natural mortality. Seven females, seven males, and two wolves of unknown sex died, including 11 adults, two yearlings, and three pups. One wolf from the Agate Creek pack apparently died from disease.

A park- led effort to determine annual survival of wolves in all three recovery areas of the northern Rocky Mountains is nearing completion. Average annual survival for a radio- collared wolf in the Yellowstone ecosystem is 80%. Pups had the lowest annual

survival rate at 74%, followed by adults (> 1 year old) at 80%, and yearlings at 83%. Annual survival for males and females for all age classes was 81% and 78%, respectively. Since reintroduction in 1995, annual survival ranged from a low in 1997 of 62% to a high in 1999 of 90%. In 2002, the 79% annual survival rate of wolves in the Idaho recovery area was approximately equal to the Yellowstone recovery area, whereas the northwest Montana recovery area had a significantly lower annual survival of 56%.

Figure 4



Other Factors Affecting the Gray Wolf Environment

In addition to fire management and other natural resource- related actions, activities of park staff include maintenance, operation, construction, and improvements to staff housing, visitor facilities, roads, trails, and backcountry patrol cabins. Ongoing visitor activities in the park that may affect gray wolf include car or snowmobile traffic; foot traffic at natural and cultural sites; and light, dispersed recreation in the backcountry that is largely confined to trails. Vehicle traffic is highest during the spring–fall period. During mid- summer (July–August), traffic along the busiest park roads should be considered moderate–heavy (> 1,500 vehicles per day) (U.S. Department of Interior, National Park Service records).

D. Bald eagle

The goal of the 1995 Bald eagle management plan (Greater Yellowstone Bald Eagle Working Group 1996) is to "maintain Bald eagle populations in the GYE at high levels with high probabilities of persistence and in sufficient numbers to provide significance to the ecosystem, academic research, and readily accessible enjoyment by the recreational and residential public." Bald eagle management- related activity in the GYE includes conducting annual nest surveys, monitoring territory occupancy and productivity, and banding nestlings. Yellowstone also conducts annual mid- winter Bald eagle surveys to estimate eagle numbers and distribution.

Nesting success fluctuates yearly in Yellowstone based on weather conditions. Over the past five years, the number of nesting Bald eagle pairs has ranged from 27- 32 and fledged between 15 and 24 young. In 2004, 32 nesting pairs fledged 18 young. In the GYE, Bald eagle increases are equally impressive, with 146 nesting pairs and 140 fledglings in 2003, compared to 38 nesting pairs and 23 fledging eaglets in 1982. The Bald eagle is considered to be ecologically recovered in Yellowstone and the GYE.

In 1988, five bald eagle nests were destroyed when fire burned the nest trees. However, bald eagle occupancy of their territories remained high, as observed in post- fire monitoring flights in late October and early November of 1988. A total of 11 eaglets fledged in the park that year; all had fledged before the fires entered their nesting territories. Bald eagles were frequently observed capturing prey fleeing from fires throughout the summer of 1988. Fire burn patterns also provided ample new trees for eagle nests. Once secure nesting trees were found, bald eagles returned to pre- 1988 productivity.

Other Factors Affecting the Bald Eagle Environment

In addition to fire management and other natural resource- related actions, activities of park staff include maintenance, operation, construction, and improvements to staff housing, visitor facilities, roads, trails, and backcountry patrol cabins. Ongoing visitor

activities in the park that may affect bald eagle include light, dispersed recreation in the backcountry that is largely confined to trails, and rarely, vehicular traffic. Vehicle traffic is highest during the spring–fall period. During mid- summer (July–August), traffic along the busiest park roads should be considered moderate–heavy (> 1,500 vehicles per day) (U.S. Department of Interior, National Park Service records).

VIII. DIRECT AND INDIRECT EFFECTS

A. Canada lynx

Potential direct effects to a Canada lynx that may occur during wildland fire suppression activities, WFU fires, and non- fire fuels management projects include (1) injury or mortality; (2) displacement from occupied habitat, and (3) temporary barriers to movements. Potential indirect effects that may result from wildland fire suppression activities, WFU fires, and non- fire fuels management projects include changes in denning and prey habitat.

Direct Effects

Anthropogenic activity associated with wildland fire suppression, monitoring WFU fires, and non- fire fuels treatment projects have a very low potential for injury/mortality, displacement, or modifying lynx movements because these activities would be temporary, very few lynx occur in the park which reduces the likelihood of human- lynx interactions, and lynx are generally tolerant of human activity (Staples 1995, J. Squires, pers. comm.). No lynx injuries or deaths associated with fire management activities are documented in the literature. Lynx occupied range is largely limited to Clear Creek and Middle Creek LAUs. MIST and FWS minimization protocols for suppression would be followed in these areas, as well as throughout the park.

Injury or mortality to lynx from WFU fires or associated smoke inhalation is highly unlikely. Wildland fire use fires are typically small in size (< 60 ha) and rates of fire spread would not exceed 0.5 miles per hour in forest habitats (P. Perkins, pers. comm.), a speed a fearful lynx could easily exceed, even through heavy deadfall. Maximum rates of spread for suppressed, high intensity fires in 1988 were typically < 1.25 miles per hour (P. Perkins, pers. comm.). Due to unfavorable moisture conditions, WFU fires would typically not occur during the May–July period when lynx use natal dens and kittens are relatively immobile.

Active suppression of wildland fires in lynx range would occur primarily in the backcountry over a week's time and involve small groups (typically two 20- person crews) working near fires and out of small spike camps located in grassland habitats or even within the burn perimeter. Camps would be located > 1.6 km (1 mile) from any known active lynx dens. Crews would be trained in food storage, in other camping

protocols, and in minimizing disturbance to wildlife. To minimize human- wildlife interactions, each camp will be attended by a resource advisor who enforces camp protocols and a caretaker to maintain the camp in the absence of firefighters.

Disturbances associated with large firefighter camps (> 100 persons) would be strictly limited to pre- existing disturbed sites (e.g., baseball fields) in the vicinity of developed areas and roads, usually outside occupied lynx range, and where existing human activity likely already limits lynx foraging, denning, and movement in the vicinity. Crews monitoring WFU fires would consist of 3–8 persons with similar training in protocols. They would work out of small camps in the backcountry for up to five days.

Helicopter- based suppression and WFU fire monitoring activities are not likely to cause localized, temporary disturbance in the form of noise, because they would not occur during the May- July denning season when high fuel moisture levels typically preclude high- intensity fires. Helicopter use within 1.6 km (1 mile) of a known active den site would not be used, unless required for firefighter and public safety. The effects of helicopter noise on lynx behavior are undocumented in the literature.

Monitoring activities or suppression camps will not impede lynx travel because these small centers of human activity in the backcountry are typically very small (< 1 ha). Large firefighter camps and thinning projects will both occur in or near developed areas where existing disturbance and buildings may already represent barriers to travel, but which resident lynx likely are already accustomed. Lynx dispersing through the park lynx may widely circumvent human activity in developed areas, but such individuals are rare in the GYA. To minimize human- wildlife interactions, each camp will be attended by a resource advisor who enforces camp protocols and a caretaker to maintain the camp in the absence of firefighters.

Fires that escaped suppression activities (uncontrolled) could result in injury or mortality. However, these events are “acts of God” and not subject to Section 7 consultation. In the event of either a suppression activity or escaped wildfire, the park would conduct Section 7 emergency consultation with FWS to determine and document effects and incidental take, if any, to lynx.

No proposed WUI fuels treatments will occur within LAUs; therefore no adverse effects to lynx habitat are expected. However, fuels treatments at Tower- Roosevelt and Bridge Bay will permanently affect approximately 2 ha and 4 ha, respectively, of forest lynx habitat currently in an unsuitable condition. Disturbance associated with fuels treatment projects would be temporary (< 6 weeks) and limited to the immediate vicinity (typically < 150 m) of developed areas where lynx are unlikely to occur. As with wildland fire suppression crews, thinning crews would also be trained in proper food storage techniques and how to minimize wildlife disturbance. Helicopters would not be used for thinning treatment sites within 1.6 km (1 mile) of a known active den site and helicopter pilots would avoid overhead flights within known active lynx den sites during

the May- July denning season. Thinning or burning operations will not occur during crepuscular or nocturnal time periods when lynx are most likely to travel through these developed areas. The potential for a project- related vehicle- strike mortality is discountable due to the low posted speeds of 15 mph and the slow speeds that vehicles actually travel in these developed areas.

Indirect Effects

Wildland fire suppression activities would carry no significant indirect effects to lynx habitat. Existing, natural fuel breaks (e.g. rock outcrops, water bodies) will be used where possible for suppression. Soils disturbances associated with newly- constructed fire lines and backcountry fire camps would be repaired when crews leave the area. Vegetation such as grass, shrubs, and conifers that are cut and removed to create fuel breaks will be moved back into fuel breaks post- fire to reduce establishment of new wildlife trails.

Naturally- ignited wildland fire is the primary natural disturbance agent in boreal and subalpine forests (along with forest insects, windfall, and avalanches) that contributes to the diversity in vegetation composition and age- structure needed to sustain populations of snowshoe hares and other Canada lynx prey (Agee 2000, Ruediger et al. 2000).

Wildland fire appears to eliminate snowshoe hare habitat immediately following a fire (Fox 1978, Ruediger et al. 2000). Fecal pellets among three stands sampled before and after the East fire (2003) in Yellowstone by Hodges and Mills indicated a very strong reduction in pellet numbers, probably related to loss of horizontal and vertical cover. However, perennial herbs and grasses does do reestablish very rapidly post- fire (< 2 years), as do forbs (< 4 years) and shrubs (< 12 years) (Ruediger et al. 2000, Turner et al. 2003). Large- scale fires could potentially reduce the habitat for of their alternate prey, the red squirrels, an alternate prey for Canada lynx, by eliminating mature conifers that both produce cones and that provide well- developed crowns for squirrel nesting.

On severely burned sites, lodgepole pine quickly regenerates due to the serotiny of their cones. This species may reach stem densities of 535,000 stems per acre two years after a fire (Turner et al. 1997). Preliminary data indicate that dense lodgepole pine regeneration is productive snowshoe hare habitat (K. Hodges pers. comm.), although the density of post- fire lodgepole pine regeneration is highly variable, related to size of burn patch size, burn severity, and pre- fire serotiny (Turner et al. 1997, 2003). Where residual conifer density is high due to low fire intensity, post- fire regeneration may be dominated by shade- tolerant species such as Engelmann spruce and subalpine fir (Agee 2000). Pre- fire coverage of stumps, logs, and roots useful to snowshoe hares for hiding cover and Canada lynx denning is not appreciably reduced by fire at ground level, but such coarse woody debris may increase to 60% coverage 50 years following a burn (Turner et al. 2003, Tinker and Knight 2000).

Annually, WFU fires in Yellowstone account for little acreage (average 60 total ha annually), even if the total acreages of the 1988 fires are included. Coverage of all LAUs and occupied LAUs, including Soda Butte LAU, is about 26% and 4% of the park, respectively. Thus, the chances of a WFU fire occurring in an occupied LAU are low. The 60- ha "average" total annual acreage for WFU fire in the park represents only < 0.8% of an average female lynx home range (7,900 ha) in Wyoming/Montana (Brainerd 1985, Squires and Laurion 2000). Wildland fire use fires typically occur in mid- aged and mature forests which typically support few snowshoe hares, and seldom occur in 15- to 40- year- old forests (dense lodgepole pine regeneration) that may support high relative hare densities.

The effects of WFU fires to lynx are likely insignificant in Yellowstone. Because lynx are highly vagile, their foraging and den site selection patterns are flexible. Having evolved with disturbance agents such as fire, they are highly likely to locate and use alternative foraging and den sites in their home ranges that remain unburned. The post- fire landscape in Yellowstone is spatially heterogeneous (Turner et al. 1997, 2003). Burn perimeters often include up to 50% coverage of unburned and lightly burned forest patches (P. Perkins pers. comm.). These areas potentially provide temporary refuge for prey and natal dens for lynx (Agee 2000). Canada lynx typically do not re- use the same natal den each year and distances between dens vary from several hundred meters to several kilometers (J. Squires, pers. comm.).

Long- term beneficial effects of fire accrue to regeneration of conifer age classes that best support snowshoe hares and creation of woody downfall useable for lynx denning (Ruediger et al. 2000, Tinker and Knight 2000). Wildland fires and other natural disturbance processes promote snowshoe hare habitat because they encourage diversity in forest age structure and species composition (numerous reference in Ruediger et al. 2000). The role and importance of fire was also supported during conservations with Yellowstone and the Canada lynx bio- team members (Pers. comm: J. Claar, B. Holt, B. Naney, U.S. Forest Service Biologist.). Yellowstone's snowshoe hare live- trapping and fecal pellet data are consistent with their guidance that dense lodgepole pine regeneration characteristic of 15- 40 year old post- fire sites support relatively high abundance of snowshoe hares. With some exceptions, mature forests (40- 300 years) typically support few hares and new burns (0- 10 years, essentially none.

It appears that a long- term fire regime that maximizes the coverage of 13- 40 year old burns is the most ideal for snowshoe hares. Burns of light or moderate intensity also enhance denning habitat for Canada lynx in the long- term because they ultimately improve woody debris such as fallen snags at ground level, while not consuming existing low- lying logs (Agee 2000, Turner et al. 2003). Wildland fire may also increase propagation of aspen, chokecherry, and serviceberry, all forage used by snowshoe hares (Ruediger et al. 2000), and improve productivity of grass and forb communities, thereby improving conditions for other mid- sized small mammals and small ungulates that may serve as Canada lynx prey.

Wildland fire use will not be considered a planned management activity; therefore the park will not apply the 30% CLCAS guidance in deciding whether or not to suppress a WFU fire. At this time, Yellowstone does not anticipate the necessity of suppressing a WFU fire for protection of the lynx because of the long- term benefits to lynx from maintaining fire as a natural process. However, if future surveys, research or changes in park resources indicate otherwise, Yellowstone will consider suppression of a WFU fire to protect the lynx as a resource management objective, provided that firefighter and public safety, available funding, and other park resource objectives are met. If the park makes a determination that specific lynx habitat warrants suppression of a WFU fire, this information will be conveyed to FWS in an annual report.

Exotic vegetation could indirectly increase or decrease food and cover available for snowshoe hares if they became important components of forest understories (J. Whipple, pers. comm.). However, exotic vegetation introduced through wildland fire suppression activities are unlikely to persist where overstory conifers and shrubs shade forest understories exist (J. Whipple, pers. comm.). No extensive vegetation changes associated with suppression activity or burned acreage have been identified at this time in the park (J. Whipple, pers. comm.).

All wildland fire suppression, WFU fires, and non- fire fuels management projects will adhere to the MIST techniques and the FWS Conservation Measures to avoid and minimize disturbances to soils. Fuels treatment projects will be monitored to detect and eradicate new exotic plant occurrences. To minimize the introduction of exotic species and promote residual seed and sprouting from the surviving below- ground native plant parts, burned areas will not be reseeded.

B. Grizzly bear

Potential direct effects to a grizzly bear from wildland fire suppression activities, WFU fires, and non- fire fuels management projects include (1) injury or mortality; (2) displacement from occupied habitat, and (3) temporary barriers to movements. Potential indirect effects from wildland fire suppression activities, WFU fires, and non-fire fuels management projects include changes in foraging habitat.

Direct Effects

Injury or mortality to a grizzly bear from a WFU fire or associated smoke inhalation is possible, but highly unlikely. Wildland fire use fires are typically small in size (< 60 ha) and rates of fire spread would not exceed 0.5 miles per hour in forest habitats (P. Perkins, pers. comm.), a speed a fearful grizzly bear could easily exceed, even through heavy deadfall. Maximum rates of spread for suppressed, high intensity fires in 1988 were typically < 1.25 miles per hour (P. Perkins, pers. comm.). Due to unfavorable moisture conditions, WFU fires would typically not occur until late summer, when

grizzly bear cubs have already attained a sufficient size to outrun a fire. Research following the 1988 Yellowstone fires presumed one grizzly bear mortality during this severe, stand- replacing fire season (Blanchard and Knight 1990).

Active suppression of wildland fires would occur primarily in the backcountry over a week's time and involve small groups (typically two 20- person crews) working near fires and out of small spike camps located in grassland habitats or even within the burn perimeter. Camps would be located away from known active grizzly bear habitat and avoid open meadows in grizzly bear habitat when possible. Crews would be trained in food storage, in other camping protocols, and to minimize disturbance to wildlife. Each camp will be attended by a resource advisor who enforces camp protocols and a caretaker to maintain the camp in the absence of firefighters.

Disturbances associated with large firefighter camps (> 100 persons) would be strictly limited to pre- existing disturbed sites (e.g., baseball fields) in the vicinity of developed areas and roads, where existing human activity likely already limits grizzly bear foraging, denning, and movement in the vicinity. Crews monitoring WFU fires would consist of 3–8 persons with similar training in protocols. They would work out of small camps in the backcountry for up to five days.

Helicopter- based suppression and WFU fire monitoring activities are not likely to cause localized, temporary disturbance in the form of noise because they would occur outside the grizzly bear denning season. Helicopter use within 1.6 km (1 mile) of a known active den site would not be used for WUIF fuels treatments to avoid disturbance.

Monitoring activities or suppression camps will not impede grizzly bear travel because these small centers of human activity in the backcountry are typically very small (< 1 ha). Large firefighter camps and thinning projects will both occur in or near developed areas where existing disturbance and buildings may already represent barriers to travel, but which resident grizzly bears are already accustomed. To minimize human- wildlife interactions, each camp will be attended by a resource advisor who enforces camp protocols and a caretaker to maintain the camp in the absence of firefighters.

Fires that escaped suppression activities (uncontrolled) could result in injury or mortality. However, these events are “acts of God” and not subject to Section 7 consultation. In the event of either a suppression activity or escaped wildfire, the park would conduct Section 7 emergency consultation with FWS to determine and document effects and incidental take, if any, to grizzly bears.

Temporary displacement to individual grizzly bears could occur during a large, stand-replacing fire. In a study of grizzly bear movements during to the intense 1988 fire season, Blanchard and Knight (1990) found that of 21 radio- monitored bears, 13 moved into burned areas immediately after fire passed, three bears remained in areas during a fire, three stayed outside of areas that burned, and two were unaccounted for. Fire did

not appear to affect denning sites, use of annual home ranges, or rates of movement before and after the fires.

Large, stand- replacing fires could provide a short- term increase in grizzly bear food items such as ungulate carrion that would provide a temporary benefit to individual grizzly bears. Research after the 1988 fires showed an increased supply of ungulate carcasses in several locations in the park, presumably as a result of large- scale crown fires accompanied by strong winds (Blanchard and Knight 1990).

Mechanical fuels reduction at the eight proposed WUI developed areas will result in approximately 177 acres to be treated, based on a maximum 400- foot perimeter from outer structures. Natural and cultural resource assessments will be conducted prior to implementation of each project to determine actual treatment boundaries.

To assess impacts to grizzly bear habitat in proposed WUI fuels treatment projects areas, the park uses seasonal habitat quality maps for grizzly bears that depict the vegetal quality (low, medium and high) 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). These maps are based on habitat and cover type maps (Despain 1990) combined with information on the quality and abundance of grizzly bear foods within different habitat and cover types. The food value of habitat to grizzly bears is also influenced by 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.

Since the grizzly bear is a generalist omnivore capable of successfully foraging for food over vast areas, negative impacts to grizzly bears due to fuels treatments would be discountable in areas and seasons containing only low to medium quality grizzly bear habitat. In areas with high- quality habitat, the park will avoid implementing fuels treatments during the season(s) of highest habitat value to grizzly bears. Table 4 lists the recommended seasonal closures for grizzly bears for the proposed WUI fuels treatments. The park will quantify impacts to high habitat quality at the treatment sites, if requested by FWS, in the annual report submitted to FWS.

Table 4. Grizzly Bear Seasonal Restrictions for Proposed WUI Fuels Treatments

Developed Area	Approximate # of Acres	FMU	Grizzly Bear Seasonal Restrictions
Norris	18	Washburn Range	Conduct work after June 15
Madison	11	Northwest	No high quality habitat
Old Faithful	50	Central Plateau	Conduct work after June 15
Grant Village	50	Southeast	Conduct work after July 15
Fishing Bridge	11	Mirror Plateau	No high quality habitat
Tower-Roosevelt	15	Northern Range	Conduct work after July 4
Mammoth	11	Northern Range	No high quality habitat
Bridge Bay	11	Southeast	Conduct work after July 15
	Total = 177		

Temporary displacement to a grizzly bear from project- related noise and activity from equipment, vehicles, and work crews during WUI fuels treatements is highly unlikely to occur as they will occur in developed areas where the park already has a policy of hazing bears away from these areas. In addition, project operations and equipment will not hinder grizzly bear movement through the project area and thinning or burning operations will not occur during crepuscular or nocturnal time periods when grizzly bears are most likely to travel through these developed areas. The potential for a project- related vehicle- strike mortality is discountable due to the low posted speeds of 15 mph and the slow speeds that vehicles actually travel in these developed areas.

Indirect Effects

Grizzly bears in the GYA have evolved with the natural disturbances to their habitat caused by wildland fire. Changes in vegetative cover and composition as a result of wildland fire may affect grizzly bear foraging habitat quality; however, such effects are complex and difficult to predict. Depending on the vegetation species, fire severity, and fire size, the effects can be both positive and negative, by reducing some species in the short- term but producing long- term benefit by creating a diverse habitat mosaic at different spatial scales. Wildland fire may stimulate understory species such as huckleberry and grouse whortleberry as well as increase the vegetative diversity in older lodgepole pine stands which could benefit bears in some areas. Based on 867 locations of 44 grizzly bears obtained from 1989- 1992, grizzlies appeared to have used burned habitats in proportion to their availability within their ranges (Blanchard and Knight 1991).

In 1988, wildfires destroyed approximately 12- 30% of whitebark pine cone- producing stands in areas frequented by bears (Franke 2000), and bear use frequency dropped by 20% in these areas in the years following the fires. However, these fires also increased the reproductive capability of whitebark pines. Therefore, depending on the fire severity, patch size, and other forage species factors, wildland fire may reduce the amount of whitebark pine seeds available to a grizzly bear in the short- term, but it is important for the long- term reproduction of whitebark pine.

Successional competition from other conifer species as a result of fire suppression, the invasion of the exotic pathogen white pine blister rust (*Cronartium ribicola*) and infestations of the native mountain pine beetle (*Dendroctonus ponderosae*) have caused significant population declines of whitebark pine in portions of its range (USFS 2003). Wildland fire suppression may exacerbate blister rust infections and mountain pine beetle infestations in whitebark pines by inhibiting whitebark pine regeneration through increased competition with other conifers. Frequent wildland fires may remove fir and spruce, but not the more fire- resistant whitebark pine. Whitebark pine regenerates more successfully on burned sites than do other conifers, but less successfully on undisturbed sites. Therefore, wildland fire suppression may result in fewer regeneration sites for whitebark pine.

To date, Yellowstone's whitebark population has not been significantly affected by any of the factors that affect whitebark pines in other areas in its range. Infection rates for blister rust are higher in moist climates that favor fungal growth (USFS 2003). Yellowstone's cool, dry climate appears to discourage high infection rates and it has been relatively free of white pine blister rust (< 5% of the population) (Kendall et al. 1986). Although Yellowstone has experienced mountain pine beetle epidemics (Franke 2000), it's cooler climate also appears to be a limiting factor, since the beetle's reproduction is increased by warm, droughty summers and mild winters (USFS 2003). However, long- term climate change in the GYA may increase competition with other conifers (Mattson and Reinhart 1994) and may increase blister rust infections and mountain pine beetle infestations.

At this time, Yellowstone does not anticipate the necessity of suppressing a WFU fire for protection of the grizzly bear because of the long- term benefits to grizzly bear habitat from maintaining fire as a natural process. However, if future surveys, research or changes in park resources indicate otherwise, Yellowstone will consider suppression of a WFU fire to protect the grizzly bear as a resource management objective, provided that firefighter and public safety, available funding, and other park resource objectives are met. If the park makes a determination that specific grizzly bear habitat warrants suppression of a WFU fire, this information will be conveyed to FWS in an annual report.

There is a low potential for an increase in the establishment of forbs, such as the exotic Alsike clover (*Trifolium hybridium*), as a result of ground- disturbance and vegetation removal during WUI operations. Forbs are eaten extensively by Grizzly bears during some years and seasons and an increase in forbs could attract Grizzly bears to the developments and lead to bear- human conflicts. However, under current management in YNP, bear activity within and immediately adjacent to all the developed areas is discouraged and bears that enter developments are hazed out to reduce the potential for bear- human conflicts and subsequent human- caused bear mortality. By hazing Grizzly bears out of developments, the potential for human conflict with bears that may be attracted to new forb production is very low.

All wildland fire suppression and WFU monitoring activities will adhere to the MIST techniques and the FWS Conservation Measures to avoid and minimize disturbances to soils. To minimize the introduction of exotic species and promote residual seed and sprouting from the surviving below- ground native plant parts, burned areas will not be reseeded.

C. Gray wolf

Potential direct effects to a gray wolf that may occur during wildland fire suppression activities, WFU fires, and non- fire fuels management projects include (1) injury or

mortality; (2) displacement from occupied habitat, and (3) temporary barriers to movements. Potential indirect effects that may result from wildland fire suppression activities, WFU fires, and non- fire fuels management projects include changes in denning and foraging habitat.

Direct Effects

Injury or mortality to an adult gray wolf from a wildland fire either from suffocation or burning is highly unlikely as a wolf would be outrun these fires. The young are usually as mobile as adults by August and are also likely to outrun a fire. Fires that are large enough to generate sufficient smoke to cause suffocation do not usually occur in Yellowstone until late summer, after the denning season. Wolves would be highly likely to be able to build a new den in the event that a den was destroyed.

Active suppression of wildland fire would occur primarily in the backcountry over a week's time and involve small groups (typically two 20- person crews) working near fires and out of small spike camps located in grassland habitats or even within the burn perimeter. Camps would be located away from known active gray wolf den or rendezvous sites when possible. Crews would be trained in food storage, in other camping protocols, and in minimizing disturbance to wildlife. To minimize human-wildlife interactions, each camp will be attended by a resource advisor who enforces camp protocols and a caretaker to maintain the camp in the absence of firefighters.

Disturbances associated with large firefighter camps (> 100 persons) would be strictly limited to pre- existing disturbed sites (e.g., baseball fields) in the vicinity of developed areas and roads, where existing human activity likely already limits gray wolf denning and movement in the vicinity. Crews monitoring WFU fires would consist of 3–8 persons with similar training in protocols. They would work out of small camps in the backcountry for up to five days.

Monitoring activities or wildland fire suppression camps will not impede gray wolf travel because these small centers of human activity in the backcountry are typically very small (< 1 ha). Large firefighter camps and thinning projects will both occur in or near developed areas where existing disturbance and buildings may already represent barriers to travel, but which resident lynx likely are already accustomed.

Helicopter- based suppression and WFU fire monitoring activities are not likely to cause localized, temporary disturbance in the form of noise, because they would not occur during the April- July denning season when high fuel moisture levels typically preclude high- intensity fires. Helicopter use within 1.6 km (1 mile) of a known active den site would not be used, unless required for firefighter and public safety.

Fires that escaped suppression activities (uncontrolled) could result in injury or mortality. However, these events are “acts of God” and not subject to Section 7

consultation. In the event of either a suppression activity or escaped wildfire, the park would conduct Section 7 emergency consultation with FWS to determine and document effects and incidental take, if any, to gray wolves.

Non- fire fuels management activities are unlikely to result in injury or mortality because wolves tend to avoid human developed areas. Currently no known den or rendezvous sites are within two miles of the remaining developed areas to be treated (D. Smith, Yellowstone National Park Wolf Biologist, pers. comm.). If wolves were to establish a den or rendezvous sites within 1 mile of a treatment area, project activities would not be conducted between April 15 and August 1. Thinning or burning operations will not occur during crepuscular or nocturnal time periods when lynx are most likely to travel through these developed areas. The potential for a project- related vehicle- strike mortality is discountable due to the low posted speeds of 15 mph and the slow speeds that vehicles actually travel in these developed areas.

Indirect Effects

Wolves have evolved with fire and the changes in forest mosaic that results from stand-replacing and mixed severity fires on a landscape scale. Wildland fire use can result in increased browse for ungulates post- fire, which would be beneficial for wolves.

At this time, Yellowstone does not anticipate the necessity of suppressing a WFU fire for protection of the gray wolf because of the long- term benefits to gray wolves from maintaining fire as a natural process. However, if future surveys, research or changes in park resources indicate otherwise, Yellowstone will consider suppression of a WFU fire to protect the gray wolf as a resource management objective, provided that firefighter and public safety, available funding, and other park resource objectives are met. If the park makes a determination that specific gray wolf habitat warrants suppression of a WFU fire, this information will be conveyed to FWS in an annual report.

D. Bald eagle

Potential direct effects to a bald eagle that may occur during wildland fire suppression activities, WFU fires, and non- fire fuels management projects include (1) injury or mortality to eggs, nestlings or chicks and (2) temporary displacement from occupied habitat. Potential indirect effects that may result from wildland fire suppression activities, WFU fires, and non- fire fuels management projects include loss of nesting and roosting habitat.

Direct Effects

Injury or mortality from wildland to an adult bald eagle is unlikely as adults are highly mobile and would be able to flee even a severe crown fire. Bald eagles were frequently observed capturing prey that were fleeing fires throughout the 1988 fire season in

Yellowstone. There is a greater potential, although still low, for injury or mortality to eggs, nestlings, and chicks to occur from associated smoke inhalation of a WFU fire or from the fire itself that causes chicks to fledge too early when they are not capable of sustaining flight or results in mortality in the nest. Crown fires that would result in these type of effects typically would occur in late summer or early fall when eaglets would have already fledged (Smith 2000); it is unlikely that a WFU that results in these types of mortality would overlap with bald eagle nesting season during the next 10- 20 years. During the 1988 fires in Yellowstone, five bald eagle nests were destroyed when fire burned the nest trees. However, a total of 11 eaglets fledged from bald eagle nests in the park that year because they had fledged before the fires entered these nesting territories. No known mortalities from smoke or fires were known to occur during this intense fire season.

Suppression activities and WFU monitoring actions with the potential to disturb bald eagles are large firefighter camps constructed to fight intense crown fires during the nesting season within close proximity to nesting bald eagles that cause adults to abandon a nest. The appropriate resource manager or ornithologist would be notified during the initial attack suppression decisions, and if suppression were authorized, would provide information on locations of nesting bald eagles and avoidance and minimization measures. Measures to protect nesting bald eagles would be undertaken such as nest tree structure protection and locating camps > 1 mile from a nesting bald eagle, provided firefighter and public safety and other resource objectives are not compromised. To minimize human- wildlife interactions, each camp will be attended by a resource advisor who enforces camp protocols and a caretaker to maintain the camp in the absence of firefighters.

Fires that escaped suppression activities (uncontrolled) could result in injury or mortality. However, these events are “acts of God” and not subject to Section 7 consultation. In the event of either a suppression activity or escaped wildfire, the park would conduct Section 7 emergency consultation with FWS to determine and document effects and incidental take, if any, to bald eagles.

None of the WUI projects in the developed areas scheduled over the next 8- 10 years will result in direct or indirect adverse affects to bald eagles or their habitat (T. McEneaney, Yellowstone National Park Ornithologist, pers. comm.). At this time, no proposed WUI fuels treatment project is within 0.5 mile of a known bald eagle nest or bald eagle habitat. In the event that a nest is constructed, project activities would not occur during the bald eagle nesting season (February 1- August 15). Helicopter pilots would avoid conducting low- level flights within 0.5 miles of a known active bald eagle nest during implementation of proposed WUI fuels treatments.

Indirect Effects

Bald eagles have evolved in the Yellowstone ecosystem and are assumed to have evolved and adapted to periodic fire disturbances (Lyon et al. 2000). Long- term indirect effects from WFU to bald eagles are largely beneficial but will depend on the burn pattern and intensity of fires. Patchy fires result in a mosaic that promotes a diversity of habitat patterns, a possible increase in snags for perching and nesting, and potentially an increase in small mammal prey. Stand–replacing fires could result in a short- term loss of nest, roosting or perching trees previously used by a bald eagle; however, nest trees for bald eagles in Yellowstone are not limiting. Even with wildfires burning 60% of the park in 1988, bald eagle occupancy of their territories remained quite high, as observed in post- fire monitoring flights in late October and early November of 1988. Once secure nesting trees were found, bald eagles returned to pre- 1988 productivity.

At this time, Yellowstone does not anticipate the necessity of suppressing a WFU fire for protection of the bald eagle because of the long- term benefits to bald eagles from maintaining fire as a natural process. However, if future surveys, research or changes in park resources indicate otherwise, Yellowstone will consider suppression of a WFU fire to protect the bald eagle as a resource management objective, provided that firefighter and public safety, available funding, and other park resource objectives are met. If the park makes a determination that specific bald eagle habitat warrants suppression of a WFU fire, this information will be conveyed to FWS in an annual report.

IX. INTERRELATED AND INTERDEPENDENT EFFECTS

The park is not aware of any interrelated and interdependent effects to Canada lynx, grizzly bear, gray wolf, and Bald eagle from the 2004 Update.

X. CUMULATIVE EFFECTS

Cumulative effects are those future State, local or private actions that are reasonably certain to occur in the project area. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7(a)(2) of the Act.

The project area is entirely within Yellowstone National Park and there are no private in- holdings within the park. The vast majority of the surrounding lands adjacent to the park are federally owned (USFS), with the exception of the small gateway communities of West Yellowstone, Gardiner, and Cooke City, and possible private in- holdings on USFS lands. The park is unaware of proposed actions in these areas that may affect the Canada lynx, grizzly bear, gray wolf, or bald eagle.

XI. CONCLUSION AND EFFECTS DETERMINATION

A. Canada lynx

Implementing the 2004 Update may affect, but is not likely to adversely affect Canada lynx. Wildland fire use fires may have temporary and localized negative effects on lynx, but these effects do not rise to the level of adverse with implementation of the proposed avoidance and minimization measures. Lynx have evolved in association with landscapes strongly influenced by fire, the primary forest disturbance agent within the GYE, are highly vagile, and are adaptable to changing ecological conditions. Lynx are readily able to locate alternative den and foraging sites if WFU fires burn through them.

By annually incorporating the best available survey and research information on lynx and snowshoe hares in decisions regarding fire management both during and outside of the fire season, any short- term, negative effects related to WFU fires will be avoided. Wildland fire use fires will provide significant long- term benefits to snowshoe hares and lynx habitat by promoting vegetation structure that favors snowshoe hares and lynx. Forests stands of 15–40 years age that are often of high value to snowshoe hares are unlikely to burn due to low flammability; mature forest stands are more likely to burn, but support few hares.

None of the proposed WUI fuels treatmentst will occur within LAUs; therefore no adverse effects on lynx are expected. Treatments at Tower- Roosevelt and Bridge Bay will permanently remove approximately 2 ha and 4 ha of forest to lynx habitat currently in an unsuitable condition.

Adverse effects to the grizzly bear from wildland fire suppression activities would be handled through Section 7 Emergency Consultation procedures.

B. Grizzly bear

Implementing the 2004 Update may affect, but is not likely to adversely affect grizzly bear with implementation of the proposed avoidance and minimization measures. Wildland fire use fires may have a combination of both positive and negative effects, depending on burn severity, patch size, and habitat type, but these effects do not rise to the level of adverse with implementation of the proposed conservation measures. Grizzly bears have evolved in association with landscapes strongly influenced by fire, the primary forest disturbance agent within the GYE, are highly vagile, and are adaptable to changing ecological conditions. Wildland fire use fires will provide significant long- term benefits to grizzly bears by maintaining natural ecosystem processes. Suppression of WFU fires in habitat important for grizzly bears will be considered if research and park management determines it to be important for their protection. The park will annually incorporate the best available survey and research information on grizzly bears in decisions regarding fire management both during and

outside of the fire season. Adverse effects to the grizzly bear from wildland fire suppression activities would be handled through Section 7 Emergency Consultation procedures.

The eight remaining WUI fuels treatments will occur within grizzly bear habitat. These areas total approximately 177 acres, based on a maximum 400- foot perimeter from the outer structures. Impacts to high quality grizzly bear habitat in the WUI project areas will not be quantified until actual treatment boundaries are determined closer to the implementation date of each project. If requested by the FWS, Yellowstone will include a quantification of the number of acres of grizzly bear habitat quality affected from any WUI fuels treatments proposed for the following year in the annual report submitted to FWS. The park has determined that even without this quantification of impacts to high grizzly bear habitat, the effects from eight fuels treatments in the proposed WUI project areas are discountable with implementation of the avoidance and conservation measures.

C. Gray wolf

Implementing the 2004 Update may affect, but is not likely to adversely affect the gray wolf with implementation of the proposed avoidance and minimization measures. Gray wolves are adapted to landscapes strongly influenced by fire, the primary forest disturbance agent within the GYE, are highly vagile, and are adaptable to changing ecological conditions. Wildland fire use fires will provide significant long- term benefits to gray wolves by maintaining natural ecosystem processes. Effects from wildland fire suppression, WFU, and non- fire fuels treatments do not rise to the level of adverse with implementation of the proposed avoidance and minimization measures.

Wildland fire suppression activities are not likely to adversely affect gray wolves with implementation of the proposed conservation MIST and FWS conservation measures. Adverse effects to the gray wolf from suppression activities would be handled through Section 7 Emergency Consultation procedures. None of the proposed WUI fuels treatments are within two miles of known den sites. The best available survey and research information on gray wolves regarding denning and rendezvous sites will be incorporated in annual fire management decisions. WUI project activities would avoid known active den or rendezvous sites in the event that new ones are established within 1 mile of a WUI project area.

D. Bald eagle

Implementing the 2004 Update may affect, but is not likely to adversely affect the bald eagle with implementation of the proposed avoidance and minimization measures. Bald eagles have evolved with landscapes strongly influenced by fire, the primary forest disturbance agent within the GYE, are highly vagile, and are adaptable to changing ecological conditions. Wildland fire use fires will provide significant long- term benefits

by maintaining natural ecosystem processes. Severe fires that produce smoke sufficient to result in injury or mortality to nest abandonment or suffocation to nestlings or chicks is highly unlikely given that most crown fires do not occur in Yellowstone until late summer/early fall when the vast majority of chicks would have already fledged and could successfully flee a WFU fire. The best available survey information on bald eagles regarding nest sites and habitat to protect from WFU fires and wildland suppression activities will be incorporated in fire management decisions.

Wildland fire suppression activities are not likely to adversely affect bald eagles, with implementation of the proposed conservation MIST and FWS conservation measures. Adverse effects to the bald eagle from suppression activities would be handled through Section 7 Emergency Consultation procedures.

The proposed remaining WUI mechanical treatments do not occur within 0.5 miles of a known bald eagle nest tree or bald eagle habitat. In the event that a nest is constructed within 0.5 miles, WUI project activities would not occur during the bald eagle nesting season (February 1- August 15). Helicopter pilots would avoid conducting low- level flights within 0.5 miles of a known active bald eagle nest.

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XIII. LIST OF DOCUMENT PREPARERS AND CONTRIBUTORS

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Attachment 1

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT
WILDLAND FIRE MANAGEMENT PLAN

YELLOWSTONE NATIONAL PARK
IDAHO/MONTANA/WYOMING

Yellowstone National Park prepared the Environmental Assessment (EA) of the revised Wildland Fire Management Plan using the findings of the Fire Management Policy Review Team, appointed by the Secretaries of Agriculture and Interior, and the results of scientific research.

The preferred alternative (Proposal) will manage wildland fires using the full range of fire management techniques. Naturally-ignited fires would be allowed to burn in certain areas of the park under specific conditions. Management-ignited prescribed fires would be initiated by National Park Service personnel to accomplish a variety of objectives including hazard fuel reduction and the reintroduction of fire to those areas of the park where suppression has altered the natural fire regime. Fires that will be suppressed include all human-caused fires; all fires which pose a threat to human life, developments, or cultural resources; any natural ignition which does not meet prescription parameters at the time that it is discovered; and any natural or management-ignited prescribed fires which exceed prescription parameters while burning. Suppression will be accomplished using confine, contain, or control strategies.

On July 12, 1991, the park released the draft Wildland Fire Management Plan and Environmental Assessment for public review. A mailing was conducted to all interested parties, and a press release was issued to media-related contacts. On July 17, 1991, 140,000 "Report and Comment Forms" on Yellowstone National Park's Wildland Fire Management Plan were distributed through nine regional newspapers and the park's five Visitor Centers. The report and comment forms were also distributed directly in the communities of Cooke City, Big Sky, and Gardiner, Montana. The formal public comment period for the Environmental Assessment closed on August 30, 1991. By September 11, 1991, 349 written comments were received.

Of the 349 responses, approximately 41 percent were supportive of the park's preferred alternative (Proposal), approximately 10 percent favored full suppression of all fire occurring in Yellowstone National Park (Alternative A), 1 percent preferred the use of Management-Ignited Prescribed Fire Only (Alternative B), approximately 14 percent favored allowing natural processes to work to the greatest extent possible, with the provision that priority be given to the protection of people and property (Alternative C), and 34 percent did not express support for a particular alternative or presented other alternatives.

A majority of the respondents listed concerns that were not directly related to fire management. They included: the 1988 fires; protection of natural resources; management policy (harvesting of timber and reforestation); protection of human life, developments, and

cultural resources; economic and political influences on the park's fire management; research; interagency cooperation; fire prevention and public information programs; and funding for the proposed Wildland Fire Management Plan.

The U.S. Fish and Wildlife Service reviewed the Environmental Assessment for compliance with Section 7 of the Endangered Species Act (ESA) and determined that the overall effects would be beneficial to listed species. They requested that each prescribed burn be reviewed for ESA compliance. This will be handled through the Park Compliance Program for each action.

The Wyoming, Montana, and Idaho state historic preservation offices reviewed the plan for compliance with Section 106 of the National Historic Preservation Act. Idaho State Historical Society pointed out that fire would affect noncombustible materials found at archaeological sites. Montana's State Historic Preservation Office, Montana Historical Society suggested that we take a more proactive approach to protecting cultural resources from fire-related activities. Wyoming's Department of Commerce, Division of Parks & Cultural Resources, State Historic Preservation Office concurred with the fire management goals for the protection of historic and prehistoric cultural resources. They recommended that the plan include provisions for cultural resource inventories subsequent to fire activities where substantial ground cover was removed. If, during the implementation of this program, cultural resources are discovered or may possibly be affected, the resources will be protected, and the appropriate state historic preservation office will be notified.

The proposal does not constitute an action that normally requires preparation of an environmental impact statement (EIS). The proposal will not have a significant effect on the human environment. Negative environmental impacts that could occur are minor and temporary in effect. There are no unmitigated adverse impacts on public health, public safety, threatened or endangered species, sites or districts listed in or eligible for listing in the National Register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, cumulative effects, or elements of precedence were identified. Implementation of the action will not violate any federal, state, or local law. Based on the foregoing, it has been determined that an EIS is not required for this project and thus will not be prepared.

Recommended: _____ 3/16/92
Superintendent, Yellowstone National Park — Date

Approved: _____ 3/26/92
for Regional Director, Rocky Mountain Region — Date

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4000 Airport Parkway
Cheyenne, Wyoming 82001

JUN 1 5 2004

In Reply Refer To:
ES-[illegible]

Memorandum

To: Field Managers, Bureau of Land Management
Forest Supervisors, U.S. Forest Service
Superintendents, National Park Service
Refuge Managers, National Wildlife Refuges
Tribal Affairs, Wind River Reservation

From: Brian T. Kelly, Field Supervisor, U.S. Fish [illegible] Wyoming Field Office, Cheyenne, Wyoming

Subject: Emergency Consultation for Wildfire Suppression

As the fire season approaches, the U.S. Fish and Wildlife Service (Service) would like to review with you the procedure for emergency consultations, which includes wildfire suppression activities. Of paramount importance is the safety of the firefighters. No constraints for protection of endangered species or their habitat will be considered if they place firefighters in danger. FIREFIGHTER SAFETY COMES FIRST ON EVERY FIRE, EVERY TIME.

There is no need to consult on the wildfire itself. Wildland fire has many beneficial effects in a naturally functioning ecosystem, but on occasion fire can destroy endangered species and their habitats and/or alter critical habitat. Wildland fire is considered a disaster or an act of God as regards section 7 of the Endangered Species Act of 1973 (Act), as amended (50 CFR §402.05). Initiation of consultation is only required if there may be an effect to a listed species resulting from *wildfire suppression activities*. Chapter 8 of the Section 7 Consultation Handbook (FWS-NMFS, 1998) describes the emergency consultation process for wildfire suppression activities. The Action Agency (i.e., the lead federal agency) has a duty to meet their section 7(a)(2) and 7(d) obligations under the Act (16 U.S.C. 1531 et seq.) even in emergency situations. Emergency consultation for wildland fire can be characterized by a 4-step process.

- Initial contact by the Action Agency: Initial contact by the Action Agency can be by phone or fax (please see numbers listed below). This contact should be followed by a written request from the Action Agency for emergency consultation if fire-suppression activities may affect a listed species or critical habitat. The Service can be contacted at any time for assistance in identifying areas with Federally protected species. **Do not delay response to a wildfire to contact the Service.** Typically, initial contact with the Service occurs simultaneously with, or at the earliest

possible consultation after the Action Agency responds to fire. During the initial contact with the Service, the Action Agency describes the emergency situation and response (proposed and taken actions) and the Service provides recommendations to minimize effects to listed species and their habitats. In addition to site specific recommendations, the Service advises use of Minimum Impact Suppression Tactics on areas with Federally protected species or habitat. Refer to Appendix F of the Interagency Standards for Fire and Aviation Operations 2005 (or updates) for designated Resource Advisors who are the field contact for coordination with the Service. The Service recommends that additional, or the continuation of, controls in place when fire suppression activities occur in areas with Federally protected species or situations where an adverse effect to listed species or their designated critical habitat may occur. The Service determines whether the incident may result in jeopardy or adverse modification.

2. Completing Consultation. During the fire management phase, the Action Agency continues the consultation process. A Biological Assessment, including verification of the expedited consultation, a description of the fire and fire suppression activities, and resultant effects to listed species and their habitats is required. Note that the "federal action" consists of the agency actions (i.e., fire suppression activities) that occurred, whereas the description of fire effects considers the environmental baseline for listed species.

3. Biological Opinion. Emergency consultations are "after the fact" consultations and are modified from the standard Biological Opinion format. Items such as the assessment of effects, identification of reasonable and prudent measures, terms and conditions are generally not applicable for emergency consultations. Documenting the amount of take that occurred due to the emergency fire suppression, (2) documenting the Service's recommendations to minimize effects, (3) evaluating the success of the Action Agency carrying out these recommendations, and (4) determines the ultimate effect of take. Effects of incidental take of listed species, if any, only for fire suppression actions. Federally listed species or critical habitats lost due to the wildfire itself are not considered "take" unless caused by the controlling agency.

4. Conservation Recommendations. Emergency consultations may contain conservation recommendations to help protect listed species and their habitats in future emergency situations or to implement beneficial actions to conserve the species. For example, a conservation recommendation may advise restoration of areas that previously provided habitat for listed species prior to being affected by suppression activities. Rehabilitation efforts in areas near or occupied by Federally protected species should be coordinated with the Service. Preventive suppression resource tactics that reduce the need for rehabilitation are preferred whenever feasible.

The most effective way to minimize impacts on endangered species is to informally consult with the Service during the development of the consulting agency's "Fire Management Plan." Endangered species concerns can be identified before wildfires start, and pre-attack suppression strategies can be designed to address endangered species needs. This will provide important information to the initial attack Incident Commander and facilitate the development of the Wildland Fire Situation Analysis (WFSA), if necessary. The WFSA is an effective means of identifying all resource considerations

including endangered species and their critical habitats. The WFSA identifies appropriate suppression actions. Appropriate suppression actions can include the entire range of activities normally implemented – application of retardant, backfires, air attack, line construction, etc. We have enclosed a list of recommended conservation measures to minimize the suppression effects to endangered species and their habitats.

If you have any questions or comments regarding your responsibilities under the Act or emergency consultation procedures, please contact our office at the letterhead address, phone (307) 772-2374 or fax (307) 772-2358. You are welcome to speak with me, the Deputy Field Supervisor, Josh Bush or any of the National Fire Plan Biologists including Brad Rogers, Trish Sweeney, Ann Hoferman Brock Applegate or Jessica Hornyack.

After Hours Emergency Contact: Brian T. Kelly (307) 231-8186 or Josh Bush (307) 631-5920

Attachment (1)

cc: D. M. Wildlife Biologists and Fire Response Staff, WY
BLM, State Office, Cheyenne, WY (T. Cottrell, D. Roberts, V. Herrera)
FS, Wildlife Biologists and Fire Response Staff, WY
FS, Region 2, Regional Office, Golden, CO (P. McDonald)
FWS, R6, Lakewood, CO (A. Cerumo, B. Fahey)
FWS, Wildlife Biologists and Fire Response Staff, WY
FWS HQ, Lander, WY (P. Brutkiewicz)
NPS, Natural Resources Staff and Fire Response Staff, WY
NPS, Intermountain Region, Denver, CO (C. Ogden)
NPS, Midwest, Wyoming State Coordinator, Cheyenne, WY (J. Keeler)

Conservation Measures to Minimize Fire Suppression Effects to Federally Protected Species

The Service recommends the following conservation measures be implemented during fire suppression operations unless firefighter safety, public safety, or the protection of property, improvements, or natural resources render them infeasible. The Service is providing these measures to reduce potential adverse effects to Federally protected species and their habitats from wildland fire suppression activities. Section 7(a)(1) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) directs Federal agencies to further the purpose of the Act by carrying out conservation measures for the benefit of endangered and threatened species. Resource Advisors should coordinate with the Service to ascertain necessary modifications or supplementation of these conservation measures during fire suppression operations.

1. **Coordination**
   a. Brief all firefighters and support personnel about Federally-protected species and procedures to minimize impacts.
   b. Apply operation guidelines from the Interagency Standards for Fire and Fire Aviation Operations 2003 (or updates).
   c. Ensure that equipment is free of weed seeds, parasites, disease and contaminants.

2. **Fire Fighting Construction Activity Areas, and Camps**
   a. Use barren lands, existing trails, roads and trails as fuel breaks.
   b. Use natural barriers as fuel breaks. In riparian areas, use openings in vegetation, such as sandy overflow channels, as fuel breaks.
   c. Use existing helispots and/or existing openings for helispot locations when possible.
   d. Construct temporary roads only if they are necessary for the protection of property or resources, including Federally protected species. Do not construct permanent roads.
   e. Build hand line instead of machine-built (e.g., bulldozer) line when possible, especially in riparian areas and wet meadows.
   f. Retain areas of fire tolerant tree species to the extent practicable.
   g. Locate camps, staging areas, aircraft landing areas, and parking areas outside of Federally protected species habitat and riparian areas, preferably in areas that are already disturbed.
   h. Establish good sanitation for handling food and trash. In areas within the range of grizzly bears, store attractants (food, trash, toiletries, etc.) in bear-resistant containers or hang them 100 yards downwind of camps. Do not burn trash. Incomplete combustion leaves odors.

3. **Aquatic Environments**
   a. Inform pilots to avoid flight paths over waterways and to drop retardants or foams no closer than 300 horizontal feet from the edge of any waterway.
   b. Fire retardants and foams should not be used within 300 feet of waterways. Retardants may cause nitrate poisoning and may be lethal to aquatic organisms. Foams cause mortality to fish via the surfactant affecting the ability of gills to absorb oxygen.
   c. Buckets that have contained fire retardant or foam should not be dipped into open waters. Set up a dip tank that is isolated from natural water bodies for this purpose.
   d. Natural water bodies should not receive or be refilled with water from tanks, or other lakes or water sources that may support non-native aquatic species, parasites or diseases.
   e. Limit stream crossing sites and locate them on hardened ground or over logs or rocks.

f. Screen pump intakes with 3/32 inch plate screen to reduce fish entrainment.
g. Construct water channels or containments to minimize streambed alteration and so that they do not inhibit fish passage.
h. Use erosion control methods, such as sediment traps to limit the inflow of ash and sediment into aquatic systems.
i. Store fuel and refuel equipment away from natural water systems.
Use containment systems for portable pumps to avoid fuel spills.
k. Be aware of management plans or develop and distribute management plans for handling spills of retardant, foams, fuels or other chemicals to waterways.
l. If fuel, other oil based contaminants or foam come in contact with surface waters, inform your administrative unit's HazMat coordinator immediately to contain the spill, and contact the National Response Center at 1-800-424-8802 or 1-202-267-2675 to report it.

4. **Raptors**
   a. Helicopter flight paths to avoid raptor nests when possible. Flight paths should be more than one mile from active bald eagle nests unless a different spatial restriction is warranted.
   b. Where air operations occur within 0.5 miles of raptor nests, consider use of helicopter water drops as an alternative to retardant drops or foam to minimize effects to raptors.

5. **Summarize Efforts and Effects**
   a. Document the locations of hand and machine built firelines.
   b. Record the locations of areas impacted by fire and fire suppression activities, such as construction of safety zones, spike camps, staging facilities, and loading areas.
   c. Identify the extent of any waterways inadvertently contaminated with foams or retardants.
   d. Identify the chemical composition of retardants and foams used during fire suppression.
   e. Record the locations of new or temporary constructed roads or trails.
   f. Identify the locations of all water sources and waterbodies used as water sources or inadvertently receiving mixed water from other sources.
   g. Identify areas where invasive weeds may have been introduced and are likely to spread.
   h. Identify general rehabilitation need.

6. **Rehabilitation**
   a. After suppression activities are completed, remove all garbage, litter, and equipment.
   b. Discourage use of trails created during the suppression effort by covering them with brush, limbs, rocks, and rotten logs in a natural arrangement.
   c. Replace the sod, soil and duff and obliterate berms created during the suppression effort.
   d. If trails were established on slopes greater than six percent, construct waterbars.
   e. Reseed, revegetate, directionally fell trees, etc. to minimize sediment delivery to waterways. Use nearby seed and transplant nearby native vegetation when possible.
   f. Restore water channels and sites used for water dipping to pre-fire conditions. Ensure that no foam or retardant residues enter waterways during restoration.
   g. In areas where pre-fire conditions consisted of degraded resources, habitat or environmental conditions, restore or stabilize those sites to the extent possible.
   h. Burned area emergency rehabilitation (BAER) activities and long-term restoration activities should be monitored with the results provided to the Service.

Appendix 3. Minimum Impact Suppression Tactics (based on the National Wildfire Coordinating Group guidelines).

The change from fire control to fire management has added a new perspective to the role of fire manager and the firefighter. Traditional thinking that "the only safe fire is a fire without a trace of smoke" is no longer valid. Fire management now means managing fire "with time" as opposed to "against time." The objective of putting the fire dead out by a certain time has been replaced by the need to make unique decisions with each fire start to consider the land, resource and incident objectives, and to decide the appropriate management response and tactics which result in minimum costs and minimum resource damage. This change in thinking and way of doing business involves not just firefighters. It involves all levels of management. Fire management requires the fire manager and firefighter to select management tactics commensurate with the fire's potential or existing behavior while producing the least possible impact on the resource being protected. The term used to describe these tactics is "Minimum Impact Suppression Tactics," commonly called MIST. Simply put: MIST is a 'do least damage' philosophy.

MIST is not intended to represent a separate or distinct classification of firefighting tactics but rather a mind set–how to suppress a wildfire while minimizing the long-term effects of the suppression action. MIST is the concept of using the minimum tool to safely and effectively accomplish the task. MIST should be considered for application on all fires in all types of land management. While MIST emphasizes suppressing wildland fire with the least impact to the land, actual fire conditions and good judgment will dictate the actions taken. Consider what is necessary to halt fire spread and containment within the fireline or designated perimeter boundary, while safely managing the incident.

Use of MIST will not compromise firefighter safety or the effectiveness of suppression efforts. Safety zones and escape routes will be a factor in determining fireline location. Accomplishments of minimum impact fire management techniques originate with instructions that are understandable, stated in measurable terms, and communicated both verbally and in writing. They are ensured by monitoring results on the ground. Evaluation of these tactics both during and after implementation will further the understanding and achievement of good land stewardship ethics during fire management activities.

GUIDELINES

The intent of this guide is to serve as a checklist for all fire management personnel. Be creative and seek new ways to implement MIST.

INCIDENT MANAGEMENT CONSIDERATIONS

- Fire managers and firefighters select tactics that have minimal impact to values at risk. These values are identified in approved Land or Resource Management Plans. Standards and guidelines are then tied to implementation practices which result from approved Fire Management Plans.
- Firefighter and public safety cannot be compromised.

- Evaluate suppression tactics during planning and strategy sessions to ensure they meet agency administrator objectives and MIST. Include agency Resource Advisor and/or designated representative.
- Communicate MIST where applicable during briefings and implement during all phases of operations.
- Evaluate the feasibility of Wildland Fire Use in conjunction with MIST when appropriate for achieving resource benefits.

RESPONSIBILITIES

Agency Administrator or Designee

- Ensure agency personnel are provided with appropriate MIST training and informational/educational materials at all levels.
- Communicate land and fire management objectives to Incident Commander.
- Periodically monitor incident to ensure resource objectives are met.
- Participate in incident debriefing and assist in evaluation of performance related to MIST.

Incident Commander

- Communicate land and fire management objectives to general staff.
- Evaluate suppression tactics during planning and strategy sessions to see that they meet the
- Agency Administrator's objectives and MIST guidelines.
- Monitor operations to ensure MIST is implemented during line construction as well as other resource disturbing activities.
- Include agency Resource Advisor and/or local representative during planning, strategy, and debriefing sessions.

Resource Advisor

- Ensure interpretation and implementation of WFSA/WFIP and other oral or written line officer direction is adequately carried out.
- Participate in planning/strategy sessions and attend daily briefings to communicate resource
- concerns and management expectations.
- Review Incident Action Plans (IAP) and provide specific direction and guidelines as needed.
- Monitor on the ground applications of MIST.
- Provide assistance in updating WFSA/WFIP when necessary.
- Participate in debriefing and assist in evaluation of performance related to MIST.

Planning Section

- Use Resource Advisor to help assess that management tactics are commensurate with land/resource and incident objectives.
- Ensure that instructions and specifications for MIST are communicated clearly in the IAP.
- Anticipate fire behavior and ensure all instructions can be implemented safely.

Logistics Section

- Ensure actions performed around Incident Command Post (ICP), staging areas, camps, helibases, and helispots result in minimum impact on the environment.

Operations Section

- Evaluate MIST objectives to incorporate into daily operations and IAP.
- Monitor effectiveness of suppression tactics in minimizing impacts to resources and recommend necessary changes during planning/strategy sessions.
- Communicate MIST to Division Supervisors and Air Ops/Support during each operational period briefing. Explain expectations for instructions listed in Incident Action Plan.
- Participate in incident debriefing and assist in evaluation of performance related to MIST.

Division/Group Supervisor and Strike Team/Task Force Leader

- Communicate MIST objectives and tactics to single resource bosses.
- Recommend specific tasks on divisions to implement MIST.
- Monitor effectiveness of suppression tactics in minimizing impacts to resources and recommend necessary changes to Operations Section Chief.

Single Resource Bosses

- Communicate MIST objectives to crew members.
- Monitor work to ensure that crews are adhering to MIST guidelines and specific incident objectives.
- Provide feedback to supervisor on implementation of MIST.

IMPLEMENTATION

- Keep this question in mind: What creates the greater impact, the fire suppression effort or the fire?
- Safety
- Apply principles of LCES to all planned actions.
- Constantly review and apply the 18 Watch Out Situations and 10 Standard Fire Orders.
- Be particularly cautious with:
    - Burning snags allowed to burn.
    - Burning or partially burned live and dead trees.
    - Unburned fuel between you and the fire.

Escape Routes and Safety Zones

- In any situation, the best escape routes and safety zones are those that already exist. Identifying natural openings, existing roads and trails and taking advantage of safe black will always be a preferred tactic compatible with MIST. If safety zones must be created, follow guidelines similar to those for helispot construction.
- Constructed escape routes and safety zones in heavier fuels will have a greater impact, be more time consuming, labor intensive and ultimately less safe.
- General Considerations
    - Consider the potential for introduction of noxious weeds and mitigate by removing weed seed from vehicles, personal gear, cargo nets, etc.
    - Consider impacts to riparian areas when siting water handling operations.
    - Use longer draft hoses to place pumps out of sensitive riparian areas.
    - Plan travel routes for filling bladder bags to avoid sensitive riparian areas.
    - Ensure adequate spill containment at fuel transfer sites and pump locations. Stage spill containment kits at the incident.

- Fire Lining Phase
    - Select tactics, tools, and equipment that least impact the environment.
    - Give serious consideration to use of water or foam as a firelining tactic.
    - Use alternative mechanized equipment such as excavators and rubber tired skidders rather than bulldozers when constructing mechanical line.
    - Allow fire to burn to natural barriers and existing roads and trails.
    - Monitor and patrol firelines to ensure continued effectiveness.
- Ground Fuels
    - Use cold-trail, wet line or combination when appropriate. If constructed fireline is necessary, use minimum width and depth to stop fire spread.
    - Consider the use of fireline explosives (FLE) for line construction and snag falling to create more natural appearing firelines and stumps.
    - Burn out and use low impact tools like swatters and gunny sacks.
    - Minimize bucking to establish fireline: preferably move or roll downed material out of the intended constructed fireline area. If moving or rolling out is not possible, or the downed log/bole is already on fire, build line around it and let the material be consumed.

Aerial fuels: brush, trees, and snags

- Adjacent to fireline: limb only enough to prevent additional fire spread.
- Inside fireline: remove or limb only those fuels which would have potential to spread fire outside the fireline.
- Cut brush or small trees necessary for fireline construction flush to the ground.
- Trees, burned trees, and snags:
- Minimize cutting of trees, burned trees, and snags.
- Do not cut live trees unless it is determined they will cause fire spread across the fireline or seriously endanger workers. Cut stumps flush with the ground.
- Scrape around tree bases near fireline if hot and likely to cause fire spread.
- Identify hazard trees with flagging, glowsticks, or a lookout.
- When using indirect attack:
    - Do not fall snags on the intended unburned side of the constructed fireline unless they are an obvious safety hazard to crews.
    - Fall only those snags on the intended burn-out side of the line that would reach the fireline should they burn and fall over.
- Mopup Phase
    - Consider using “hot-spot” detection devices along perimeter (aerial or hand-held).
    - Use extensive cold-trailing to detect hot areas.
    - Cold-trail charred logs near fireline: do minimal scraping or tool scarring. Restrict spading to hot areas near fireline.
    - Minimize bucking of logs to check for hot spots or extinguish fire: preferably roll the logs and extinguish the fire.
    - When ground is cool return logs to original position after checking.
    - Refrain from piling: burned/partially burned fuels that were moved should be arranged in natural positions as much as possible.
    - Consider allowing larger logs near the fireline to burn out instead of bucking into manageable lengths. Use a lever, etc. to move large logs.

    - Use gravity socks in stream sources and/or combination of water blivets and fold-a-tanks to minimize impacts to streams.
    - Personnel should avoid using rehabilitated firelines as travel corridors whenever possible because of potential soil compaction and possible detrimental impacts to rehab work.
    - Avoid use of non-native materials for sediment traps in streams.
    - Aerial fuels (brush, small trees, and limbs): remove or limb only those fuels which if ignited have potential to spread fire outside the fireline.
- Burning trees and snags:
    - *Be particularly cautious when working near snags (*ensure adequate safety measures are communicated).
    - The first consideration is to allow a burning tree/snag to burn itself out or down.
    - Identify hazard trees with flagging, glow-sticks or a lookout.
    - If there is a serious threat of spreading firebrands, extinguish with water or dirt.
    - Consider felling by blasting, if available.

Aviation Management

- Minimize the impacts of air operations by incorporating MIST in conjunction with the standard aviation risk assessment process.
- Possible aviation related impacts include:
- Damage to soils and vegetation resulting from heavy vehicle traffic, noxious weed transport, and/or extensive modification of landing sites.
- Impacts to soil, fish and wildlife habitat, and water quality from hazardous material spills.
- Chemical contamination from use of retardant and foam agents.
- Biological contamination to water sources, e.g., whirling disease.
- Safety and noise issues associated with operations in proximity to populated areas, livestock interests, urban interface, and incident camps and staging areas.

<u>Helispot Planning</u>

- When planning for helispots determine the primary function of each helispot, e.g., crew transport or logistical support.
- Consider using long-line remote hook in lieu of constructing a helispot.
- Consult Resource Advisors in the selection and construction of helispots during incident planning.
- Estimate the amount and type of use a helispot will receive and adapt features as needed.
- Balance aircraft size and efficiency against the impacts of helispot construction.
- Use natural openings as much as possible. If tree felling is necessary, avoid high visitor use locations unless the modifications can be rehabilitated. Fall, buck, and limb only what is necessary to achieve a safe and practical operating space.

<u>Retardant, Foam, and Water Bucket Use</u>

- Assess risks to sensitive watersheds from chemical retardants and foam. Communicate specific drop zones to air attack and pilots, including areas to be avoided.
- Fire managers should weigh use of retardant with the probability of success by unsupported ground force. Retardant may be considered for sensitive areas when benefits will exceed the

overall impact. This decision must take into account values at risk and consequences of expanded fire response and impact on the land.
- Consider biological and/or chemical contamination impacts when transporting water.
- Limited water sources expended during aerial suppression efforts should be replaced. Consult
- Resource Advisors prior to extended water use beyond initial attack.

Logistics, Camp Sites, and Personal Conduct

- Consider impacts on present and future visitors.
- Provide portable toilets at areas where crews are staged.
- Good campsites are found, not made. If existing campsites are not available, select campsites not likely to be observed by visitors
- Select impact-resistant sites such as rocky or sandy soil, or openings within heavy timber. Avoid camping in meadows and along streams or shores.
- When there is a small group, try to disperse use. In the case of larger camps, concentrate, mitigate, and rehabilitate.
- Lay out camp components carefully from the start. Define cooking, sleeping, latrine, and water supplies.
- Prepare bedding and campfire sites with minimal disturbance to vegetation and ground.
- Personal Sanitation:
    - Designate a common area for personnel to wash up. Provide fresh water and biodegradable soap.
    - Do not introduce soap, shampoo or other chemicals into waterways.
    - Dispose of wastewater at least 200 feet from water sources.
    - Toilet sites should be located a minimum of 200 feet from water sources. Holes should be dug 6-8 inches deep.
    - If more than 1 crew is camped at a site strongly consider portable toilets and remove waste.
    - Store food so that it is not accessible to wildlife, away from camp and in animal resistant containers.
    - Do not let garbage and food scraps accumulate in camp.
- Monitor travel routes for damage and mitigate by:
    - Dispersing on alternate routes or concentrating travel on one route and rehabilitate at end of use.
    - If a campfire is built, leave no trace of it and avoid using rock rings. Use dead and down wood for the fire and scatter any unused firewood. Do not burn plastics or metal.

Restoration and Rehabilitation

Firelines:

- After fire spread has stopped and lines are secured, fill in deep and wide firelines and cup trenches and obliterate any berms.
- Use waterbars to prevent erosion, or use woody material to act as sediment dams.
- Ensure stumps are cut flush with ground.
- Camouflage cut stumps by flush-cutting, chopping, covering, or using FLE to create more natural appearing stumps.

- Any trees or large size brush cut during fireline construction should be scattered to appear natural.
- Discourage the use of newly created firelines and trails by blocking with brush, limbs, poles, and logs in a naturally appearing arrangement.
- Camps:
    - Restore campsite to natural conditions.
    - Scatter fireplace rocks and charcoal from fire, cover fire ring with soil, and blend area with natural cover.
    - Pack out all garbage.
- General:
    - Remove all signs of human activity.
    - Restore helicopter landing sites.
    - Fill in and cover latrine sites.
    - Walk through adjacent undisturbed areas and take a look at your rehab efforts to determine your success at returning the area to as natural a state as possible.
    - Cover/fill in latrine sites.

Appendix 4. Eight Preliminary Maps of Proposed WUI Fuels Treatments in Developed Areas in Yellowstone National Park.

Yellowstone National Park
MT, WY, ID

National Park Service
U.S. Department of the Interior

Bridge Bay Developed Area: WUI

Produced by the Yellowstone Spatial Analysis Center 307-344-2246

December 2004

Yellowstone National Park
MT, WY, ID

National Park Service
U.S. Department of the Interior

Tower Developed Area: WUI Treatment Area

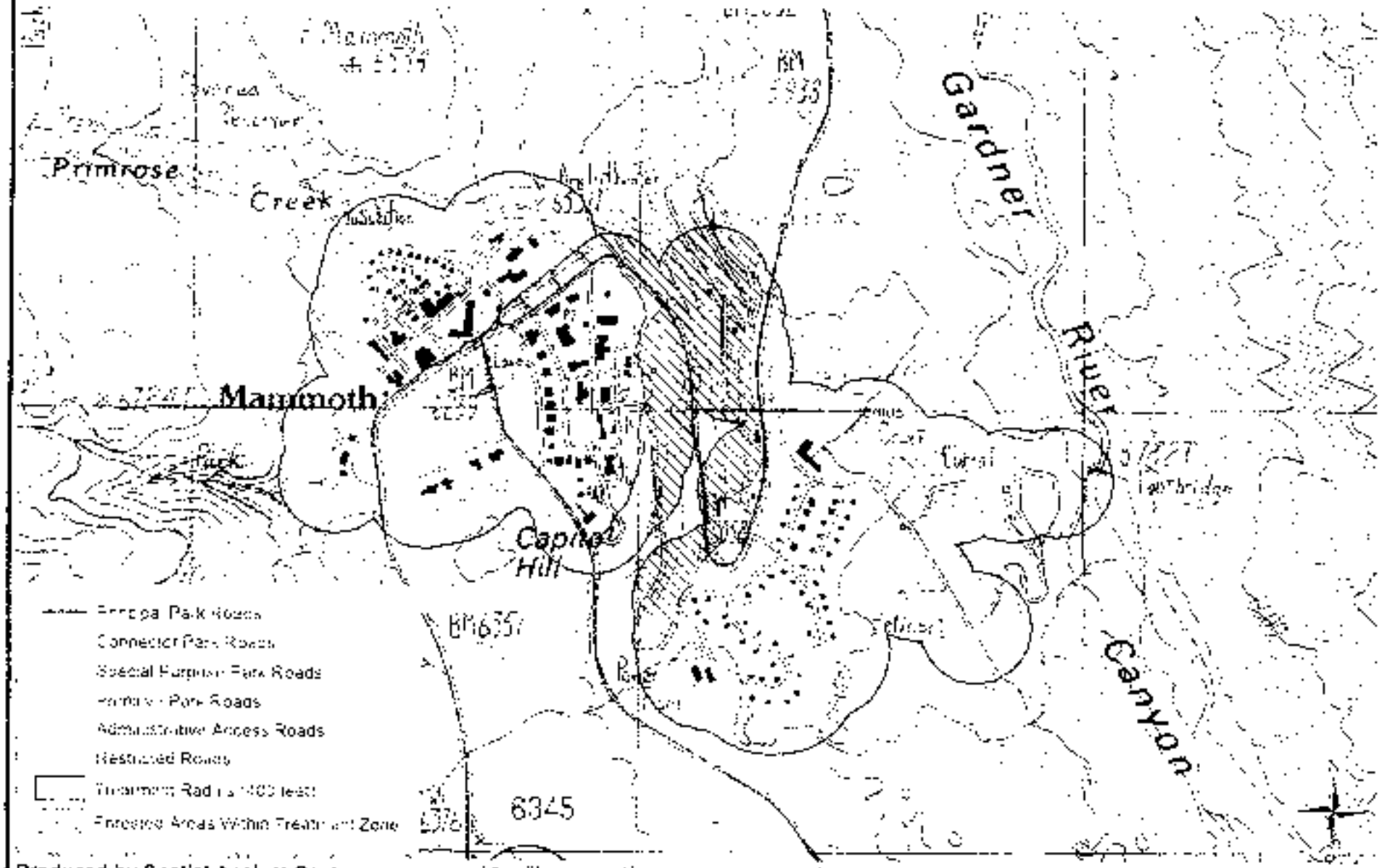
Produced by the Yellowstone Spatial Analysis Center 307-344-2246

November 2004

Yellowstone National Park
MT, WY, ID

National Park Service
U.S. Department of the Interior

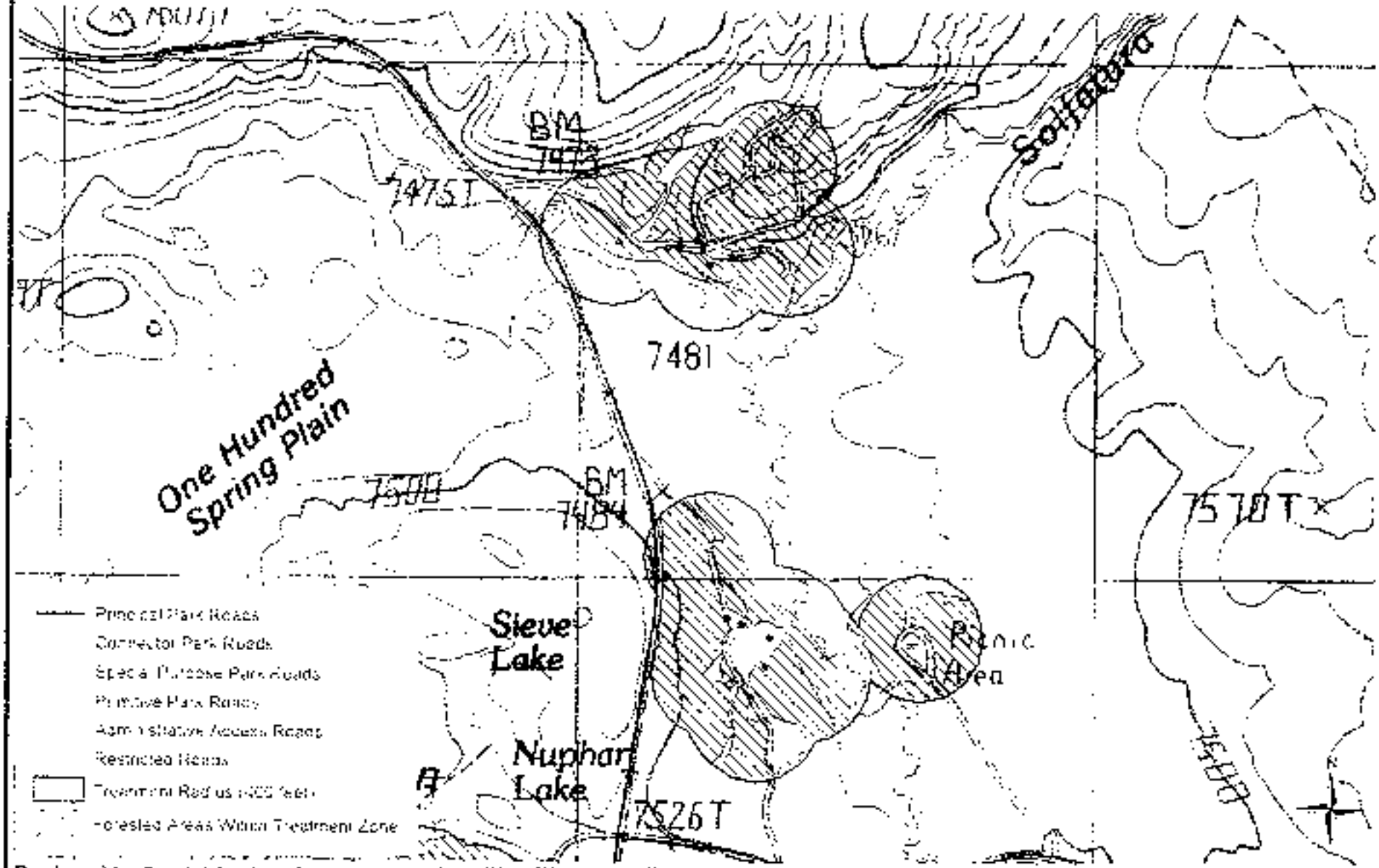
Hazard Fuel Reduction: Mammoth



Yellowstone National Park
MT, WY, ID

National Park Service
U.S. Department of the Interior

Hazard Fuel Reduction: Norris



Produced by Spatial Analyst Center

Acres 101 Forested Acres 58

July 2003

Yellowstone National Park
MT, WY, ID

National Park Service
U.S. Department of the Interior

Madison Developed Area: WUI

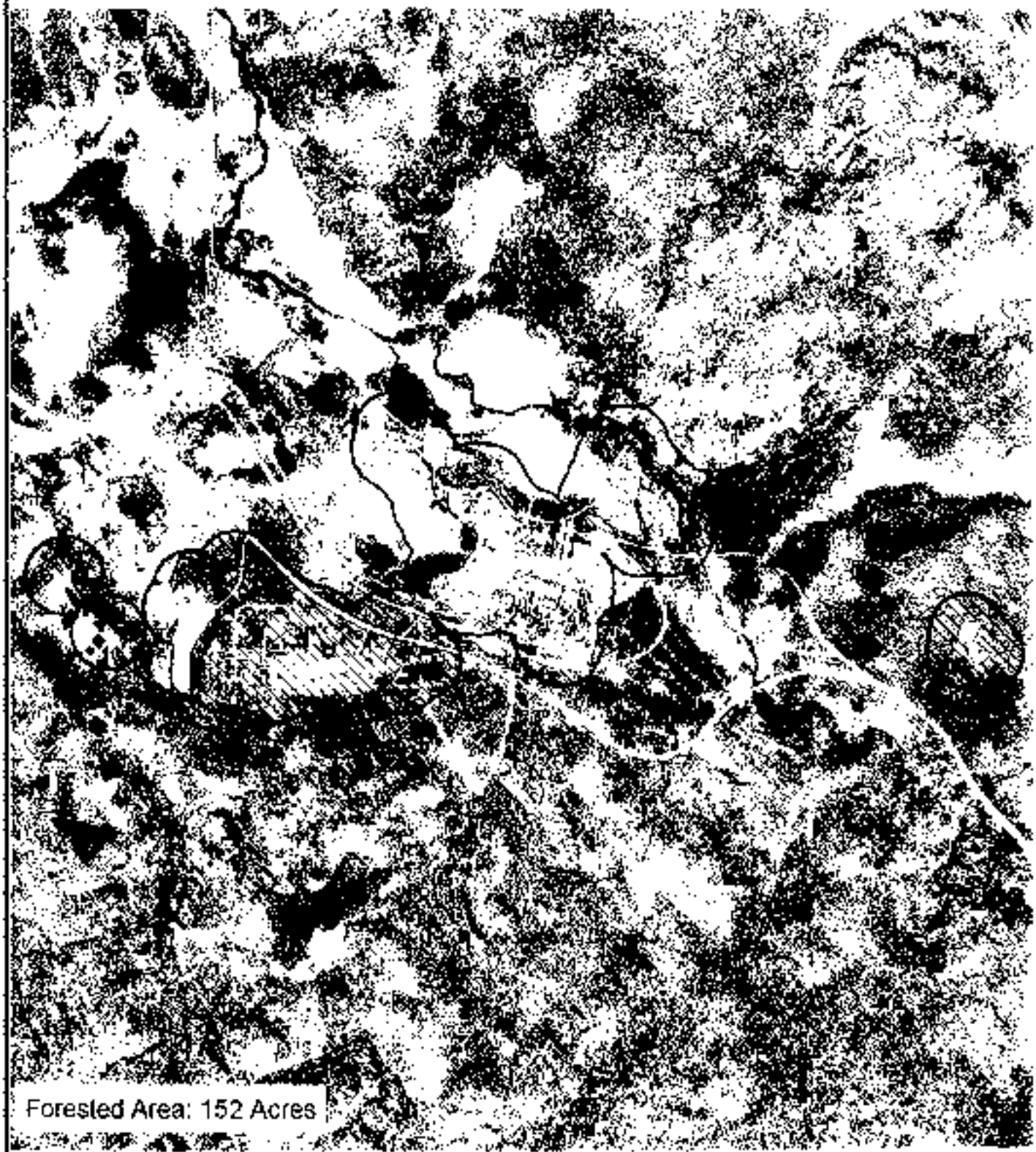
Produced by the Yellowstone Spatial Analysis Center 307-344-2246

December 2004

Yellowstone National Park
MT, WY, ID

National Park Service
U.S. Department of the Interior

Old Faithful Developed Area: WUI



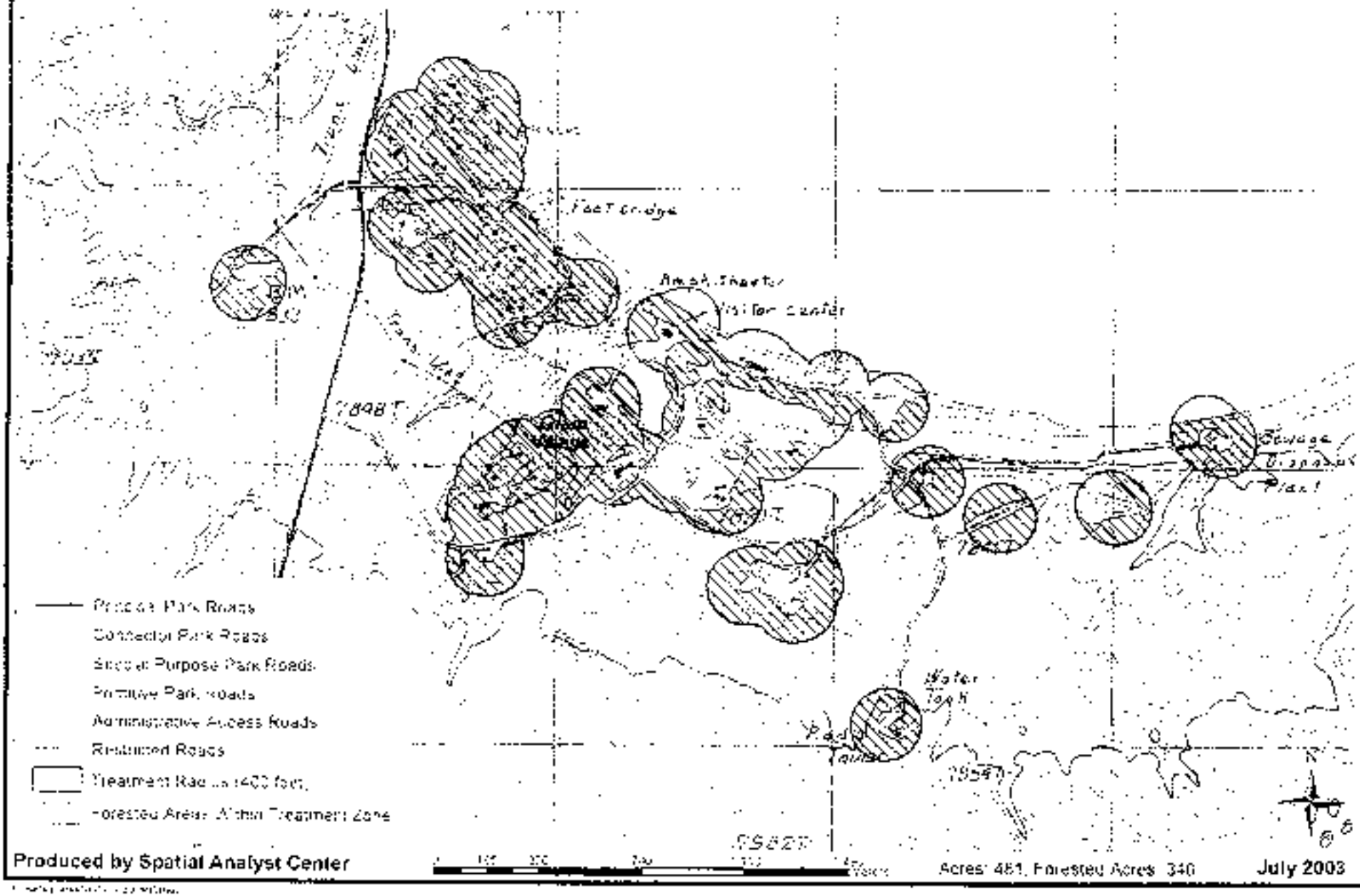
Produced by the Yellowstone Spatial Analysis Center 307-344-2246

December 2004

Yellowstone National Park
MT, WY, ID

National Park Service
U.S. Department of the Interior

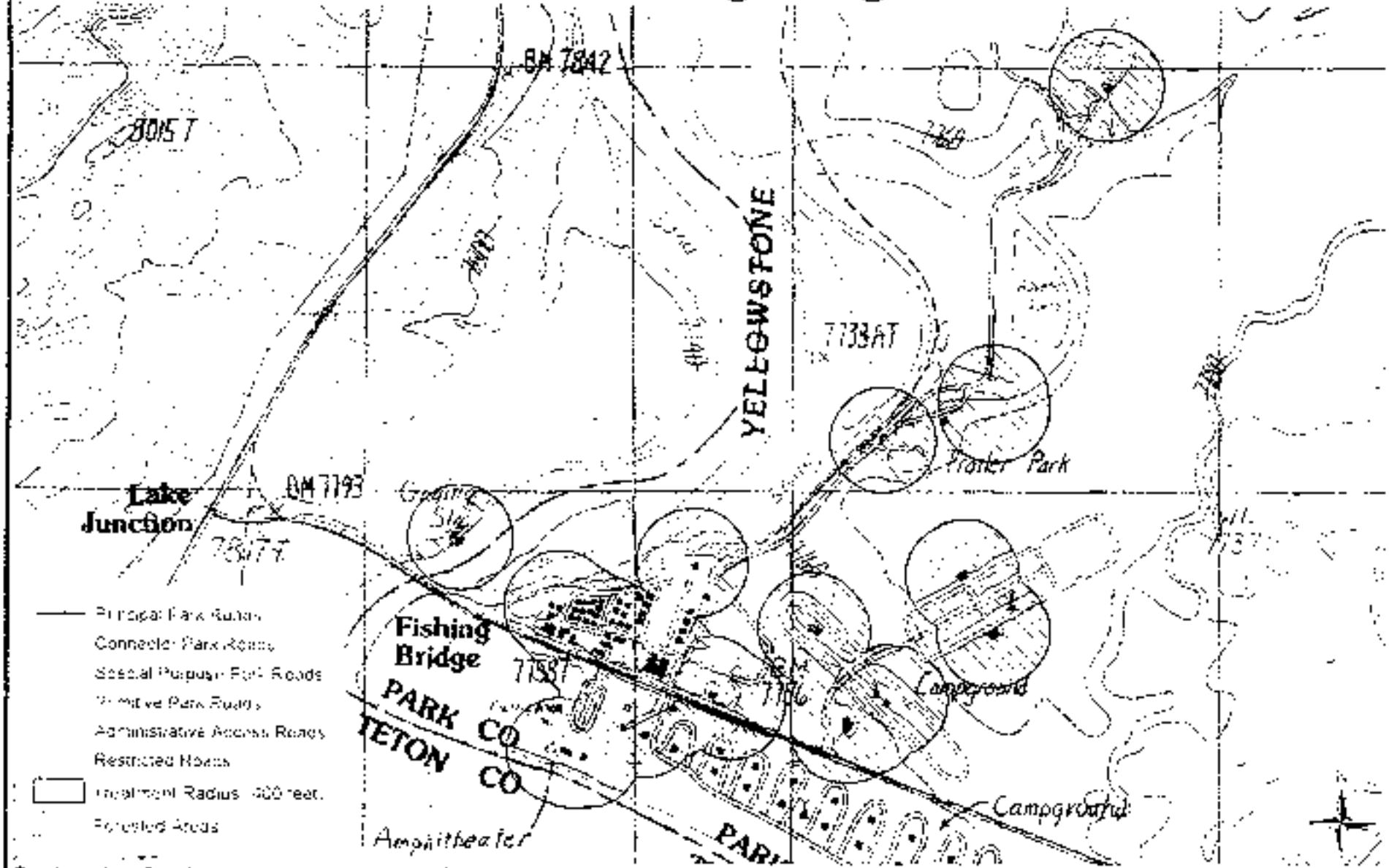
Hazard Fuel Reduction: Grant



Yellowstone National Park
MT, WY, ID

National Park Service
U.S. Department of the Interior

Hazard Fuel Reduction: Fishing Bridge



Appendix J. Informal Section 7 Concurrence Letter from U.S. Fish and Wildlife Service.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4000 Airport Parkway
Cheyenne, Wyoming 82001

In Reply Refer To:
ES-61411/W.25/WY9207

Memorandum

To: Suzanne Lewis, Superintendent, National Park Service, Yellowstone National Park, Wyoming

From: Brian T. Kelly, Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming

Subject: Programmatic Biological Assessment for Yellowstone National Park Fire Management Plan

Thank you for your letter, dated February 22, 2005, and attached 2004 Update of the 1992 Fire Management Plan, Programmatic Biological Assessment (PBA), dated January 31, for Yellowstone National Park (YNP or park). Your information was received in our Cheyenne U.S. Fish and Wildlife Service (Service) office on February 25. You requested Service concurrence pursuant to section 7(a)(2) of the Endangered Species Act of 1973 (Act), as amended (50 CFR §402.13) for your "may affect, not likely to adversely affect" determinations for the federally threatened Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos horribilis*), gray wolf (*Canis lupus*), and bald eagle (*Haliaeetus leucocephalus*).

The Service consulted on the original 1992 Fire Management Plan (FMP) in 1992 and concurred that the proposed action would be beneficial to the threatened grizzly bear and, at that time, the endangered bald eagle. Subsequent to the 1992 FMP, the bald eagle was downlisted to threatened in 1995, the gray wolf was reintroduced into the park in 1995 and 1996, and the Canada lynx was listed as threatened in 2000. Recent discussions about the 2004 Update of the 1992 FMP were held in a conference call with YNP staff on September 28, 2004 and during Northwest Wyoming Level I Streamlining meetings on September 15 and November 9, 2004.

The 1992 FMP, accompanying Environmental Assessment, and Finding of No Significant Impact included three strategies: *suppression*, *naturally-ignited prescribed natural fire*, and *management-ignited prescribed fire* in three delineated zones. In the 2004 Update, the new terminology for these strategies is *wildland fire suppression*, *wildland fire use (WFU)*, and *prescribed fire*, respectively. All fires not ignited by YNP management for specific purposes (i.e., prescribed fire) are considered wildland fires. In addition, the three fire management zones in the 1992 FMP have been redrawn into seven fire management units (FMUs) in the 2004 Update.

YNP encompasses 2,219,790 acres (3,472 square miles) and is located primarily in the northwestern corner of Wyoming (Teton and Park Counties), with small areas extending into southwestern Montana (Park and Gallatin Counties) and southeastern Idaho (Fremont County).

(WUI) of human development and at backcountry structures, such as patrol cabins and ranger stations. Treatments include thinning and removal of fuels ladders to eliminate the vertical and horizontal continuity of the fuel arrangement, thus reducing the likelihood of spot fire ignition, fire intensity, and the rate of spread. Associated equipment and activities may include chainsaws, skidders, chippers, trailers, ATVs, horse-skidding, winches, helicopters, motor vehicles, debris pile stacking and burning, and establishment of temporary decking and trailer turn-around areas.

YNP has identified eight additional WUI non-fire fuels management projects within the next 8 to 10 years, covering approximately 177 acres in all but the Southwest FMU. Treatments are intended to remove approximately 30 to 40 grams/cubic meter of the crown bulk density of vegetation matter and include the following:

- 0-30 feet of structures: remove all hazardous ground and ladder fuels (seedlings, saplings, downfall, standing dead, and trees);
- 30-120 feet of structures: remove 70-90 percent of pole-sized trees (4 to 6 inches diameter at breast height [DBH]), hazard trees, saplings (< 4 inches DBH), seedlings, and downfall to achieve an approximate 50-foot bole spacing;
- 120 feet from the edge of the structures to the treatment edge (approximately 250 to 400 feet): remove 50 percent of ground and ladder fuels, with the remaining amount of understory increasing with distance from the structure to achieve an approximate 30-foot bole spacing;
- Remove mature trees (≥ 6 inches DBH) from 30 feet of the structures to the treatment edge to achieve 20-foot crown spacing.

Avoidance and Minimization Measures. The PBA provided the following measures to avoid and minimize impacts to listed species during suppression activities, WFU fires, and non-fire WUI fuels treatments.

- Prior to and during the fire season, planning by fire management personnel will incorporate appropriate information on species' sensitive locations needing protection during suppression and WFU fires. Quantification of adverse effects from WFU fires to the species considered cannot be determined prior to each fire season; however the types of effects can be predicted and areas identified that may warrant suppression of a WFU fire in the future. Although park biologists have not identified those locations or areas that warrant suppression of a WFU fire to protect listed species at this time, the park is aware that resource conditions may change over time and/or research may demonstrate that suppression of a WFU fire is necessary to protect a listed species.
- The park will conduct Section 7 emergency consultation with the Service in the event a fire management action may affect or is likely to adversely affect a listed species.

- YNP will submit a brief annual report to the Service after each fire season and prior to May 1 of the subsequent fire season that includes the following information: (1) number of acres of mapped Canada lynx suitable habitat within Lynx Analysis Units (LAU) affected by wildland fire suppression activities, WFU fires, non-fire fuels management, and Section 7 emergency consultations in the previous fire season; (2) proposed WUI fuels treatments for the upcoming fire season and quantification of impacts to habitat quality, if requested by the Service; and (3) any recommended locations/areas for suppression of a WFU fire to protect listed species.

Frequent, low-intensity fire in mixed conifer forests may reduce competition with the more shade-tolerant subalpine fir and Engelmann spruce.

Gray wolf. At the end of December 2003, at least 174 wolves in 14 packs occupied YNP. Eight packs (96 wolves) reside on the northern range and seven (78 wolves) live throughout the rest of the park. Most packs on the northern range showed a typical seasonal distribution: low elevation in winter and the denning season and high elevation for foraging in summer.

Bald eagle. The PBA indicated that nesting success fluctuates annually in Yellowstone based on weather conditions. Over the past five years, the number of nesting bald eagle pairs has ranged from 27-32 and fledged between 15 and 24 young. In 2004, 32 nesting pairs fledged 18 young. In 1988, five bald eagle nests were destroyed when fire burned the nest trees. However, bald eagle occupancy of their territories remained high, as observed in post-fire monitoring flights in late October and early November of 1988. Bald eagles were frequently observed capturing prey fleeing from fires throughout the summer of 1988.

Direct effects. The PBA indicated that potential direct effects to lynx, grizzly bear, gray wolf, and bald eagle that may occur during wildland fire suppression activities, WFU fires, and non-fire fuels management projects include: (1) injury or mortality to these species (including bald eagle eggs, nestlings or chicks) from fire activities; (2) displacement from occupied habitat, and (3) temporary barriers to movements. However, anthropogenic activity associated with wildland fire suppression, monitoring WFU fires, and non-fire fuels treatment projects have a very low potential for injury/mortality, displacement, or modifying these species' movements because these fire activities would be temporary. The potential for project-related vehicle-strike mortality is discountable due to the low posted speeds of 15 mph and the slow speeds that vehicles actually travel in developed areas.

Direct Effects specific to lynx. Injury or mortality to lynx from WFU fires or associated smoke inhalation is highly unlikely. Wildland fire use fires are typically small in size (less than 60 hectare;ha) and rates of fire spread would not likely exceed 0.5 miles per hour in forest habitats, a speed that a lynx could easily exceed, even through heavy deadfall. Maximum rates of spread for suppressed, high intensity fires in 1988 were typically < 1.25 miles per hour. Due to unfavorable moisture conditions, WFU fires would typically not occur during the May–July period when lynx use natal dens and kittens are relatively immobile. No proposed WUI fuels treatments will occur within LAUs; therefore no adverse effects to lynx habitat are expected.

Direct effects specific to grizzly bears. The PBA indicated that temporary displacement to individual grizzly bears could occur during a large, stand-replacing fire; however, evidence shows that some bears use newly burned areas. Evidence also indicates that fire does not appear to affect denning sites, use of annual home ranges, or rates of movement before and after the fires. Large, stand-replacing fires could provide a short-term increase in grizzly bear food items such as ungulate carrion, thereby providing a temporary benefit to individual grizzly bears.

Because the grizzly bear is a generalist omnivore capable of successfully foraging for food over vast areas, negative impacts to grizzly bears due to fuels treatments will be discountable in areas and seasons containing only low to medium quality grizzly bear habitat. In areas with high-quality habitat, the park will avoid implementing fuels treatments during the season(s) of highest habitat value to grizzly bears.

species factors, wildland fire may reduce the amount of whitebark pine seeds available to a grizzly bear in the short-term, but fire is important for the long-term reproduction of whitebark pine.

Frequent wildland fires may remove fir and spruce but not the more fire-resistant whitebark pine. Whitebark pine regenerates more successfully on burned sites than do other conifers but less successfully on undisturbed sites. Wildland fire suppression may exacerbate blister rust infections and mountain pine beetle infestations in whitebark pines by inhibiting whitebark pine regeneration through increased competition with other conifers. Therefore, wildland fire suppression may result in fewer regeneration sites for whitebark pine.

There is a low potential for an increase in the establishment of forbs, such as the exotic Alsike clover, as a result of ground-disturbance and vegetation removal during WUI operations. Forbs could attract grizzly bears to developed areas and lead to bear-human conflicts. However, under current management in YNP, bear activity within and immediately adjacent to all developed areas is discouraged and bears that enter developments are hazed out.

Indirect effects specific to wolves. Wildland fire use can result in increased browse for ungulates post-fire, which would be beneficial for wolves. YNP does not anticipate the necessity of suppressing a WFU fire for protection of the gray wolf because of the long-term benefits to gray wolves from maintaining fire as a natural process.

Indirect effects specific to bald eagles. Potential indirect effects that may result from wildland fire suppression activities, WFU fires, and non-fire fuels management projects include loss of nesting and roosting habitat. Long-term indirect effects from WFU to bald eagles are largely beneficial but will depend on burn patterns and fire intensities. Patchy fires result in a mosaic that promotes diversity of habitat patterns, a possible increase in snags for perching, and potentially an increase in small mammal prey. Stand-replacing fires could result in a short-term loss of nest, roosting or perching trees previously used by a bald eagle; however, nest trees for bald eagles in Yellowstone are not limiting.

Conservation Measures. The PBA provided the following conservation measures to avoid and minimize impacts to listed species during suppression activities, WFU fires, and non-fire WUI fuels treatments.

- Avoid and/or minimize helicopter activity associated with suppression activities, WFU fire monitoring, and WUI fuels reduction treatments within 1.6 km (1 mile) of known active lynx den sites and/or suspected denning areas May 1-July 31 and within 0.5 miles of known active bald eagle nests between February 1 and August 15.

- Avoid low-level aircraft flights in occupied grizzly bear habitat and open alpine meadows used by grizzly bears when possible and within 1.6 km from known active wolf dens or rendezvous sites between April 15 and August 1.

- Locate backcountry firefighter camps > 1.6 km (1 mile) from known active lynx dens, wolf dens or rendezvous sites, and nesting bald eagles. Crews will be trained in food storage and other camping protocols and in minimizing disturbance to wildlife. To minimize human-wildlife interactions, each camp will be attended by a resource advisor who enforces camp protocols and a caretaker to maintain the camp in the absence of firefighters. Large firefighter

This concludes informal consultation for Yellowstone National Park's 2004 Update of the 1992 Fire Management Plan, pursuant to the regulations implementing the Act. This project should be re analyzed if new information reveals effects of the action that may affect listed or proposed species or designated or proposed critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to a listed or proposed species or designated or proposed critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by the proposed project.

The Service appreciates Yellowstone National Park's continued efforts in the conservation of federally-listed species. If you have any questions or comments regarding this letter or your responsibilities under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 *et seq.*, please contact Ann Belleman at (307) 578-5942.

cc: NPS, GTNP, Supervisor's Office, Resource Staff (S. Cain)
USFS, Shoshone NF, Supervisor's Office, Cody, WY (L. Otto)
WGFD, Statewide Habitat Protection Coordinator, Cheyenne, WY (V. Stelter)
WGFD, Non-Game Coordinator, Lander, WY (B. Oakleaf)

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