Fire Management Plan Review and Update
For
Denali National Park and Preserve

June 15, 2011

The National Park Service Director's Order (DO) 18, Wildland Fire Management, and the subsequent Reference Manual (RM) 18 provide wildland fire management guidelines. DO 18 states that "every park area with burnable vegetation must have a fire management plan approved by the Superintendent." Chapter 4 of RM 18 requires each NPS unit to review and update their fire management plan (FMP) annually, stating that "an annual review is essential to ensure that the FMP continues to conform to current laws, objectives, procedures, and strategies."

Plan review and updates are intended to keep the fire management plan current; changes in terminology, cooperative agreements, and modifications of multi-year treatment plans are examples of appropriate annual revisions to a fire management plan using this plan review and update format.

The updates identified in this document will become effective upon signature by the NPS unit Superintendent. The updated information should be incorporated into the Park unit's FMP, and records kept in the park files. Please send a copy of this completed and signed document to the Alaska Regional Fire Management Officer.

A comprehensive Fire Management Plan revision and NEPA compliance review of this plan is required every 5 years (DO 18, chapter 4). The FMP for Denali National Park and Preserve was originally approved September 29, 2004. It will be revised and the NEPA will be comprehensively reviewed in 2012.

Directions. Please review the following in the NPS unit FMP. If no updates are required, please check "no update"; if updates are required, please check "update included here", and identify the specific update(s) in the space provided. Some items may require discussions with park resources management personnel.

Terminology updates/revisions

__X__ No update

_____ Update included here:

Compliance (are the following still valid? NEPA, NHPA – Section 106, ESA – Section 7) NOTE: If major changes have occurred invalidating the NEPA, then the FMP may be suspended. The park unit would revert to suppression-only until a new NEPA process, and a new or revised FMP would be completed and approved.

__X__ No update

_____ Update included here:

Policy Change

__X__ No update: Language added to reflect the March 31, 2010 conversion to using the Wildland Fire Decision Support System as the only Decision Support System.

_____ Update included here (does this require additional compliance work?):

Step-up Staffing Plan (Section IV. B. 3. of the FMP)

_____ No update

__X__ Update included here: Included staffing requirements for prevention on high fire danger conditions.

Delegation of Authority (Appendix I. of the FMP)

__X__ No update: 2010 Delegation of Authority on file and still valid

_____ Update included here:

Wildland Fire Use (Section IV. A. of the FMP)

__X__ No update: : In 2009 the Fire Management plan revised to be in compliance with the 2009 Fire Management Plan Review Process for Revised Policy Implementation Guidance.

_____ Update included here: .

Wildland Fire Suppression (Section IV. B. of the FMP)

__X__ No update: : In 2009 the Fire Management plan revised to be in compliance with the 2009 Fire Management Plan Review Process for Revised Policy Implementation Guidance.

_____ Update included here:

Organizational Responsibilities (Section VI. B of FMP)

_____ No update

__X__ Update included here: Updated Organization Chart (Figure 2).

Agreements/Coordination/Contracts (Appendix I and D. of FMP)

_____ No update

__X__ Update included here: Updated Interagency and Alaska Western Area Fire Management Contact List (Appendix D) and updated references to the Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement and the Alaska Statewide Annual Operating Plan.

Multi-year Treatment Plan (Appendix D)

_____ No update

__X__ Update included here: Updated Hazard Fuels Plan and Alaska Western Area Multi-year Treatment Plan (Appendix D).

Preattack Plan (Sections IV. A,B)

_____ No update

__X__ Update included here: No substantial changes to the Preattack Plan, primarily contact information.

Other Updates

_____ No update

__X__ Update included here: Updated Appendix J. – Fire Statistics & Graphs; Appendix K. – Maps. The current Fire Management Plan is not in the current NPS FMP Template format. The Fire Management Plan will be updated to the 2010 NPS FMP Format in 2012.

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Superintendent

FIRE MANAGEMENT PLAN

For

DENALI NATIONAL PARK & PRESERVE, ALASKA

September 29, 2004

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I. INTRODUCTION

The following Fire Management Plan (FMP) is a specific action plan for the implementation of agency-wide and park-specific policies. As stated in Director's Order 18 (DO-18), the National Park Service specifies that "each park with vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to the park's natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities." Accordingly, this plan is intended to facilitate the achievement of the goals and objectives identified in the General Management Plan (GMP 1986) and Resource Management Plan (RMP 1998) for Denali National Park and Preserve (DENA). The 1986 Denali GMP specifies that "The National Park Service is a participant in the Tanana-Minchumina interagency fire management plan, which encompasses most of the fire-dependent ecosystems of Denali (as well as millions of outlying acres). …In accordance with NPS policy the objective for Denali is to allow natural forest and tundra fires to fulfill their ecological role in vegetation succession. Under the plan, natural fires occurring in Denali will be allowed to burn unless they threaten inholdings, certain identified historic sites, or neighboring lands that are zoned for protection."[1] More specifically, within the Park/Preserve's Resource Management Plan (RMP) Project Statement DENA N-520 mandates the on-going development of a fire program which will "protect human life, property and significant resources while allowing fire to fulfill its role in the ecosystem."

Since 1983, guidance for fire management activities within DENA has come from a series of statewide interagency plans developed cooperatively by the National Park Service, the Bureau of Land Management, the Alaska Department of Natural Resources, the Alaska Department of Fish and Game, the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Bureau of Indian Affairs, and Native Regional and Village Corporations. This Fire Management Plan, in turn, comprises a park-specific action plan; as such, it will be used in conjunction with the current Alaska Interagency Wildland Fire Management Plan (AIWFMP) to direct all personnel engaged in fire management actions within DENA toward the fulfillment of the goals and objectives specified by the DENA General Management Plans.

Authority for the implementation of this Fire Management Plan originates with the Organic Act of the National Park System, August 25, 1916. The act states that the primary goal of the National Park Service is to preserve and protect the natural and cultural resources found on lands under its management in such a manner as will leave them unimpaired for future generations. Current service-wide fire management policy is specifically expressed in Director's Order 18 (DO-18) and the attendant Reference Manual (RM-18). Additional authority is articulated in the Department of Interior, Departmental Manual, Series: Public Lands, Part 620: Wildland Fire Management, Chapter 1: General Policy and Procedures and specifically Chapter 2, General Policy and Procedures – Alaska. As stated in the Departmental Manual: "Nothing herein relieves agency administrators in the Interior bureaus of the management responsibility and accountability," and "Each Bureau will continue to use its delegated authority for application of wildland fire management activities such as

[1] The Tanana-Minchumina Interagency Fire Management Plan has been subsequently succeeded by the 1998 Alaska Interagency Wildland Fire Management Plan.

planning, education and prevention, use of prescribed fire, establishing emergency suppression strategies, and setting emergency suppression priorities for the wildland fire protection organization on respective Bureau lands." The Fire Management Plan for Denali National Park and Preserve (DENA) complies fully with these directives.

The actions described within this plan also meet the requirements of the National Environmental Planning Act (NEPA), the National Historic Preservation Act (NHPA), and the Alaska National Interest Lands Conservation Act (ANILCA). Compliance with these acts will be demonstrated as follows:

- The DENA Fire Management Plan is accompanied by an Environmental Assessment (Appendix C.1), a substantive discussion of the effects upon Denali's natural and cultural resources by several alternative actions, including the proposed course of action that is explained throughout the FMP.

- The Environmental Assessment, in turn, is accompanied by an ANILCA 810(a) Summary Evaluation and Findings document (Appendix C.2), an assessment of the impacts of the proposed actions upon subsistence activities within DENA.

- The Fire Management Plan, Environmental Assessment, and 810(a) Summary Evaluation and Findings will be submitted to National Park Service staff members at Denali National Park and Preserve and to the Alaska Regional Support Office for review of operational soundness and compliance with federal policy.

- The Fire Management Plan, Environmental Assessment, and 810(a) Summary Evaluation and Findings will be submitted for review to local communities, local native corporations, and to all state and federal agencies holding or administering lands adjacent or in the proximity of the Park.

- The State Historic Preservation Officer (SHPO) will review the Fire Management Plan and Environmental Assessment; in addition the SHPO will review all individual prescribed fire burn plans prior to their approval by the Superintendent. A Programmatic Agreement (pending) among Denali National Park and Preserve, Western Arctic National Parklands, Lake Clark National Park and Preserve, Katmai National Park, the Advisory Council on Historic Preservation, and the Alaska State Historic Preservation Office specifies the actions to be taken by all park units in conjunction with their Fire Management Plans for compliance with the National Historic Preservation Act.

- Notice of availability of the FMP and accompanying Environmental Assessment and 810(a) Summary will be made locally, with public comments accepted by the NPS for a period of thirty days thereafter.

As delineated by these statewide interagency plans, the State of Alaska, Bureau of Land Management - Alaska Fire Service and the Forest Service, provides primary suppression services. In addition to the fact that primary suppression services are provided by other organizations, five factors are the primary drivers that shape the NPS Alaska Wildland Fire

Management program and aspects of its planning rationale:

- The fire-funded park units encompass large fire-dependent ecosystems with fire regimes that have not been significantly affected by a relative short-period (~50 years) of fire suppression.

- The predominant fuel types present are boreal forest and tundra shrub with a long return interval (80-150 years), therefore it is classified as Fire Regime 4. With the possible exception of areas immediately adjacent to town, villages and park administrative areas or sites, all fuel types found in NPS units are classified as Condition Class 1. (For definitions of Fire Regimes and Condition Classes: http://www.fire.org/frcc/FrccDefinitions.pdf)

- Low-population density with the majority of population concentrated in a few major cities and towns, villages, park administrative areas and isolated individual inholdings (e.g., allotments and cabin sites).

- Due to the aforementioned factors, 91% of all lands managed by the NPS in Alaska fall within the Limited Fire Management Option (primarily the Use of Wildland Fire on NPS lands) with the remaining <1% in Critical, 5% in Full and 7% in Modified Fire Management Options.

- Most of the Critical, Full and Modified Options areas within NPS unit boundaries are the result of inholdings and other landowner selections.

The implications of these factors on the NPS Alaska Wildland Fire Management Program are:

- NPS fire personnel provide surveillance and fire effects monitoring of ongoing fires, often for a long duration, to the NPS management and park staffs. All surveillance activities are coordinated with the protection organizations.

- During critical resource shortages NPS personnel, in coordination with protection organization, may provide initial structure protection, usually for significant cultural resources.

- During resource shortages or if they are the closest resource NPS personnel, in coordination with protection organization, may provide initial attack (2002 Western Area Fire Management staff initial attacked three fires in DENA).

- NPS fire personnel in conjunction with park management/staff continue to evaluate and determine the appropriate protection levels of isolated, remote structures (cultural resources) within NPS units.

- Since fire behavior in the boreal forest includes high intensity stand-replacement fires with long spotting distances, fuels management opportunities are limited to mechanical thinning/removal adjacent to structures – not large landscape scale reduction.

- By allowing wildland fire to fulfill its natural role in fire-dependent ecosystems, Fire Condition Class 1 is maintained in the most efficient, cost-effective and safe manner

Therefore, the NPS organization is not large, but meets the NPS needs for Wildland fire management in Alaska in a cost-efficient and effective manner.

II. NPS POLICY AND RELATION TO OTHER PLANS

A. NPS Policy

In 1995, an interagency review of the risks and expenses associated with wildland fire management culminated in the Final Report of the Federal Wildland Fire Management Policy and Program Review. This review contained several principles, policy changes, and recommendations that were accepted and endorsed by the Secretary of the Interior. In response to these changes and recommendations, the director of the National Park Service (NPS) issued *Director's Order #18: Wildland Fire Management* (DO-18) in 1998. The provisions of DO-18 supersede all previous requirements and statements of policy with regard to wildland fire management. The 1995 Federal Wildland Fire Management policy was updated in 2001.

Foremost, DO-18 recognizes the need of the NPS to foster healthy and natural fire ecology within individual parks, through the development of fire management programs designed around resource management objectives. Tailoring the FMP to park resource management objectives while still following national guidelines is central to the development of individual fire management plans for each park unit. To this end, each unit of the NPS is directed to prepare a fire management plan that supports cultural and natural resource management objectives while emphasizing safety for park visitors, employees, and developed facilities.

All fires burning in wildland fuels within the park will be classified as either wildland fires or prescribed fires. A prescribed fire is one that is intentionally ignited by park managers to achieve resource objectives. Every prescribed fire must have a detailed prescribed burn plan, approved by the superintendent, which describes all aspects of the operation, including need and objectives, environmental parameters, monitoring, and contingency actions. Wildland fires are all other fires, whether ignited by natural or human causes. All wildland fires will be effectively managed by applying the guidelines specified in the park's fire management plan, which take into consideration firefighter safety, resource values to be protected, the effects of suppression, and numerous other criteria specific to the park unit.

B. Establishment and Purpose of DENA

From the time Congress established Denali National Park and Preserve, the purpose of the park has become complex due to the different mandates that apply to the Old Park (the original Mount McKinley National Park), the park additions (added by ANILCA), the national preserve (also added by ANILCA), and the designated wilderness (covering most of the Old Park).

Originally preserved as "a game refuge", Congress drafted The Act of February 26, 1917 (39 Statute 938) establishing Mount McKinley National Park. This Act stated that Mount McKinley National Park was:

> "… set apart as a public park for the benefit and enjoyment of the people…for recreation purposes by the public and for the preservation of animals, birds, and fish and for the preservation of the natural curiosities and scenic beauties thereof…said park shall be, and is hereby established as a game refuge."

In 1980, with the passage of the Alaska National Interest Lands Conservation Act (ANILCA), the National Park Service in Alaska gained stewardship of millions of acres of new Monuments, Parks and Preserves. In return the NPS became responsible for the care, proper management and longevity of resources that existed on these lands. With the passage of the Act [PL 96-487, section 202(3)(a)] on December 2, 1980, the former park (Old Park) was enlarged and renamed as Denali National Park and Preserve.

All the new additions to the national park system established by ANILCA were to be administered pursuant to the act of August 25, 1916, which created the National Park Service (39 Statute 535, as amended and supplemented in 16 USC 1, et seq.). That act states that lands within the system will be managed "to conserve scenery and the natural and historic objects and the wild life… and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

As one of the conservation units created and/or modified through the passage of ANILCA, Denali National Park and Preserve is charged with the following mission:

> "To preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation, including those species dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest, and coastal rainforest ecosystems; to protect the resources related to subsistence needs; to protect and preserve historic and archeological sites, rivers, and lands, and to preserve wilderness resource values and related recreational opportunities…; and to maintain opportunities for scientific research and undisturbed ecosystems."

The fundamental purposes of the 1980 Denali additions are set forth in Section 202(3)(a) of ANILCA:

> "The park additions and preserve shall be managed for the following purposes, among others: To protect and interpret the entire mountain massif, and additional scenic mountain peaks and formations; and to protect habitat for and populations of fish and wildlife including, but not limited to, brown/grizzly bears, moose, caribou, Dall sheep, wolves, swans and other waterfowl; to provide continued opportunities, including reasonable access, for mountain climbing, mountaineering and other wilderness (sic) recreational activities."

ANILCA also provides direction for the preservation of the opportunity for rural residents engaged in a subsistence way of life to continue to do so. Subsistence uses by local residents shall be permitted in the DENA additions, where such uses are traditional (ANILCA, sec 202(3)(a)).

Finally, as stated in the Denali RMP, "The overall purpose of Denali National Park and Preserve is to protect natural and cultural resources and provision of opportunities for human enjoyment of those resources in such a way that alteration by humans is minimized."

C. DENA General Management Policy and Fire Management

National Park Service Management Policies (2001 and DO-18 (1998) direct individual parks to manage natural resources, and to maintain, rehabilitate, and perpetuate their inherent integrity. More specifically, NPS Management Policies recognize the need to foster healthy and natural fire ecology within individual parks, through the development of fire management plans designed around resource management objectives.

The Denali Fire Management Plan is intended to facilitate the achievement of the goals and objectives identified in the General Management Plan (GMP 1986) and Resource Management Plan (RMP 1998) for Denali National Park and Preserve. The Denali GMP contains management direction intended to address potential issues and problems within DENA.

The General Management Plan maintains a consistent view on fire and how it will be managed within the unit. Below are some of the natural resource management objectives that relate to fire. GMP management objectives that relate to fire management for Denali National Park and Preserve include:

- Protect and interpret natural ecosystems and their individual components, based on an understanding of the role played by natural processes, including fire.

- Manage natural resources to perpetuate ecological processes and systems.

- Emphasize the continuation of the natural processes that have shaped the landscape and sustained the plant and animal populations found on NPS lands and waters.

- Allow wildfire as a natural process while protecting private property, [Alaska Native Claims Settlement Act (ANCSA) 21(e) significant historic resources, and human life.

- Maintain clean air and unimpaired view sheds.

- Protect significant cultural resources on parklands with methods that are compatible with the wilderness purposes of the area.

- Continue research to better understand fire behavior, effects, and fire history so that fires become more predictable and management goals and objectives can be safely and efficiently accomplished.

- Maintain natural features, environmental integrity, and the dynamics of natural processes operating within the park.

- Conduct fire studies in the area for the purpose of collecting information and data as a basis for updating the interagency management plan.

The GMP emphasizes preservation of natural processes in Denali National Park and Preserve. However, wildfire is also recognized as a potential threat to private property, cultural and administrative resources and human life. Consequently, the National Park Service selected the limited fire management option identified in the Alaska Interagency Wildland Fire Management Plan (AIWFMP) for approximately 90% of the lands within DENA. Fires that threaten human life, significant cultural sites or private property are suppressed only to the degree necessary to provide protection. This policy follows interagency fire planning policy and direction, and complies with provisions in the Alaska Native Claims Settlement Act [ANCSA 21(e)] that afford native lands wildland fire protection services from the United States. Additionally, the GMP allows for the use of prescribed fire as a tool to manage vegetation to protect property at risk and maintain fuel conditions.

D. DENA Resource Management Policy and Fire Management

The current DENA Resource Management Plan (1998) comprises an action plan for the implementation of the Park's GMP and as such provides resource-oriented guidelines for the development of a fire management program for Denali National Park and Preserve. With respect to fire management, the RMP Project Statement DENA N-520 recommends such actions as developing a comprehensive fire management plan, hazard fuel reduction programs for the front and back country, continued qualification and training for NPS employees, and improvements and maintenance of fire records and data. Extensive research, mitigation, monitoring, and increased interpretation and education will continue. In addition DENA N-520.001 states:

> "The fire management program goal is to protect human life, property and significant resources while allowing fire to fulfill its role in the ecosystem."

The accomplishment of the GMP objectives will occasionally demand the prioritization of wildland fire management activities by some DENA staff. Large or complex wildland fire incidents may demand the involvement of many DENA personnel, in some cases for extended periods of time.

E. Relation of DENA Fire Management Program to Interagency Fire Management Policy

In Alaska, primary responsibility for wildland fire suppression is divided between the Alaska Department of Natural Resources (DNR), the US Forest Service (USFS), and the Bureau of

Land Management Alaska Fire Service (BLM-AFS). Department of Interior Manual (620) delineates BLM authority for providing suppression services on Department of Interior and Native lands and provides for reciprocal fire protection agreements. A reciprocal fire protection agreement exists between BLM and the State of Alaska, Department of Natural Resources. Regardless of land ownership, BLM-AFS has suppression responsibilities for the northern half of Alaska, and the State has suppression responsibility in southcentral, most of southwestern Alaska and portions of the central interior. The US Forest Service provides suppression services on a portion of the Kenai Peninsula and in southeastern Alaska. An Interagency Fire Protection Agreement is in effect between the National Park Service, Alaska Region and BLM Alaska Fire Service to delineate purpose, authorities and responsibilities of both entities related to wildland fire suppression.

BLM-AFS and DNR have the primary responsibility for suppression actions on lands within Denali National Park and Preserve (See Appendix K, Map 1). Although BLM-AFS and DNR have primary responsibility for suppression, 620 Departmental Manual 2.4 states that "nothing herein relieves agency administrators in the Interior bureaus of the management responsibility and accountability of activities occurring on their respective lands." Section 2.4 goes on to state that "each bureau will continue to use its delegated authority for applications of wildland fire management activities such as planning, education, and prevention, use of prescribed fire, establishing emergency suppression strategies, and setting emergency suppression priorities for the wildland fire suppression organization on respective bureau lands."

The NPS, as well as the US Fish and Wildlife Service (USFWS), the Bureau of Indian Affairs (BIA), and Alaska Native Regional Corporations and villages participate in wildland fire management training and provide suppression resources during periods of increased fire activity in DENA, Alaska and the contiguous United States. Although the use of NPS personnel for initial attack and structure protection is not common, qualified NPS personnel may provide initial attack, in coordination with the protection organization(s), if they are the closest resources or if no other initial attack resources are available.

In the 1980's, the NPS cooperated with the BLM, the Alaska DNR, the Alaska Department of Fish and Game (ADF&G), the USFS the USFWS, the BIA, and Native Regional and Village Corporations to initiate a state-wide series of area-specific fire management plans. Two of these documents, the Alaska Interagency Fire Management Plan for the Tanana/Minchumina Planning Area (1982) and the Alaska Interagency Fire Management Plan for the Matanuska/Susitna Planning Area (1986), provided direction for fire management activities within DENA through 1998. In 1998, under the Alaska Wildland Fire Coordinating Group, the common elements of the area-specific fire management plans were incorporated into a single reference document: the Alaska Interagency Wildland Fire Management Plan. Copies of the 13 original area-specific plans and the AIWFMP can be found at the NPS regional office and the Alaska Resource Library both located in Anchorage, Alaska. Under the AIWFMP, fire protection needs were determined by the land manager/owner and reviewed annually. Lands are placed in Critical, Full, Modified, or Limited protection categories. The protection categories establish priorities for allocating fire-fighting resources with the Critical category being the highest priority and Limited the lowest. These categories are based on values to be protected, as well as the managing

agency's resource management objectives, policies and mandates. These categories are discussed in detail in the AIWFMP (2010).

This Fire Management Plan integrates the policies set forth in both DO-18 and the AIWFMP. Specifically, it is a detailed program of action to implement the fire management policies and objectives of the National Park Service. Additionally, this FMP will help to meet the objectives set forth in the DENA General Management Plans.

III. SCOPE OF WILDLAND FIRE MANAGEMENT PROGRAM

A. Fire Management Goals at DENA

Whenever safely possible, Denali National Park and Preserve will utilize the role of fire in the natural environment in the fulfillment of NPS natural resource management directives. Accordingly, DENA will direct all fire management activities toward the accomplishment of the following goals:

- The protection of human life, property, and irreplaceable natural and cultural resources.
- The preservation of fire in its natural role and as a natural process to the fullest extent possible.
- The maintenance of dynamic natural processes occurring within DENA.
- The use of selected wildland fires for the maintenance of Condition Class 1, accomplishment of resource management objectives and the reduction of hazardous fuels.
- The minimization of adverse effects of fire and fire suppression activities.
- The coordination and scientific management of wildland fire based upon natural resource management program, Central Alaska Inventory and Monitoring Network program, park and NPS goals and objectives.
- The education of employees and public about the scope and effect of wildland fire management.
- The management of wildland fire incidents in accordance with accepted interagency standards and the achievement of maximum efficiency through interagency coordination and cooperation.
- The creation and maintenance of defensible space to reduce the risk of property damage from wildland fire, improve safety for visitors, employees and residents, and reduces the risks to firefighters through the implementation of the Hazardous Vegetative Fuel Treatment Plan 2002.

- The development of on-site protection capabilities at Headquarters, Talkeetna, Wonder Lake and Toklat through the training of DENA personnel and acquisition of wildland fire fighting equipment.

- The presentation of timely and accurate fire situation, fire behavior and fire effects information to the DENA Superintendent, park staff, regional fire management staff or Incident Management Team and to the appropriate cooperative protection organization or department personnel.

B. Fire Management Options

The NPS policy DO-18 specifies the various fire management options available for use by the fire management program. These options are described below, and are summarized in Table 1.

1. Wildland Fire

Wildland fire is defined as any non-structure fire that occurs in the wildland. Two distinct types of wildland fire have been defined and include wildfire (unplanned ignition) and prescribed fire (planned ignition). Following both DO-18 and the AIWFMP, wildland fires may be managed for the accomplishment of resource management objectives.

a. Wildfire

Wildfire is defined as unplanned ignition of a wildland fire or escaped prescribed fire where the objective is to protect values at risk while meeting resource objectives specified in the Land/Resource Management Plan. Multiple objectives may be implemented on any wildfire incident. Generally the incident objectives are related to protection (suppression) and/or use of wildland fire (resource benefit) objectives.

i. Use of Wildland Fire Objectives

Use of wildland fire is the management of wildfire to meet objectives specified in Land/Resource Management Plans. Resource benefit objectives includes the preservation of fire in its natural role in the ecosystem which maintains the natural fire regime and maintains Fire Regime Condition Class 1. Fire Regime Condition Class 1 includes areas that are within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency; severity and pattern; and other associated disturbances. Fire Regime Condition Class 1 is the desired condition for all NPS managed lands in Alaska. Specific elements must be in place before the Use of Wildland Fire can be applied to incident objectives, including an approved fire management plan, appropriate environmental and subsistence compliance, the establishment of fire management units, a prescription for implementation, and management oversight. These elements will be discussed further in the wildland fire management section below.

ii. Suppression Objectives

Suppression objectives are any fire management action that is based on protection goals rather than resource management concerns. All unplanned

ignitions failing to meet predetermined conditions for the Use of Wildland Fire objectives will be suppressed in accordance with the fire protection category defined in the AIWFMP for the ignition location. In selecting suppression strategies, the Incident Commander and/or the protection agency Fire Management Officer (FMO) and/or the Agency Administrator must consider firefighter and public safety, cost effectiveness, and impact of suppression activities, as well as protection of resources and values to be protected. Accordingly, suppression strategies may range from aggressive initial attack to surveillance including indirect containment. The Superintendent may request a higher level of suppression response (AIWFMP).

2. Fuels Management

In wildland fire management, fuel is defined as live or dead organic matter. Managing the amount of fuel at any given site is one of the primary tasks of the fire management program. Managing wildfire with resource benefit objectives usually assists with managing fuels on a larger scale using natural ignitions. If the Use of Wildland Fire is not appropriate for an area, the two primary management options for fuel management/reduction are described below.

a. Prescribed Fire

Prescribed Fire is defined as the planned implementation of fire within a predetermined area and under predetermined conditions, for the accomplishment of resource management objectives and/or hazard fuel reduction. Each implementation of prescribed fire must follow a Prescribed Fire Plan prepared by the FMO (or delegate) and approved by the Superintendent. Currently DENA has no plans to implement broadcast prescribed fire in the immediate future. Broadcast prescribed fire may, however, be an appropriate tool at DENA for the purposes of hazard fuel reduction, protection of significant cultural features, scientific research, or the restoration of historical landscapes/conditions at culturally significant sites.

b. Mechanical Fuel Reduction

Mechanical Fuel Reduction is defined as the use of power saws, crosscut saws, mowers, hand tools, or similar devices to mitigate hazard fuel buildup or recreate historical landscape conditions in areas where fire would pose an unacceptable threat to property or resources. Each mechanical fuel reduction action at DENA must follow a written plan prepared by the Western Area FMO (or delegate) and be approved by the Superintendent. In areas designated as wilderness, a minimum requirement/minimum tools analysis will be completed and integrated into the plan, following the conditions set forth in the Wilderness Act.

The Fire Management Options, their intent and policy for implementing actions within the Fire Management Options are summarized in Table 1.

Table 1: DO-18 Fire Management Options

Management Option	Intent	Policy
Prescribed Fire Prescribed Fire Plan → management-implemented ignition ***Wildfire (Use of Wildland Fire)*** Natural ignition → managed based on resource management objectives	• Ecosystem sustainability • Achieve Resource Management goals and objectives • Long-term protection of life, property, and/or fire sensitive resources. • Restoration of historic conditions. • Cost effectiveness.	• May only be implemented within FMUs designated for such use. • Context and circumstances of the fire dictate the appropriate response, based on the approved FMP. • Management strategy or prescribed fire plan should be based on resource management objectives.
Wildfire(Suppression) **Any ignition where there are no alternative appropriate responses→ suppression response**	• Immediate protection of life, property, and/or fire-sensitive resources. • Cost effectiveness.	• Suppression actions triggered automatically in certain FMUs. • Agency Administrator may select suppression actions in any FMU. • Context and circumstances of the fire dictate the appropriate response, based on the approved FMP • Suppression actions should comply with resource management objectives whenever possible. • Minimum Impact Suppression Tactics (MIST) will be used

C. Fire Management Units (FMUs)

The fire management program at Denali National Park and Preserve complies with the policies resulting from the Federal Wildland Fire Management Policy Review of 1995, as well as those established by the Alaska Interagency Wildland Fire Management Plan. All human-caused fires will be suppressed or managed using the appropriate operational suppression response delineated in the AIWFMP. In accordance with DO-18, the Parklands have been sub-divided into four Fire Management Units (FMUs), each indexed to an appropriate AIWFMP category. Map 2 in Appendix K illustrates the general location of the Parkland's FMU boundaries within the park as well as the AIWFMP protection categories for adjacent lands.

According to the AIWFMP, each FMU has specific, predetermined management strategies (or combinations thereof) that consist of the various management options described below. For example, the Use of Wildland Fire will be the pre-planned response for ignitions detected within the DENA Limited Protection FMU and in the Modified Protection FMU after the conversion date. These management strategies are summarized by FMU in Table 2.

Table 2: AIWFMP Management Options

PROTECTION CATEGORY	POLICY/RESPONSE	INTENT
CRITICAL	• Aggressive suppression of fires within or threatening designated areas. • Highest priority for available resources.	• Prioritization of suppression actions for wildland fires threatening human life, inhabited property, and/or other designated structures. • Complete protection of designated sites
FULL	• Aggressive suppression of fires within or threatening designated areas, depending upon availability of resources.	• Protection of uninhabited cultural and historical sites, private property, and high-value natural resources.
MODIFIED	• Fires in designated areas receive initial attack depending on availability of resources, unless land manager chooses otherwise and documents with WFDSS. • After designated **conversion date**, operational response to Modified protection zones is identical to that of Limited zones.	• Greater flexibility in selection of suppression strategies when chance of spread is high (e.g., indirect attack). • Reduced commitment of resources when risk is low. • Balancing of acres burned with suppression costs and with accomplishment of resource management objectives.
LIMITED	• Wildfires allowed to burn within predetermined areas. • Continued protection of human life and site-specific values. • Surveillance/Monitor.	• Reduction of long-term costs and risks through reduced frequency of large fires. • Reduction of immediate suppression costs. • Facilitation of bio-diversity and ecological health

Determination of DENA Fire Management Units and their respective management strategies is based on the proximity of values at risk, the role of fire within the DENA vegetative communities, and overall management objectives, as specified in DO-18. Variables such as fuel type, loading, and moisture level will be considered in the decision-making process for specific incidents, as well as in the writing of individual prescribed fire plans. Table 3 below summarizes the DENA FMUs and rationale for FMU determination.

Table 3: Integration of AIWFMP and DO-18 Policy at DENA

DENA Fire Management Units (Derived from AIWFMP Protection Categories)	**POSSIBLE RATIONALES for FMU Determination**	**APPLICABLE Management Strategies**
Critical	• Presence of permanent residences and valuable cultural resources, including National Historical Landmarks.	• Suppression Objectives • Prescribed Fire Use • Mechanical

Full	• Presence of private structures and of structures included on the National Register of Historical Places. • Proximity to Critical FMU.	• Suppression and/or Resource Benefit Objectives • Prescribed Fire Use • Mechanical
Modified	• Proximity to Critical and Full FMUs. • Presence of fire-dependent ecosystems. • Appropriate balance of cost and control.	• Suppression and/or Resource Benefit Objectives • Prescribed Fire Use • Mechanical
Limited	• Presence of fire-dependent ecosystems. • Relative lack of significant fire-sensitive resources.	• Suppression and/or Resource Benefit Objectives • Prescribed Fire Use • Mechanical

A statewide Multi-Agency Coordination (MAC) group will be convened when the Alaska Preparedness Level reaches Level 4 to establish priorities for suppression resource allocation and to determine if the need exists for a temporary change in the selected fire management option identified in the AIWFMP for a specific geographic area(s). Such temporary changes may be implemented during periods of unusual fire conditions (e.g., numerous or unusually large fires, predicted drying trends, problematic smoke dispersal, shortages of suppression resources, etc.). The duration and geographical extent of any such changes will be determined by the MAC group and will be reflected in DENA FMU boundaries, which will be managed accordingly. The regional FMO represents the NPS on the MAC group.
[Note: See the Current Alaska Mobilization Guide for current procedures and guidelines.]

D. Description of DENA Fire Management Units

Due to the vast acreage covered by this fire management plan coupled with the geographically large and politically complex boundaries that define each management option, detailed written descriptions of each fire management option are not included. Instead a general description of where the fire management option occurs within the unit boundary will follow accompanied by a detailed map (See Appendix K, Maps 2 and 3).

With the implementation of the Alaska Interagency Wildland Fire Management Plan, selection of given fire management protection categories was based upon laws, enabling legislation, mandates, and policies applicable to publicly managed lands, values/resources to be protected, fire behavior and ecology, and human use patterns. If land manager/owners selected different options for adjacent lands, attempts were made to negotiate an agreement on the selected option or determine reasonable boundaries if options differed. Every effort was made **not** to use administrative boundaries (e.g. park boundaries) but to select option area boundaries that were identifiable from the air and were feasible considering operational and fire behavior concerns. Selection of areas also depended upon the values to be protected. Due to the aforementioned factors, 96.8% of the approximate 6 million acres lands managed by DENA fall in the Limited Fire Management Option (default wildfire with resource benefit objectives on NPS lands) [5,833,915 acres]. The balance of management option acreage is delineated 1.1% Full [66,030 acres] and 1.9% Modified [113,169 acres] less than 1% is identified as Critical [10,618 acres]. Most classified Critical, Full and Modified Options

areas within NPS unit boundaries are the result of inholdings, administrative facilities and other land owners' selections.

Finally, the historic role of fire in DENA, weather analysis, fire regime and season, and fuel characteristics are discussed not by fire management unit, but for the entire management area as a whole since they apply to all of the fire management units.

1. Critical Protection Fire Management Unit

a. Physical Descriptors

Denali National Park and Preserve contains 10,618 acres of land that falls within the critical fire Management option. Future DENA fire management reviews have the flexibility to grant critical protection status to any area within their jurisdiction that falls within the Critical protection criteria. (See Appendix K, Maps 2 and 3)

b. Management objectives

In accordance with the AIWFMP, the highest priority for the aggressive suppression of ignitions occurs within Critical Protection zones and/or sites. Prescribed fire and/or mechanical fuel reduction is appropriate in critical protection FMUs based upon land manager/owner's land and fire management objectives.

c. Management constraints

- Firefighter and public safety will be the number one concern in all fire management activities.

- Western Area Fire Management and park staff will make every reasonable effort to communicate to the public and NPS employees during an incident in DENA. Ongoing fire management efforts, fire situation, and socio-political and economic impacts of any fire management activities conducted within this FMU will be addressed.

- Retardant will not be used without the approval of the Superintendent (or delegate), except when fire imminently threatens life or values to be protected. Any use of retardant will comply with standards identified in the Interagency Standard for Fire and Fire Aviation Operations (published annually).

- Heavy equipment (including bulldozers) will not be used without the approval of the Superintendent (or delegate), except in life-threatening situations.

- Prior to the set-up of any extended fire camp in any of the DENA management units, fire managers will make every attempt to notify appropriate park staff. Fire staff will actively work with park staff to select an appropriate camp location. This consultation will ensure campsite locations are chosen in order to minimize impacts to resources at risk.

d. Special concerns

Western Area Fire Management and park staff involved in fire management activities in DENA will make every effort to understand current sensitive issues in park areas. This includes but is not limited to; current political issues, subsistence seasons/areas; critical migration paths/timing, wilderness policy, private land issues and susceptible cultural resources. Park managers will reciprocate by providing timely and accurate information that will aid fire managers in determining appropriate responses to current fire situations without jeopardizing valuable park resources and park/community relations.

The use of motorized equipment or mechanized transport that is generally prohibited by the Wilderness Act (helicopter landings, use of chainsaws, use of bulldozers, etc.) will not be permitted on lands that are designated as wilderness or suitable for wilderness prior to the preparation of a Minimum Requirement/Minimum Tool Analysis. Actions taken to suppress wildfires will use the minimum requirement concept, and will be conducted in such a way as to protect natural and cultural resources and to minimize the lasting impacts of the suppression actions.

2. Full Protection Fire Management Unit

a. Physical descriptors:

Denali National Park and Preserve contains 66,030 acres of land that falls within the Full Fire Management Option. Future DENA fire management reviews have the flexibility to grant full protection status to any area within their jurisdiction that falls within the Full protection criteria. (See Appendix K, Maps 2 and 3)

b. Management objectives

The primary objective in the Full Protection FMU is to protect valued resources by minimizing the presence of uncontrolled fire. AFS, State Department of Forestry (DOF) and/or the NPS will respond whenever possible to ignitions within this FMU with an appropriate suppression response. The Use of Wildland Fire may occur within this FMU if circumstances preclude initial attack within 24 hours of discovery or suppression response is not feasible. The Use of Wildland Fire may be implemented with Agency Administrator's approval with consultation from the Western Area FMO and AFS Tanana Zone or DOF Fairbanks/Mat-Su Area FMO (Protection Organization FMO). The decision to manage wildfire with resource benefit objectives will be documented through the Wildland Fire Decision Support System strategic planning process. Prescribed fire may also be implemented in this FMU, with the Superintendent's approval of a formal prescribed fire plan, for the purpose of preserving and/or restoring fire in its natural role, reducing hazardous fuel accumulations, or restoring historic conditions. Mechanical fuel reduction is appropriate based on land manager/owner's land and fire management objectives.

In all cases, fire management strategies for incidents within the Full Protection FMU and/or sites will be aimed primarily at the protection of structures and other valued resources. Mitigation of immediate threats will take precedence, but implementation of alternative strategies aimed at long-term fuels management and/or other management goals will also be allowed when deemed appropriate by the Agency Administrator.

c. Management constraints

- Firefighter and public safety will be the number one concern in all fire management activities.

- Western Area Fire Management and involved park staff will make every reasonable effort to communicate to the public and NPS employees' ongoing fire management efforts, fire situation, and socio-political and economic impacts of any fire management activities conducted within this FMU.

- Retardant will not be used without the approval of the Superintendent (or delegate), except when fire imminently threatens life or values to be protected. Any use of retardant will comply with standards identified in the Interagency Standard for Fire and Fire Aviation Operations (published annually).

- Heavy equipment (including bulldozers) will not be used without the approval of the Superintendent (or delegate), except in life-threatening situations.

- Prior to the set-up of any extended fire camp in DENA, fire managers will make every attempt to notify appropriate park staff. Fire staff will actively work with park staff to select an appropriate camp location. This consultation will ensure campsite locations are chosen in order to minimize impacts to resources at risk.

- Establishment of helispots and helibases will be minimized.

d. Special concerns

Western Area Fire Management and park staff involved in fire management activities in DENA will make every effort to understand current sensitive issues in parkland areas. This includes but is not limited to; current political issues, subsistence seasons/areas; critical migration paths/timing, wilderness policy, private land/allotment issues and susceptible cultural resources. Park managers will reciprocate by providing timely and accurate information that will aid fire managers in determining appropriate responses to current fire situations without jeopardizing valuable park resources and park/community relations.

The use of motorized equipment or mechanized transport that is generally prohibited by the Wilderness Act (helicopter landings, use of chainsaws, use of bulldozers, etc.) will not be permitted on lands that are designated as wilderness or suitable for wilderness prior to the preparation of a Minimum Requirement/Minimum Tool Analysis. Actions taken to suppress wildfires will use the minimum requirement concept, and will be conducted in such a way as to protect natural and cultural resources and to minimize the lasting impacts of the suppression actions.

3. Modified Protection Fire Management Unit

a. Physical descriptors

Denali National Park and Preserve contains 336,230 acres of land that falls within the Modified Fire Management Option. (See Appendix K, Maps 2 and 3)

b. Management objectives

The primary objective in the Modified Protection FMU is to achieve an appropriate balance between protection of life and property and cost effectiveness through the implementation of alternative suppression strategies. AFS/DOF will provide initial attack for ignitions detected within the Modified Protection FMU, if adequate fire fighting resources are available and conversion has not occurred. However, minimizing acreage burned is less of a priority in Modified FMUs than it is in Critical or Full FMUs. Accordingly, Incident Managers will consider a wide range of suppression strategies within the Modified FMU, including containment by natural barrier or indirect use of retardant or handline. The Use of Wildland Fire is allowed within this FMU if circumstances preclude initial attack within 24 hours of discovery or suppression response is not feasible. The Use of Wildland Fire may be implemented with Agency Administrator's approval with consultation from the Western Area FMO and Protection Agency FMO(s). The decision to manage wildfire with resource benefit objectives will be documented through the Wildland Fire Decision Support System strategic planning process. Once the Modified Protection FMU has converted, management objectives are identical to those established for the Limited Protection FMU and the Use of Wildland Fire becomes the default management action. Prescribed fire may be implemented in this FMU for the purpose of reducing hazardous fuel accumulations or restoring historical conditions, with the Superintendent's approval of a formal prescribed fire plan. Mechanical fuel reduction is deemed appropriate based upon land manager/owner's land and fire management objectives.

c. Management constraints

- Firefighter and public safety will be the number one concern in all fire management activities.

- The Western Area Fire Management and park fire staff will make every reasonable effort to communicate to the public and NPS employees ongoing fire management efforts, fire situation, and socio-political and economic impacts of any fire management activities conducted within this FMU.

- Retardant will not be used without the approval of the Superintendent (or delegate), except when fire imminently threatens life or values to be protected. Any use of retardant will comply with standards identified in the Interagency Standard for Fire and Fire Aviation Operations (published annually).

- Heavy equipment (including bulldozers) will not be used without the approval of the Superintendent (or delegate), except in life-threatening situations.

- Prior to the set-up of any extended fire camp in any of the DENA management units, fire managers will make every attempt to notify appropriate park staff. Fire staff will actively work with park staff to select an appropriate camp location. This consultation will ensure campsite locations are chosen in order to minimize impacts to resources at risk.

- Establishment of helispots and helibases will be minimized.

d. Special concerns

Western Area Fire Management and park staff involved in fire management activities in DENA will make every effort to understand current sensitive issues in each of the parkland areas. This includes but is not limited to; current political issues, subsistence seasons/areas; critical migration paths/timing, wilderness policy, private land/allotment issues and susceptible cultural resources. Park managers will reciprocate by providing timely and accurate information that will aid fire managers in determining appropriate responses to current fire situations without jeopardizing valuable park resources and park/community relations.

The use of motorized equipment or mechanized transport that is generally prohibited by the Wilderness Act (helicopter landings, use of chainsaws, use of bulldozers, etc.) will not be permitted on lands that are designated as wilderness or suitable for wilderness prior to the preparation of a Minimum Requirement/Minimum Tool Analysis. Actions taken to suppress wildfires will use the minimum requirement concept, and will be conducted in such a way as to protect natural and cultural resources and to minimize the lasting impacts of the suppression actions.

4. Limited Protection Fire Management Unit

a. Physical descriptors

The Limited Fire Management Option (5,598,450 acres) includes all DENA holdings (lands under NPS management) not contained within the Critical, Full or Modified FMUs. (See Appendix K, Maps 2 and 3)

b. Management objectives

Due to the near absence of values at risk within this unit, most ignitions occurring within the Limited Protection FMU will be managed for the purpose of preserving fire in its natural role within the ecosystem and accomplishing fire and land management objectives. The Use of Wildland Fire may be implemented with Agency Administrator's approval with consultation from the Western Area FMO and Protection Agency FMO(s). The Use of Wildland Fire is the default management action for wildfires in the Limited Protection FMU. The decision to manage wildfire with resource benefit objectives will be documented through the Wildland Fire Decision Support System strategic planning process. Prescribed fire may also be implemented in this FMU with the Superintendent's approval of a formal prescribed fire plan, for the purpose of preserving and/or restoring fire in its natural role, reducing hazardous fuel accumulations, or restoring historic conditions. Mechanical fuel reduction is deemed appropriate based upon land manager/owner's land and fire management objectives.

c. Management constraints

- Firefighter and public safety will be the number one concern in all fire management activities.

- The Western Area Fire Management and involved park staff will make every reasonable effort to communicate to the public and NPS employees ongoing fire management efforts, fire situation, and socio-political and economic impacts of any fire management activities conducted within this FMU.

- Retardant will not be used without the approval of the Superintendent (or delegate), except when fire imminently threatens life or values to be protected. Any use of retardant will comply with standards identified in the Interagency Standard for Fire and Fire Aviation Operations (published annually).

- Heavy equipment (including bulldozers) will not be used without the approval of the Superintendent (or delegate), except in life-threatening situations.

- Prior to the set-up of any extended fire camp in any of the DENA management units, fire managers will make every attempt to notify appropriate park staff. Fire staff will actively
  work with park staff to select an appropriate camp location. This consultation will ensure campsite locations are chosen in order to minimize impacts to resources at risk.

- Establishment of helispots and helibases will be minimized.

d. Special concerns

Western Area Fire Management and park staff involved in fire management activities in DENA will make every effort to understand current sensitive issues in each of the four management areas. This includes but is not limited to; current political issues, subsistence seasons/areas; critical migration paths/timing, wilderness policy, private land issues and susceptible cultural resources. Park managers will reciprocate by providing timely and accurate information that will aid fire managers in determining appropriate responses to current fire situations without jeopardizing valuable park resources and park/community relations.

The use of motorized equipment or mechanized transport that is generally prohibited by the Wilderness Act (helicopter landings, use of chainsaws, use of bulldozers, etc.) will not be permitted on lands that are designated as wilderness or suitable for wilderness prior to the preparation of a Minimum Requirement/Minimum Tool Analysis. Actions taken to suppress wildfires will use the minimum requirement concept, and will be conducted in such a way as to protect natural and cultural resources and to minimize the lasting impacts of the suppression actions.

E. DENA Ecology and Fire.

Mount McKinley and accompanying east-west trending line of towering mountains known as the Alaska Range dominate the Denali area. The Alaska Range forms the northernmost portion of the Pacific Mountain system, and is one of the great mountain uplifts in North America, rising above lowlands (500 to 2000 foot elevation) to the pinnacle of Mount McKinley at 20,320 feet. The northern foothills of the Alaska Range consist of a series of east-trending ridges, starting with the Kantishna Hills and run eastward. Summit altitudes range between 2,000 and 6,200 feet. The foothills vary from 3 to 7 miles in width and from 5 to 20 miles in length. Broad flat valleys of glacial origin, which range from 2 to 10 miles in width, separate these foothills.

Vast and remote, Denali's geography contains a variety of ecotypes typical of interior and mountainous Alaska. From the boreal forest zones of the Alaskan interior plains found in the Park's northwest corner, to the treeless tundra of the upper alpine mountain zones, fire has visited every ecotype. Due to climatic and vegetative conditions, the Park's northwest corner generally experiences considerably higher fire occurrence than its mountainous counterpart. (See Appendix K, Maps 4 and 5)

Denali’s vegetation is characteristic of subarctic areas where the growing season is less that 100 days and soils are poor in available nutrients. The taiga, or boreal forest, is found at the lowest elevation and consists of black spruce with stands of white spruce, paper birch and aspen on better drained sites. Tamarack, balsam poplar, little tree willow, feltleaf willow, resin birch, American green alder, thinleaf alder, Alaska rose and red currant are also present in some places. Understory vegetation consists of low shrubs, (cranberry, blueberry, crowberry), herbs, mosses and lichens. Trees are slow growing and even the best sites seldom have trees taller than 50 feet, except on well-drained areas. At lower elevations or in floodplain areas, white spruce and balsam poplar can attain 80-85 feet. Even trees of this height may not have diameters exceeding 15 inches.

Between 2,600-3,000 feet (treeline), the forests give way to shrublands covered by plants such as dwarf birch, willows, alders and sedges. Blueberry, Labrador tea, legumes, and crowberry are common. The shrubs in this zone are usually 1/2 to 1 meter high. Much of the shrubland is poorly drained.

Above 3,400-3,600 feet, the shrubland is replaced by alpine tundra, which is often dominated by low growing mats of avens only a few inches high. Heather, cinquefoil, and saxifrage are also common. Lichens are abundant. In swales and along steams, willow shrubs and alder are common.

The Park/Preserve is home to caribou, moose, brown and black bears, Dall sheep, wolves, lynx, trumpeter swans, Peregrine falcons, bald and golden eagles, several species of fresh water and anadromous fish, and numerous additional bird and small mammal species. Sensitive animal habitat is described in Denali's Back Country Management Plan’s (BCMP) accompanying Affected Environment section.

1. Historic Role of Fire in DENA

Fire has been a driving force in the Alaskan interior for thousands of years. It is a key environmental factor in Alaskan cold-dominated ecosystems. Periodic fires have served to select plants and animals that are adapted to fire-caused change. The influence of fire on permafrost depends on type of vegetation, moisture, and the severity of the burn. In a low severity fire, or if the surface peat and moss layers are moist, minimal organic soil may be consumed and the permafrost (if present) may not be significantly disturbed. If the surface vegetation and moss layers are very dry, a more severe fire may totally consume the organic soils and reduce the insulative cover, thereby reducing permafrost and increasing the active layer depth. In general without fire, organic matter accumulates, the permafrost table rises, and ecosystem productivity declines. Vegetation communities become much less diverse.

Fire rejuvenates these systems. It removes insulating organic matter and elicits a warming of the soil. Nutrients are added both as a result of combustion and by increased decomposition rates.

The natural role of wildland fire at Denali varies considerably across the Park/Preserve's geographical zones. Denali's higher elevations found in the Alaska Range include many glaciers and rock exposures, thus lack substantial fuels. The southern portion of the Park/Preserve typically experiences higher humidity and receives more precipitation, which nearly precludes fire in many areas south of the Alaska Range. However north of the Alaska Range, as elsewhere in the Alaskan Interior, fire has been an inextricable component of boreal forest communities. Periodic fire of considerable size and intensity is typical in much of this area, as evidenced by forest mosaic patterns and fire history.

The impact of aggressive suppression in Interior Alaska and DENA is difficult to assess. Organized suppression has occurred in Alaska since 1939, when the Alaska Fire Control Service (predecessor to the AFS) was established. The effects of this activity are not clear, however, the reduction of total fire acreage has been unmistakable in some areas. A past study of the Tanana/Minchumina Planning Area has shown that annual burned acreage hovered around 900,000 acres between 1957 and 1981, down from the estimated 1.5 to 2.5 million acres prior to 1940. The Tanana/Minchumina Planning Area received greater fire suppression emphasis than the area encompassed by DENA. Yet despite this reduction, large, high-intensity fires remain a frequent occurrence, in part because the detection of interior fires remains difficult especially during periods of high fire activity and smoke concentration. Alaska fire management personnel feel that the fire ecology of DENA is relatively unchanged from the condition prior to the development of organized suppression efforts. This opinion is based upon the recognition that large fires continue to occur and the fact that the length of time that suppression activities have occurred is less than the predicted return interval for fires in DENA. The probability exists that an area where a fire was suppressed will burn within the return interval.

Fire history and the distribution of fire causes in DENA, for the years that data exists, indicates natural caused - lightning, plays a significant roll in the ignitions in DENA (See Appendix J – Fire Statistics and Graph 1 and Appendix K - Maps 4 and 5). Records, as indicated from the Alaska Interagency Fire Management Plan (Tanana/Minchumina and Matanuska/Susitna) reveal that, on average, less than two fires a year occurred in the

Matanuska/Susitna planning area (South of the Alaska Range). Whereas, on average, greater that 35 fires occurred per year in the Tanana/Minchumina planning area (North of the Alaska Range) due to lightning. The majority of human-caused fires in Denali have been along the railroad and road corridors. In general these fires have received aggressive fire suppression actions and likely constitute the largest impact on fuels through fire suppression.

2. Weather Analysis

Denali National Park and Preserve is located in two of the major climatic zones of Alaska. The Alaska Range plays a major role in influencing climate by blocking much of the moisture that sweeps inland from the Pacific Ocean and the Gulf of Alaska. A continental climate lies north of the range, while a transitional coastal climate exists south of the range. The northern portion of the Park/Preserve is characterized by less precipitation and greater temperature fluctuations while experiencing hotter weather in summer and much colder conditions in winter.

Annual temperature extremes may range from 90 degrees to –52 degrees Fahrenheit. The mean maximum temperatures at headquarters at the eastern entrance to the park are 12.8 degrees for January and 65.9 degrees for July. The mean minimum temperatures for the same months at the entrance area location are –5.2 degrees and 43.8 degrees, respectively. Sunlight in the park/preserve reaches 20 hours/day in June and July, thus providing little variation in burning conditions between day and night during the peak of fire season.

The transitional coastal climate area south of the Alaska Range experiences quite different weather than that of its northern interior counterpart. With a maritime influence, the southern park area experiences lower fluctuations in diurnal temperatures than are witnessed in the more interior area. Temperature, humidity and winds are largely dependent on prevailing weather patterns flowing north off of the Gulf of Alaska. Precipitation is greater on the south side of the Alaska Range than on the northern side.

Precipitation is greater in summer than in winter for the entire region. Rainfall occurs on a average of 21 days during June, July and August at the Denali and Lake Minchumina recording stations. The average annual precipitation at park headquarters is slightly in excess of 15 inches. Average annual snowfall at headquarters is 75.7 inches.

The NPS, FWS, and BLM maintain Remote Automated Weather Stations (RAWS) at various sites in and around DENA's boundaries. The following locations have RAWS stations that may provide helpful fire weather information to fire managers: Lake Minchumina (MHM), McKinley River (MCK), Wonder Lake (WON), Wien Lake (WNL), Telida (TEL), Denali Visitor Center (DVC) and Healy (PAHV). Denali also maintains other non-fire RAWS about the park as part of the inventory and monitoring program of the Central Alaska Network (CAKN). A National Weather Service site is also maintained at the park kennels. Data from all fire RAWS sites are available on the Internet through the Alaska Fire Service homepage (go to **http://fire.ak.blm.gov/** ; next click **weather**, then **AFS Fire Weather Database**). Information collected from the RAWS sites contributes to interagency efforts to monitor weather and generate fire weather indices. All RAWS records are archived at the Western Region Climatological Center. (go to **http://www.wrcc.dri.edu/**)

The impact of global climate change is expected to be greatest in northern environments. Increased temperature and alternations of hydrological cycles will have significant impact on weather patterns, fire occurrence and extent of wildland fires, as well as distribution of floral and faunal. Fire management programs may require significant restructuring to respond to the changes resulting from global climate change.

3. Fire Season

The seasonal fire cycle in central Alaska consists of four micro-seasons or phases, each varying with the changing weather pattern, seasonal variability, and the stage of vegetation development for the growing season.

The first phase begins in early May with the loss of snow cover and ends in mid June when green-up (the budding of trees and shrubs) begins. During the transition from 100% winter-cured fuels to green-up, human-caused fires may occur; these fires are usually relatively easy to suppress due to high relative humidity recovery at night, cool day and night temperatures, and typical close proximity to roads, airstrips, and/or navigable water. Spring fires that are not suppressed, however, often grow later in the season as fuels become dryer. This phase constitutes approximately 6.2 percent of the fires in the park/preserve (See Appendix J).

The second phase is primarily lightning caused. Suppression of these fires is harder, because of their occurrence in remote areas where detection and access are more difficult and because more time typically passes between detection and initial attack. Fires occurring in the second half of June, the second period, usually do not develop the intensity of later summer fires. However, during hot, dry, and windy conditions, June wildland ignitions can result in extreme fire behavior. This phase constitutes approximately 71.1 percent of the fires in the Park/Preserve.

The third phase begins in early July and runs through the first part of August. Fires in this phase also are primarily lightning caused. This is the period of maximum fire activity. The usual problems of accessibility and detection are compounded by increased rates of spread and higher fire intensities due to lower fuel moisture levels. Even with prompt initial attack, fires are often beyond immediate control by the time fire fighting forces arrive, and indirect attack is often the only viable suppression strategy. This phase constitutes approximately 13.9 percent of the fires in the Park/Preserve.

The final phase occurs from early to late August, with few occasional starts into September on dry warm years. Hunters and fishermen usually cause ignitions during this period. These fires are generally easy to control, except during particularly dry autumn weather. This phase constitutes approximately 8.8 percent of the fires in the Park/Preserve.

Seasonal distribution of fire activity in the park/preserve's fire-prone areas is similar with that of other portions of the Alaskan interior. The majority of DENA fires are lightning-caused. Fire occurrence generally corresponds with lightning activity if given fuel conditions stand receptive. Therefore, the Park/Preserve's overall fire activity for the months of May through August relies on the occurrence of lightning. The months of June and July exhibit the highest number of starts, accounting for approximately 38% and 46%, respectively, of all ignitions within the peak five-month period. September accounts for the lowest number of

starts within the period, at 2 %. The number of total starts is usually dramatically lower in April and September (See Appendix J, Fire Statistics and Appendix K, Maps 4 and 5).

Within the pertinent areas of the park/preserve, the portion of fires attributable to lightning is about 90% of total annual incidents; this percentage remains fairly constant throughout the five-month peak season, with an increase in lightning-caused ignitions towards the end of June and beginning of July.

Throughout most of the season, the highest concentration of ignitions occurs north and west of Kantishna, beyond the west end of the park road. An important exception to this pattern is the Stampede corridor. This portion of the park, north of the Wyoming Hills and east of the Kantishna Hills, in the Northeast section of the Park/Preserve, receives regular lightning caused ignitions. Post ANICLA and the park/preserve additions, human caused ignitions have been drastically reduced from 43% pre-ANICLA to 13% post-ANILCA. Though human caused fires are rare, typically they occur along the park road or along the railroad/George Parks Highway corridor. (Refer to the Alaska Interagency Fire Management Plan for the Tanana/Minchumina Planning Area, 1982, and for the Matanuska/Susitna Planning Area, 1986, for further statistics on seasonal fire behavior patterns in and around the Park/Preserve.)

4. Fuel Characteristics and Fire Behavior

Fire behavior is essentially a function of fuel type, fuel loading, fuel moisture content, topography, and local weather conditions. DENA exhibits several major fire behavior systems of vegetation that can be described as fuel types: grass/tundra, deciduous forest/shrublands, mixed forests, and conifers. A breakdown of these major fuel types follows. This breakdown facilitates a more representative depiction of fire behavior in each of the sub-types.

a. Grass/Tundra

Continuous grass cover, with occasional trees or shrubs that do not appreciably affect fire behavior characterizes this fuel type. Three subtypes are found in this system: matted grass, common after snowmelt in the spring; standing dead grass, common in late summer to early fall; and tussock/tundra. The live to dead ratio and wind speed in grasslands has a pronounced effect on fire spread.

Matted/Standing Dead Grass: Fire behavior in these two grass subtypes is relatively easy to suppress. This fuel type burns during the spring and fall. The burning period is shorter due to less solar radiation and high humidity recovery at night; a condition referred to as diurnal effect. The rate of spread can be high in this fuel type but there is limited smoldering and mop-up (post-suppression maintenance accomplished to ensure that all ground fire is extinguished) is relatively easy.

Tussock Tundra: Fire behavior in the tussock tundra type is substantially different than other grass models. Tussocks form an extensive layer of dead leaves at the base of the plant creating grassy knobs. The dense thatches of dead leaves that make up the tussock mound are small in diameter and loosely compacted. The fuel wets and dries very rapidly, burns quickly, and, because there is typically a substantial amount of fuel,

the fires can be remarkably intense when burning under dry, windy conditions. This fuel situation presents a set of control problems unique to the fuel type, as extinguishing can be extremely difficult due to thick mats of dry mosses, lichens and other organic matter. Travel on the ground is also difficult in tussock tundra. Elevations above 3,000 feet form effective barriers to fire spread since they generally do not support enough vegetation to carry fire.

b. Deciduous Forest/Shrublands

Pure Deciduous Forest: This fuel type is represented by pure stands of deciduous forest species including but not limited to alder, willow, aspen and birch. Stages in leaf development (leafless, green-up, leaf fall) drastically effect fire behavior and fuels present in this system. Fires in this type usually occur in spring before leaf-out or in fall after leaves have fallen. During this time, leaf litter is the primary carrier of the fire and usually results in low to moderate fire intensities except under the most severe weather conditions. Fires can burn in this fuel type post green-up (leaf-on) but fire behavior is greatly reduced due to shading of fuel by the forest canopy thus increasing relative humidity, decreasing fuel temperatures and reducing surface windspeeds. Fires that do occur during the leaf-on stage carry in grasses, dry herbaceous, and various understory shrubs.

Shrublands

Alder/Willow Shrublands: This fuel type is represented by pure stands of deciduous shrub of alder and willow, but also includes deciduous forest types of balsam poplar, aspen or paper birch. Stages in leaf development (leafless, green-up, leaf fall) drastically affect fire behavior and fuels present in this system. Fires in this type usually occur in spring before leaf-out or in fall after leaves have fallen. During this time, leaf litter is the primary carrier of the fire and usually results in low to moderate fire intensities except under the most severe weather conditions. Fires can burn in this fuel type post green-up (leaf-on) but fire behavior is greatly reduced due to shading of fuel by the canopy cover thus increasing relative humidity and decreasing fuel temperatures. Fires that do occur during the leaf-on stage carry in grasses, dry herbaceous, and various understory shrubs.

Birch/Ericaceous Shrublands: Dwarf birch and ericaceous genera comprise this fuel type. These shrub species grow in mosaic-like patterns with all varieties of tundra communities. The shrub layer forms a continuous fuel bed that often burns mid summer with green leaves intact unlike the pure deciduous forest fuel type above. Dwarf birch particularly has elevated resin contents that lead to an increase in fire behavior in this type. Although common throughout Alaska, this fuel type is not clearly defined nor is the fire behavior well-documented in literature currently available.

c. Mixed forests

Aspen, willow, cottonwood, birch, black and white spruce characterize the mixed forests fuel type. On any specific site, individual species can be present or absent from the mixture; however, spruce must be present in order for the fuel to fall into this classification. Stand mixtures exhibit wide variability in age and within stand structure two phases associated with the seasonal variation in the flammability of the hardwoods

are recognized—the leafless stage occurring during the spring and fall, and the green stage during summer. Rate of spread in both fuel types is weighted according to the proportion of softwood and hardwood components. In areas where the proportion of hardwoods is greater than softwoods and when the deciduous overstory and understory are in leaf, fire spread is greatly reduced with maximum spread rates only 1/5 that of spring or fall fires under similar burning conditions. During spring and fall when the deciduous overstory and understory are leafless, the leaf litter can burn similarly to the grass models because the diurnal effect shortens the burning period and there is little smoldering. In areas where the proportion of softwoods is greater than hardwoods, the dryness of the organic mat will dictate the difficulty of extinguishing fire. The rate of spread will be relatively slow in these areas unless there is a very large grass component and conditions are extremely dry.

d. Needleleaf Forest

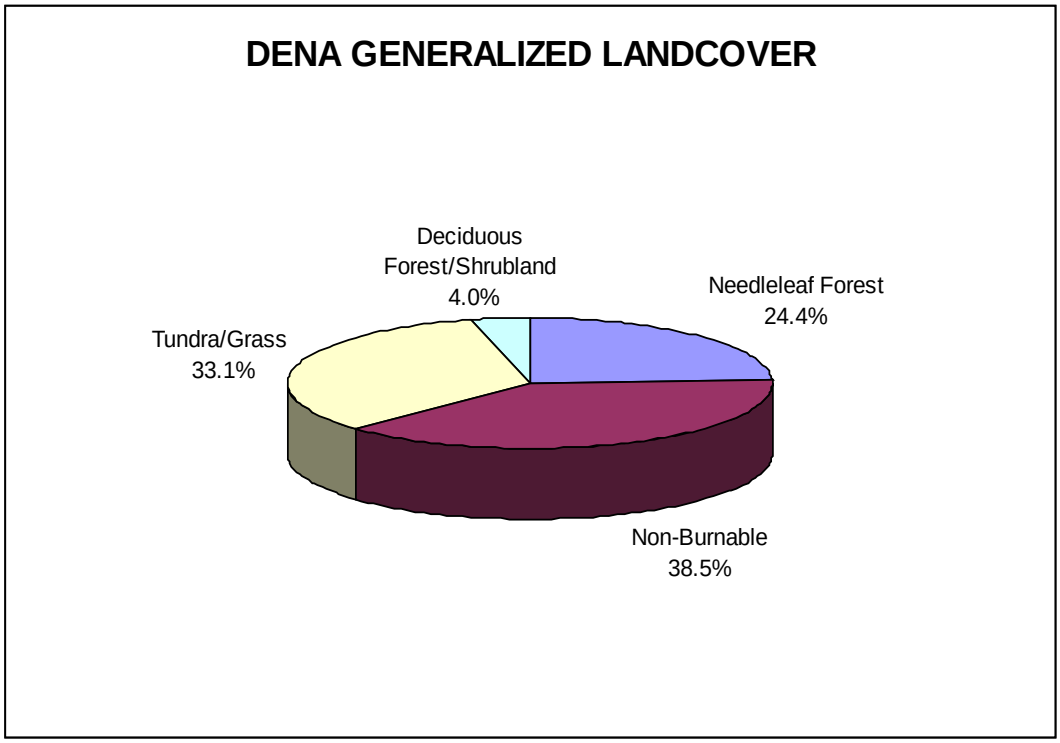
Spruce-Lichen Woodland. This fuel type is characterized by open, white spruce. Stands occupy well-drained upland sites. Forest cover occurs as widely spaced individuals and dense clumps. Tree heights vary considerably, but bole branches that emanate from the trunk of the tree (both live and dead) uniformly extend to the forest floor and layer development is extensive. Woody surface fuel accumulation is usually very light and scattered, and shrub cover is exceedingly sparse. The ground surface is fully exposed to the sun and commonly covered by a nearly continuous mat of reindeer lichens, averaging 3-4 cm in depth.

The spruce-lichen woodland fuel type may support a high rate of spread, but may or may not support a continuous crown fire. Mop-up may be difficult if the organic mat is deep and dry. For the most part, fires occurring in this fuel type are relatively easy to control because they are primarily surface fires, which can be extinguished by firefighters on the ground.

Boreal Spruce. This fuel type is characterized by pure, moderately well-stocked black spruce stands on poorly drained sites. Branches occur near or on the surface and dead branches are typically draped with bearded lichens. The flaky nature of the bark on the lower portion of the trunk is pronounced. Low to moderate volumes of woody material is present on the ground. Labrador tea is often the major shrub component, and a carpet of feather mosses and/or ground-dwelling lichens dominates the forest floor. Sphagnum mosses may occasionally be present. A compacted organic layer commonly exceeds a depth of 20-30 cm below ground surface.

Stand replacement and crown fires dominate the fire behavior of this fuel type. A crown fire may commence when the fire reaches a rate of spread of 10 chains (660 feet) per hour or flame height over 1 ft. Crowning typically occurs just behind the flaming front. Independent crown fires are rare. It is also common to have spotting by aerial firebrands in a crowning spruce fire. Wind is the crucial factor, with spotting frequently occurring between ½ to two miles ahead of the fire. The carrier fuel consists of the organic mat, which has a tremendous surface-to-volume ratio with immediate responses to changes in relative humidity, solar radiation, and wind. Rate of spread is relatively slow and predictable, while intensity is high in surface fuels. Mop-up may be difficult if the organic mat is dry.

Figure 1. Generalized Landcover for DENA, Unburnable is defined as water, area barren of vegetation or sparse vegetation that cannot sustain continuous fire-growth.



5. Historical Alterations of Fuel Regimes

There is little information to be found regarding the historical alteration of the fuel regimes in DENA. Although fire suppression has occurred since the establishment of the AIWFMP within DENA, and continues on a relatively few fires, the overall effect of wildland fires suppression appears to be negligible on vegetation. Therefore, much of the large-scale alterations to the fuel regimes in DENA to date have occurred as the result of fire, albeit as a natural part of the environmental system. Human alterations have occurred on a relatively minute scale throughout the area.

6. Control Problems

Control and suppression problems are dependent on fuel type, fuel loading, weather, and time of year. Alaska has four distinct micro-seasons of fire activity with different control and suppression problems associated with each.

a. Spring Green-up

Ignitions during spring green-up are usually wind driven surface fires that are relatively easy to control and extinguish. High winds can cause high rates of spread and control may be more difficult. These fires are mostly limited to fine fuels (i.e. grass) that are directly exposed to solar radiation, humidity, wind, and precipitation. This period is typically from early to mid June.

b. Transitional

Ignitions that occur during the transitional time are typically more difficult to control, as hand-constructed firebreaks are less effective. Water under pressure from fire pumps with hose lays and aerial support, such as a medium helicopter and bucket, may be required for effective action at the fire's head. This period is typically mid June to early July.

c. Cumulative Drought

Initial ignitions during the time of cumulative drought, as well as carryover fires from the previous period, are the most difficult types to control and extinguish, and may require indirect attack, aerial back firing, and/or the use of natural barriers. Direct attack is rarely possible because of the fire's intensity, and should only be attempted with the utmost caution. Suppression actions must be restricted to the flanks and back of the fire. Indirect attack in the form of aerial ignition, if available, may be effective depending on the fire's forward rate of spread. Fire extinguishing may be particularly difficult in the conifers and mixed forests due to the deep, dry organic mat present. This period is typically from early July to early August.

d. Diurnal Effect

This period is typically from early to late August when the days become shorter. Ignitions during this period of diurnal effect are easier to suppress because the reduced amount of daylight allows for the relative humidity to recover, resulting in increased moisture content in fuels. These fires are limited to fine fuels, such as grass, that are directly exposed to the drying effects of solar radiation. Smoldering and creeping fires from the previous periods may still be evident.

7. Non-Federal Land Ownership within DENA

Denali National Park and Preserve's boundary contains approximately 6 million acres. Approximately two-thirds of this acreage was added to Mt. McKinley National Park by ANILCA in 1980. Within this boundary are approximately 200 acres of patented inholdings, about 700 acres of unpatented mining claims, around 26,000 acres of conveyed Native Corporation lands, around 12,000 acres of Native Corporation selections, 810 acres of allotments, and 7561 acres of state selections and easements. Four major right-of-way easements include the Alaska Railroad at 200 feet wide for 36 miles (wider in short sections), the George Parks Highway (Alaska Highway #3) at 300 feet for 7 miles, the 4.5 mile Kantishna section of the Park Road at 200 feet wide, and 7 miles of the Golden Zone/Dunkle Road, at 100 feet wide. Submerged lands under navigable waterways total an estimated 417.5 acres and are owned by the state of Alaska. Land status and ownership continually changes. The Western Area fire management and park staff relies upon the NPS GIS system for updated ownership information during fire management incidents.

8. Ownership of Adjacent Lands

Primary suppression efforts in all of these areas are the responsibility of the BLM - Alaska Fire Service or Alaska State Department of Forestry, depending on jurisdictional zones. Lands adjacent to DENA fall under the following categories of ownership/management:

- Bureau of Land Management
- State of Alaska (owned and selected lands)
- Ahtna Regional Corporation
- Cantwell Village Corporation
- Doyon Regional Corporation
- State of Alaska/Alaska Railroad
- University of Alaska
- Minchumina Native, Inc
- Other Native-owned land
- Other Native-selected land

The majority of lands surrounding Denali National Park and Preserve are owned by the state of Alaska and were granted under the Alaska Statehood Act. Major public land holdings are also owned by the Denali and Matanuska-Susitna Boroughs - parcels that were selected from state lands. A large portion of the south boundary of DENA adjoins Denali State Park.

There are still major areas of federal land east and northwest of the park that are under Bureau of Land Management administration. Native corporations also own significant parcels of land east and west of Denali. These include lands owned by Cook Inlet Region Inc. Ahtna Inc., and Doyon, Ltd.

There are other relatively small but significant parcels of private land adjacent to the park. These include lands along the George Parks Highway just east of the park that are being extensively developed for commercial facilities to support park visitors. This includes lodging, restaurants, stores, and related employee residential development.

(See the DENA GMP's accompanying Land Protection Plan for details on ownership of adjacent lands.)

IV. WILDLAND FIRE MANAGEMENT

Following March 31, 2010 the new guidance for the Implementation of Federal Wildland Fire Policy is in effect for the 2010 fire season. Decision support processes and analysis that help determine and document decisions regarding the management of individual ignitions will follow national direction. The policy for the National Park Service is to use the Wildland Fire Decision Support System (WFDSS) and analysis tools such as FARSITE, FlamMap, and FSPro.

Further regional guidance is located in the 2011 Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement and the 2011 Alaska Statewide Annual Operating Plan.

A. Use of Wildland Fire (Previously termed Wildland Fire Use)

1. Rationale

Federal and NPS policy requires that the following elements be in place before the Use of Wildland Fire is implemented: 1) an approved Fire Management Plan; 2) appropriate environmental/subsistence compliance; 3) pre-established Fire Management Units; 4) prescription for implementation; and 5) management oversight. As defined in the Department of the Interior's Department Manual, Part 620, Chapter 1, Section 1.3K, the above-mentioned prescriptions will be based on "safety, public health, environmental, geographic, administrative, social or legal considerations." Geography comprises the primary prescriptive variable at DENA; FMUs consist of extensive tracts of fire-dependent ecosystems, with relatively low numbers of rare resources to be protected.

As specified in the DENA GMP, a key resource management objective is the preservation of the dynamics of natural processes. The GMP states that NPS management will, whenever safely possible, allow fire to fulfill its ecological role within the wilds of interior Alaska. Wildland fires that do not threaten life or property offer an opportunity for the accomplishment of this objective. Accordingly, the Use of Wildland Fire for resource benefit may occur in each of the DENA FMUs when pre-specified conditions are met. Within the Limited Protection FMU, fire often poses little threat to sensitive or valued resources. Consequently, the detection of natural ignitions within this FMU may trigger the Use of Wildland Fire for resource benefit unless the Agency Administrator specifies otherwise. Ignitions within the Modified (prior to the conversion date) and Full Protection FMUs will trigger suppression actions; the Use of Wildland Fire for resource benefit, however, will remain available in these FMUs as an alternative response upon the request of the Agency Administrator. Lands classified in the Critical Protection category will advocate immediate suppression actions.

The Superintendent may request additional suppression actions. The Superintendent with collaboration from the Western Area FMO and the AFS Tanana Zone and/or DOF Fairbanks/Mat-Su/Southwest Area FMO(s), may select a reduced suppression response.

2. Objectives

The primary objective for Use of Wildland Fire at DENA is to maintain the area's biodiversity through the use of fire (including the naturally occurring spectrum of fire intensities and effects) while also ensuring the safety of life, property, and sensitive resources. Another important objective for the Use of Wildland Fire is the cost-effective maintenance of fuel loads within the natural range of variation for the fire regimes and maintenance of Condition Class 1 within DENA park units.

3. General Plan

Use of Wildland Fire at DENA occurs by default in Limited and Modified (after conversion) protection categories identified in the AIWFMP. Use of Wildland Fire may occur in Modified (prior to conversion) and Full protection categories if suppression actions have not

been initiated and the criteria for Use of Wildland Fire have been met (AIWFMP). The extent of Use of Wildland Fire in DENA may be altered based upon adjustments of the appropriate boundaries and management options for FMUs. Each winter the NPS Western Area FMO meets with DENA staff members and fire management personnel from the AFS Tanana and/or, DOF Fairbanks/Mat-Su/Southwest Area Zones to re-evaluate the categorization and boundary locations of these units. Other land manager/owners will be consulted and concurrence will be sought for unit boundary location or categorization changes that affect their lands. Final authority for the adjustment of FMUs and/or fire protection categories within the Parklands rests with the DENA Superintendent.

The FMU descriptions contained within this plan specify preplanned management actions, to be enacted automatically by the appropriate Protection Agency dispatch in the absence of further guidance by the Jurisdictional Agency. Alternative actions, however, may be considered and/or selected by the Agency Administrator with consultation with the Western Area FMO and Protection Agency FMO(s) on a case-by-case basis, as determined by current fuel, weather, and fire management conditions and as dictated by NPS policy and the DENA FMP.

4. Responsibility for Initiation of Decision Process

In DENA, Use of Wildland Fire is the preplanned action in the Limited and Modified (after conversion) Protection FMUs and will be implemented automatically by the appropriate Protection Agency dispatch unless the Agency Administrator directs otherwise. Use of Wildland Fire is an alternative action within the Modified (prior to conversion) and Full Protection FMUs. Use of Wildland Fire is available in these units based upon previously described conditions and on the approval and documentation by the Agency Administrator. The Superintendent may request additional actions on any wildland fire.

Implementation of Use of Wildland Fire actions will be initiated through the Wildland Fire Decision Support Process (WFDSS) through consultation with the Western Area FMO and the appropriate Protection Agency FMO(s).

Regional guidance for the responsibility for completion of the WFDSS components is located in the 2011 Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement and the 2011 Alaska Statewide Annual Operating Plan.

5. Staffing Requirements for Implementation of Wildfire

Western Area FMO in consultation with DENA management and AFS Tanana and/or, DOF Fairbanks/Mat-Su/Southwest Area Zone FMO will determine staffing and monitoring requirements for wildfire incidents. All personnel involved with fire management activities will be appropriately qualified to meet National Wildfire Coordinating Group (NWCG) standards. Because of the remote nature, relative scarcity of structures or other sensitive values within portions of DENA, wildfires with resource benefit objectives incidents may often be adequately managed through aerial surveillance every few days. Other incidents may demand the continuous presence of monitors or fire behavior analysts. The Superintendent and Western Area FMO will determine what DENA staff will be available to

assist with wildfire incidents based upon the needs of the fire organization, DENA needs and individual interest.

6. Monitoring for Wildfire

Monitoring procedures at DENA will follow guidelines established by the Regional Fire Ecologist, Western Area FMO, and DENA resource management staff, Central Alaska Inventory and Monitoring Network staff, as well as the Alaska Fire Effects Task Group. Monitoring actions conducted at DENA specifically in support of wildfire incidents will, whenever possible, include measurement of fuel moisture levels for forest floor duff layers (as represented by the Canadian Forest Fire Danger Rating System) as well as for traditional fine and heavy fuel models. (See Chapter IX for a description of the DENA short and long-term fire monitoring program.) The use of motorized equipment or mechanized transport that is generally prohibited by the Wilderness Act (helicopter landings, use of chainsaws, use of bulldozers, etc.) and will not be permitted on lands that are designated as Wilderness or suitable for Wilderness prior to the preparation of a Minimum Requirement/Minimum Tool Analysis.

7. Wildfire and Step-up Staffing

See Chapter IV Section B Unit 3 for step-up staffing.

8. Predetermined Implementation Procedures for Wildfire at DENA

The FMU parameters described within this plan (and adjusted annually) comprise are the primary predetermined implementation procedures for Use of Wildland Fire at DENA. The "Wildland Fire Use Reference Guide, Denali National Park and Preserve" (Appendix H.) provides area specific guidance for relevant to the implementation of the Use of Wildland Fire.

9. Incident-Specific Implementation Procedures for Wildfire at DENA

The procedures for wildfires in DENA are the same for incidents with suppression only, resource benefit only or a combination of suppression and resource benefit objectives.

Regional guidance is located in the 2011 Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement and the 2011 Alaska Statewide Annual Operating Plan.

Examples of the type of analysis appropriate for Response Level 1, 2, and 3 are listed below.

Table 4. Response Level 1 Components for Wildfire

Component	Input	Output/Notes
WFDSS Basic Information	Fire Information entered by the Protection Agency	
WFDSS Incident User Roles	Jurisdictional Agency assigns Incident User Roles (ie. Reviewer, Editor, Approver)	Protection and Jurisdiction Agency FMOs are assigned Edit and Approver Roles for actions that follow the default action for the FMU
WFDSS Situation	FMU assigned to incident Planning Area Defined Resources at Risk Identified Management Action Points Identified/Developed Short-Term Fire Behavior Prediction BEHAVE/FBP system Farsite FlamMap FSPRO	BEHAVE/FBP runs 2-5 day risk analysis 1-3 day risk analysis Probability Analysis
Risk Assessment	Relative Risk chart	Relative Risk chart output
WFDSS Objectives	Incident Objectives and Management Requirement	
WFDSS Course of Action	Protection and Jurisdictional Agency develop course of action Cost Estimate developed	
WFDSS Validation	Protection and Jurisdictional Agency enter Justification for Validating the Course of Action	Completed by the Protection and Jurisdiction Agency FMOs

Table 5. Response Level 2 and 3 Components Wildfire

Component	Input	Output/Notes
WFDSS Basic Information	Fire Information entered by the Protection Agency	
WFDSS Incident User Roles	Jurisdictional Agency assigns Incident User Roles (ie. Reviewer, Editor, Approver)	Protection and Jurisdiction Agency FMOs are assigned Edit Roles and the Agency Administrator or approved Delegated are assigned Approver Roles
WFDSS Situation	FMU assigned to incident Planning Area Defined Resources at Risk Identified Management Action Points Identified/Developed Short-Term Fire Behavior Prediction BEHAVE/FBP system Farsite FlamMap FSPRO	BEHAVE/FBP runs 2-5 day risk analysis 1-3 day risk analysis Probability Analysis
Risk Assessment	Relative Risk chart	Relative Risk chart output
WFDSS Objectives	Incident Objectives and Management Requirement	
WFDSS Course of Action	Protection and Jurisdictional Agency develop course of action Cost Estimate developed	
WFDSS Validation	Protection and Jurisdictional Agency enter Justification for Validating the Course of Action	Completed by the Protection Agency FMOs and Agency Administrator or approved Delegated
WFDSS Decision	Protection and Jurisdictional Agency cooperate in developing the Decision Must include Rational Periodic Assessment Frequency assigned Approved by Agency Administrator	Approved Published Decision Document
WFDSS Periodic Assessment	Reviewed, accepted or rejected by Agency Administrator.	

10. Funding/Fiscal Tracking

The Western Area FMO will work with the Regional FMO to ensure that appropriate funding is available for the wildland fire management program/activities and that the appropriate accounts are utilized for the wildland fire management program and wildland fire incidents in DENA. Guidelines for funding and financial tracking of fire management programs and activities for individual parks are contained within Reference Manual-18, Chapters 17 and 18.

11. Permanent Project Records for Use of Wildland Fire

The Western Area Fire Management Officer will ensure that a complete project record will be produced and retained for each Use of Wildland Fire (Incident with resources benefit objectives) wildfire incident at DENA. Each record will contain the following items:

- All approved planning documents guiding management actions (e.g. WFDSS Decision Document).

- Summary of surveillance and fire effects monitoring activities, including schedule; individual reports and findings.

- Funding codes and cost accounting.

- Project maps (permanently map and archive fires greater than 100acres)

- DI-1202

- Other information as appropriate (e.g. photo points).

12. Information and Interpretation for Use of Wildland Fire

The information and interpretation requirements of the DENA fire management program are specifically addressed in Chapter XI. The following objectives, however, pertain directly to wildfire with resource objectives:

- When extended Use of Wildland Fire incidents are likely to be visible (smoke or flames) to visitors, NPS personnel will prepare and distribute handouts explaining the DENA fire management program, the nature of the specific incident, and the desirability of preserving the area's natural fire regime. This information will be available at visitor contact station(s) and available to park staff that may encounter park visitors.

- An attempt will be made to educate all DENA employees about local fire ecology, the DENA fire management objectives, and wildfire with resource benefit objectives incidents that are in progress.

- When wildfire with resource benefit objectives incidents occur near frequently used locations, interpreters or other NPS employees will make periodic visits to the location to answer questions.

13. Potential Impact of Use of Wildland Fire Implementation

In managing the use of wildland fire, DENA administrators will take into account both the short and long-term impacts of any such activity upon all facets of Park, Preserve, and Monument use, including backcountry wilderness users and subsistence activities. Although some local residents have expressed concern over the impact of wildland fire upon subsistence hunting and/or trapping operations in DENA, the preservation of the area's fire regime is necessary for the long-term viability of wildlife populations and vegetation communities that support the wildlife populations and subsistence activities. The Agency Administrator will in all cases assess the short-term impact of wildfire with resource benefit objectives incidents actions on subsistence activities.

B. Wildland Fire Suppression

1. Range of Potential Fire Behavior

Fire behavior in DENA can range from creeping subterranean fire in tundra to fast moving ground or canopy fire in surface fuels or spruce stands. For more detailed discussion refer to Fuel Characteristics and Fire Behavior (Chapter III Section E.3).

2. Preparedness Actions

a. Fire prevention activities

- Fire prevention, wildfire with resource benefit objectives and fire suppression will be discussed at selected staff safety meetings in the early spring to ensure that all personnel are aware of concerns and familiar with procedures for wildfire. If prescribed fire is to be used in DENA, it will be included in the discussion.

- NPS personnel will participate in fire prevention and safety fairs at local schools/communities so that the general public is aware of the importance of fire prevention.

- During periods of high danger, the general public and park visitors will be informed of conditions through press releases, interpretive media and, if necessary, the posting of signs at field stations, public-use cabins, campgrounds, etc.

b. Staff readiness:

The Western Area FMO will oversee the annual certification, training, and evaluation of DENA personnel involved in fire management activities, in accordance with the timetable shown in Table 6.

c. Program readiness

The Western Area FMO will ensure the accomplishment of the following objectives each winter:

- Inventory fire equipment; order needed supplies and update inventory list.

- Review and confirm DENA and/or Regional fire-related account procedures.

- Review and adjust FMU parameters (i.e. AIWFMP protection categories).

- Review and revise DENA Fire Management Plan and prepare new compliance documents as appropriate.

Table 6: Staff Readiness Schedule

January-June • Physical exams for firefighters will be completed in accordance with Interagency Medical Standards.

March-May; September-November • Fire qualifications updated and entered into IQCS
May-June • Annual wildland fire refresher training for all red-carded personnel. • Annual Work Capacity Tests administered, as per RM-18 and Interagency Medical Standards. • NWCG courses in Alaska for firecrew members.
September • Critique fire season (all fire management activities). • Evaluate individual performance of DENA staff, correct deficiencies and recognize exemplary effort.
November-June • Nominate personnel for specific training courses based on fire program and individual development needs. • Coordinate/facilitate training detail opportunities with other NPS units and agencies.

3. Step-up Staffing and Pre-Attack Plan

The Western Area FMO and associated fire staff is responsible for Denali National Park/Preserve, Lake Clark National Park/Preserve, and Western Arctic Parklands (Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Noatak National Preserve, and Kobuk Valley National Park). The matrices outlined in Tables 8 and 9 below will be used to assist in the pre-positioning of these personnel and fire management resources.

Table 7. Complexity Level

Fire Indices	0-3 fires	3-6 fires	6+ fires
FFMC=<85	LOW COMPLEXITY LEVEL	LOW COMPLEXITY LEVEL	MODERATE COMPLEXITY LEVEL
FFMC=86-89	LOW COMPLEXITY LEVEL	MODERATE COMPLEXITY LEVEL	HIGH COMPLEXITY LEVEL
FFMC=90+	MODERATE COMPLEXITY LEVEL	HIGH COMPLEXITY LEVEL	HIGH COMPLEXITY LEVEL

Number of Current Fires—A measure of complexity due to the number of fires within or threatening the park regardless of the FMU that is burning. This is also an indication of potential suppression or monitoring resource shortages.

FFMC—the Fine Fuel Moisture Content (FFMC) is a numerical rating of the moisture content of litter and other cured fine fuels (needles, mosses, and twigs). The FFMC is representative of the top litter layer 1-2 cm deep. FFMC fuels are affected by temperature, wind speed, relative humidity, and precipitation. FFMC values change rapidly and reflect

the weather conditions that have occurred over the past three days. The FFMC is used to indicate ease of ignition, or ignition probability with the scale ranging from 0-99. Of importance is the fact that fire starts increase exponentially with an increase in FFMC values at the high end of the scale.

Complexity Level
Low: Few fires within or threatening the DENA park units and relatively abundant resources available. May be early or late in the year, hence fire behavior is reduced and relatively easy to control and extinguish.

Moderate: Several fires within or threatening DENA park units and resources becoming scarce within the AFS Zone. Fires are difficult to extinguish - carryover fires are occurring.

High: Many fires within or threatening DENA park units and resources are becoming scarce within the state. Fires are difficult to control and extinguish - multiple carryover fires occurring.

Table 8. Preparedness Levels

	Values at Risk		
Complexity	Low	Moderate	High
Low	Low Preparedness Level	Low Preparedness Level	Moderate Preparedness Level
Moderate	Low Preparedness Level	Moderate Preparedness Level	High Preparedness Level
High	Moderate Preparedness Level	High Preparedness Level	High Preparedness Level

Values at Risk
These values are life and property including historically significant sites. The low values at risk are those under limited protection. The medium values at risk are those under full protection. The high values at risk include sites that are under critical protection (see Chapter XIII Section A. Protection of Sensitive Resources for criteria for protection levels).

Preparedness Levels
Low: The weather and fire danger indices will be monitored daily.

Moderate: Fire staff will be available within the state. The weather and fire danger indices will be monitored daily. AFS will be contacted as necessary for tactical and resource updates.

High: The Duty Officer, contract helicopter, helicopter manager and two fire staff will be available within the park, dependent upon availability due to fire activity. The weather, fire and danger indices will be monitored daily. AFS/DOF will be contacted, as warranted, for tactical and resource updates. The Western Area FMO will contact the DENA Public Information Officer and/or the Regional Fire Communication/Education/Prevention Specialist daily to provide information updates.

***Prevention Note**: If the Fine Fuel Moisture Code is > 91 and the Duff Moisture Code is > 60 (at WON or DVC RAWS), and/or if Red Flag conditions exist in the Park in high visitor*

use areas fire prevention patrols may be conducted during the burning period. Under the above specified conditions, during high visitor use times (ie. Memorial Day, Fourth of July, etc.) prevention patrols will be conducted during the burning period. In addition, fire prevention patrols may be initiated if fire conditions warrant fire spread during high visitor use times of the year (ie. Memorial Day, Fourth of July, etc.)

4. Minimum Impact Suppression Tactics (MIST)

It is the policy of the National Park Service that all fire management activities will be executed using minimum impact suppression guidelines. Accordingly, the following constraints apply to all fire management activity in Denali National Park and Preserve:

- Use water rather than retardant whenever possible; when retardant is necessary, use fugitives if available and avoid as much as possible the use of any retardant in or around lakes or marshes.

- Use cold-trailing or wet-lining techniques when feasible.

- Utilize weeping hoses or foggers in mop-up; avoid "boring" or other scarring hydraulic actions.

- Dozers and other heavy equipment will be used only with the approval of the Superintendent (or delegate), except in life-threatening circumstances.

- Minimize the falling of trees and the cutting of shrubs; limb vegetation adjacent to fireline only as needed to prevent additional fire spread.

- Minimize the use of helispots/ helibases that require clearing.

- Emphasize appropriate Leave No Trace practices by personnel on the fireline and/or in spike camps, particularly with regard to human waste disposal, selection of durable campsites, and food storage in bear country.

Minimum impact suppression tactics and Leave No Trace ethics will be identified as an objective on all fire suppression incidents occurring in DENA.

5. Rehabilitation

Firelines may require rehabilitation in order to stabilize the burn area and to mitigate the effects of suppression activities. The Agency Administrator will ensure that the Incident Commander consults with natural resource managers as needed, regarding any specific rehabilitation needs. When possible, burned areas will be allowed to regenerate naturally. Any emergency rehabilitation or restoration will be in accordance with the Department of Interior Interagency Emergency Rehabilitation and Restoration Policy and Guidelines.

6. Completion of Records and Reports

The general pathway for documentation of wildland suppression incidents is shown in Chapter IV, Section A. For wildfire incidents the Western Area Fire Management Officer or delegate will be responsible for the completion of some or all of the following items, as indicated.

a. Wildland Fire Decision Support System

The Western Area FMO will ensure that the WFDSS strategic planning process is completed for every wildfire at DENA. For default responses within the DENA, the WFDSS strategic planning process is satisfied by the AFS Tanana and/or, DOF Fairbanks/Mat-su/Southwest Area Zone dispatch office through their recording of initial detection and determination of the incident location and entering the WFDSS Basic Information and FMU. The Western Area FMO is responsible for preparing additional WFDSS planning documentation for the Agency Administrators approval as needed.

b. DI-1202

The DI-1202 is the standard format for submission of fire data into the Department of Interior Wildland Fire Management Information (WFMI). On DENA wildland fire incidents an initial DI-1202 will be prepared by the Incident Commander and submitted to the Alaska Fire Service. The Area Fire Management Officer, however, will ensure the preparation and entry of an additional DI-1202 on behalf of DENA into the NPS fire occurrence database. The following items are pertinent to the production of the DI-1202; the Western Area FMO will ensure that these items are retained and filed at the Western Area Fire administrative office located in Denali Park, Alaska**.**

- Fire number (obtained from Alaska Interagency Coordination Center)
- Copy of WFDSS Planning Documents (as appropriate)
- Resource order forms (NFES 1470)
- Equipment rental or purchase receipts
- Accident and/or injury reports
- Personnel lists (including Emergency Time slips)
- All weather, fire danger and fire behavior data reports and records
- Situation maps
- Rehabilitation plan
- Limited Delegation of Authority if an Incident Management Team is assigned.

V. NON-FIRE FUEL TREATMENT

The Alaska Western Area Fire Management will implement a Fuel Treatment Plan (Fuel Plan, Appendix F.) to better protect the built environment (including historic structures) as well as the lives of visitors, employees, and firefighters in the event of a wildland fire. The Fuel Plan details the protocols for the mechanical removal of vegetation that could carry a wildland fire toward structures and a maintenance plan for retaining viable fire breaks around the facilities.

Denali National Park and Preserve's Fuel Plan complies with NPS policies and guidelines and provides guidance for treating hazardous vegetative fuels. The Alaska NPS Structure Protection Procedures were approved in 2005 by the Alaska Regional Director and provide direction to the park superintendents concerning structure protection (Appendix G.)

This plan also describes implementation and maintenance schedules for specific sites.

VI. PRESCRIBED FIRE MANAGEMENT

A. Long-term Scope

Though Denali National Park and Preserve presently has no plans to use prescribed fire, it may be implemented in the future for the accomplishment of specific resource management goals. Because of the relatively undisturbed nature of DENA landscapes as a result of fire fulfilling its role as an ecological process and maintaining Condition Class 1, currently there is not a need for large-scale prescribe burning. DENA park management may use prescribed fire for the purposes of restoring historical conditions at selected sites or for reducing hazard fuel loads in the vicinity of resources requiring protection. If global climate change or ecological change agents precipitate changes in fire occurrence, fire regimes, or condition class, prescribed fire may be the appropriate management tool for restoring ecosystem integrity.

B. Prescribed Fire Planning

1. Annual planning

Any implementation of prescribed fire within DENA will be predicated upon a planning session attended by the Western Area FMO, the Local Park Fire Coordinator, Superintendent or delegate and any other key players or interested parties. Topics covered in this meeting may include the determination of prescribed burn units, the establishment of prescribed fire objectives, the presence and protection of sensitive resources, the mitigation of smoke management problems, determination of prescriptions and/or burning windows, fire effects monitoring protocols and the impact of the proposed action on the full spectrum of DENA uses, including wilderness values, and subsistence hunting and trapping.

2. Individual plans

Each implementation of prescribed fire will follow a specific plan prepared by the Western Area FMO, or designee, in accordance with the parameters outlined in RM-18, Chapter 10, Fuels Management. The State Historical Preservation Officer will review the written plan for compliance with the National Historic Preservation Act. It will then be reviewed and approved by the Superintendent, in consultation with the Chief of Resource Management. Final authority for the implementation of the prescribed fire plan resides with the designated Burn Boss.

3. Staffing

An appropriately certified Prescribed Fire Burn Boss (RXB3, RXB2, RXB1) will supervise all prescribed fires at DENA for the corresponding fuel types and complexity levels of the burns. Burn bosses for DENA prescribed fires may be obtained from other agencies, provided that designated individuals are appropriately certified. Prescribed fires at DENA will be staffed exclusively by certified wildland firefighters. The Western Area FMO will determine the amount and specific nature of resources required for prescribed fire operations through the preparation of the prescribed fire plan. The designated burn boss, however, is responsible for the tactical implementation of the plan and as such must confirm the adequacy of planned staffing levels prior to ignition.

4. Monitoring

All prescribed fires will be monitored on both a short and long term basis, in order to provide the following types of information: 1) anticipated fire conditions including rate of spread, predicted weather, potential threats to resources and/or safety, fuel load, etc.; 2) observed ambient conditions including topographic influences, current weather conditions, drought index, fire and smoke behavior, etc.; and 3) assessment of post-fire effects including fuel reduction, vegetative change, etc. Collection of all three types of information is required to help ensure adherence to prescription, accomplishment of management objectives, and establishment of baseline data. Complexity, frequency, and duration of monitoring activity will be dictated by burn objectives and will be specified in the prescribed fire plan. Objectives and guidelines for monitoring procedures at DENA are further specified in Chapter IX.

5. Documentation

The Western Area Fire Management Officer will ensure that each prescribed fire is documented with the following items:

- Approved prescribed fire plan.
- Compliance and planning documents.
- Map of project and surrounding area.
- Monitoring data (including weather, fire behavior, and fire effects observations).
- Smoke dispersal information.
- DI-1202

6. Reporting Requirements

The Western Area FMO will report the intent to conduct a prescribed fire via phone to the AKSO Fire Management Office by 3:00 p.m. the day before a prescribed fire. The FMO will also notify the AFS Tanana and/or, DOF Fairbanks/Mat-su/Southwest Area Zone dispatch, specific individuals/organizations/agencies identified in the burn plan, and the Alaska Interagency Coordination Center (AICC) the day prior to the burn and again immediately upon its completion. AICC will incorporate the information into the daily situation report.

7. Prescribed Fire Critiques

Immediately following the prescribed burn the Burn Boss will conduct a review of the prescribed burn operation. The overhead staff, crewmembers, local park fire contact, resource specialist(s), park management and the Western Area Fire Management Officer will attend the review. Items for discussion will include safety, accomplishment of objectives, fire behavior and effects, and effectiveness of operations.

8. Air Quality/Smoke Management

All fire management actions at Denali National Park and Preserve will be conducted in full compliance with local, state, and interstate air pollution control regulations as required by the Clean Air Act, 42 U.S.C. 7418. The Alaska Department of Environmental Conservation issues open burning permits. The National Park Service has been an active participant with the Alaska Department of Environmental Conservation in the development of the Alaska Smoke Management Plan. The optimal goal of a smoke management plan and program is to protect public health and the environment while allowing for reasonable resource management (e.g. Use of Wildland Fire and Prescribed Fire). Addressing smoke management concerns is a critical component of a Prescribed Burn Plan and the Wildland Fire Decision Support System.

VII. FIRE MANAGEMENT ORGANIZATION AND RESPONSIBILITIES

A. Organizational Structure

1. Cooperation with Alaska Fire Service and Alaska State Department of Forestry

In order to ensure safe and efficient operations, a basic understanding of the cooperative relationship between the DENA fire management program BLM-Alaska Fire Service (AFS) and the Department of Forestry is imperative for all personnel. As specified in the Alaska Interagency Wildland Fire Management Plan and the 2010 Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement and the 2010 Alaska Statewide Annual Operating Plan, the Alaska Fire Service and the Department of Forestry are responsible for providing fire suppression services on all wildland fires occurring within DENA. The management and staff of Denali, in turn, will ensure that all suppression services contribute to the achievement of the management goals of the Park and Preserve and the National Park Service, and to the greatest extent possible, support suppression efforts as required.

2. Additional Resources

Denali may use personnel to assist in information collection above and beyond the information provided by the AFS and DOF. These personnel may work directly for the NPS Western Area Fire Management Officer or, when an Incident Commander is assigned, directly for the IC. The NPS Western Area Fire Management Officer and the Protection organization FMO will work together to determine the chain of command for these individuals and the dispersal of the information.

3. Agency Administrator

An Agency Administrator will be designated for each incident at Denali National Park and Preserve. The Agency Administrator will function as the direct representative of the DENA Superintendent and as such will be responsible for the identification and accomplishment of DENA and NPS resource management goals and suppression constraints. The Agency Administrator will prepare, in consultation with the Western Area FMO and Protection FMO, and sign key decision-making and validation documents (e.g. Wildland Fire Decision Support System). The Agency Administrator may also request that additional personnel be ordered to assist specifically with the accomplishment of DENA and/or NPS goals (e.g., resource advisors, monitors, fire behavior analysts, etc.).

4. Incident Command Structure

For incidents at DENA, resource advisors will report to the Planning Section Chief or Incident Commander as per NWCG specifications for Incident Command structure. Other personnel requested specifically to assist with the accomplishment of agency or DENA resource management goals (e.g. monitors, fire behavior analysts, fire-use module personnel, etc.) will report to the Protection Agency FMO. Exceptions could occur if mutually agreed upon between the Western Area FMO and the Protection Agency FMO. If resources are placed under the supervision of the Western Area FMO these personnel will be briefed on contingent procedures and alternative chain of command for situations in which the Western Area FMO departs the incident or is out of regular contact. Depending upon the complexity of the incident these individuals may be assigned to the appropriate Incident Command element.

In summary, NPS personnel may participate in fire management operations within the parklands in two distinct ways:

1. NPS employees may serve directly with operational forces (or other branches of command), under the supervision of the IC provided by AFS or ordered through the interagency mobilization system. For instance, a DENA employee assigned to assist smokejumpers during line construction on a small wildland fire would report directly to a jumper-in-charge dispatched from Fairbanks.

2. NPS employees may work to help ensure the achievement of DENA management goals under the supervision of the Western Area Fire Management Officer (or the Planning Section Chief or Incident Commander, in the case of NPS personnel serving as resource advisors). For example, an NPS employee working as a monitor in support of the WFDSS validation process might report to the Western Area FMO (If mutually agreed upon by the Protection and Jurisdictional FMO; a DENA staff member advising an incident command team on the presence of sensitive resources would report to the Planning Section Chief or Incident Commander.

DENA employees dispatched directly by the NPS may occasionally serve as interim Incident Commanders, as qualified, on DENA incidents. These rare instances will be in consultation with the protection FMO. In most cases, however, operations will be conducted from the

outset by the AFS or DOF, with DENA managers focusing on the identification and achievement of resource management goals, the conduction of monitoring efforts when necessary and ensuring compliance with AIWFMP by protection forces.

5. Fire Management Responsibilities for DENA Personnel

In light of the inter-organizational nature of fire management at DENA as well as the shared nature of the Western Area FMO and fire crew, fire management responsibilities for individual employees are best explained in two steps. All personnel at DENA have predetermined responsibilities within the fire management program; these fixed responsibilities are listed below and generalized in Table 9. For specific incidents, however, any one of several appropriate personnel will fill specific functions. These incident specific functions, their organizational structure, and lists of personnel who may perform them are shown in Figure 2.

The Western Area Fire Management officer coordinates the WEAR Fire Management Program. Although administratively based in Denali National Park, the Area FMO also provides fire planning and support to WEAR, and Lake Clark. This is a shared position between all parks and no single park maintains ownership or priority over another. The Western Area FMO should be considered park fire staff in each of the units he/she is responsible for. General duties for the Western Area Fire Staff are as follows.

Area Fire Management Officer – Oversight of all aspects of the fire programs for the area parklands, coordination of fire management strategies between the Area Parklands, Superintendent and the Protection Organization, coordinate and prepare wildland fire decision documents, keep Area parkland Superintendents informed and engaged in the fire organization.

Assistant Fire Management Officer (Wildland Fire Operations Specialist) – Supervises the daily operations of the area fire program. Assists the Area FMO in oversight and coordination responsibilities. In the absence of the Area FMO will assume all responsibilities of the Area FMO in an acting capacity. Assists as directed in all aspects of the area fire program.

Fire Program Management Assistant – Provide administrative and budgetary expertise to the fire program. Assists in the administrative duties in planning and reporting for the program and works to minimize the administrative burden on the rest of the area fire program staff.

Helicopter Manager – Provides leadership to the aviation portion of the area fire program. Leads, manages and administers the Fire Exclusive Use helicopter contract for the area fire program. Assists in the staffing of the NPS National Contract Helicopter, based at Great Smokey National Park, between January through May. The helicopter manager will assume the AFMO responsibilities in the absence of the AFMO. Assists as directed in all aspects of the area fire program.

Assistant Helicopter Manager – Assists the Helicopter Manager is all duties as stated above. Assists the Supervisory Forestry Technician with hazard fuels projects. In the absence of the Helicopter Manager assumes the Helicopter Managers responsibilities. In the absence of the

Supervisory Forestry Technician assumes the supervision of the five person fuels/Helitack/ engine crew. Assists as directed in all aspects of the area fire program.

Supervisory Forestry Technician – Hires and supervises the five person fuels/Helitack/engine crew. Responsible for hazard fuels project planning and implementation. Oversees the readiness of the Type 6 engine. Assists as directed in all aspects of the area fire program.

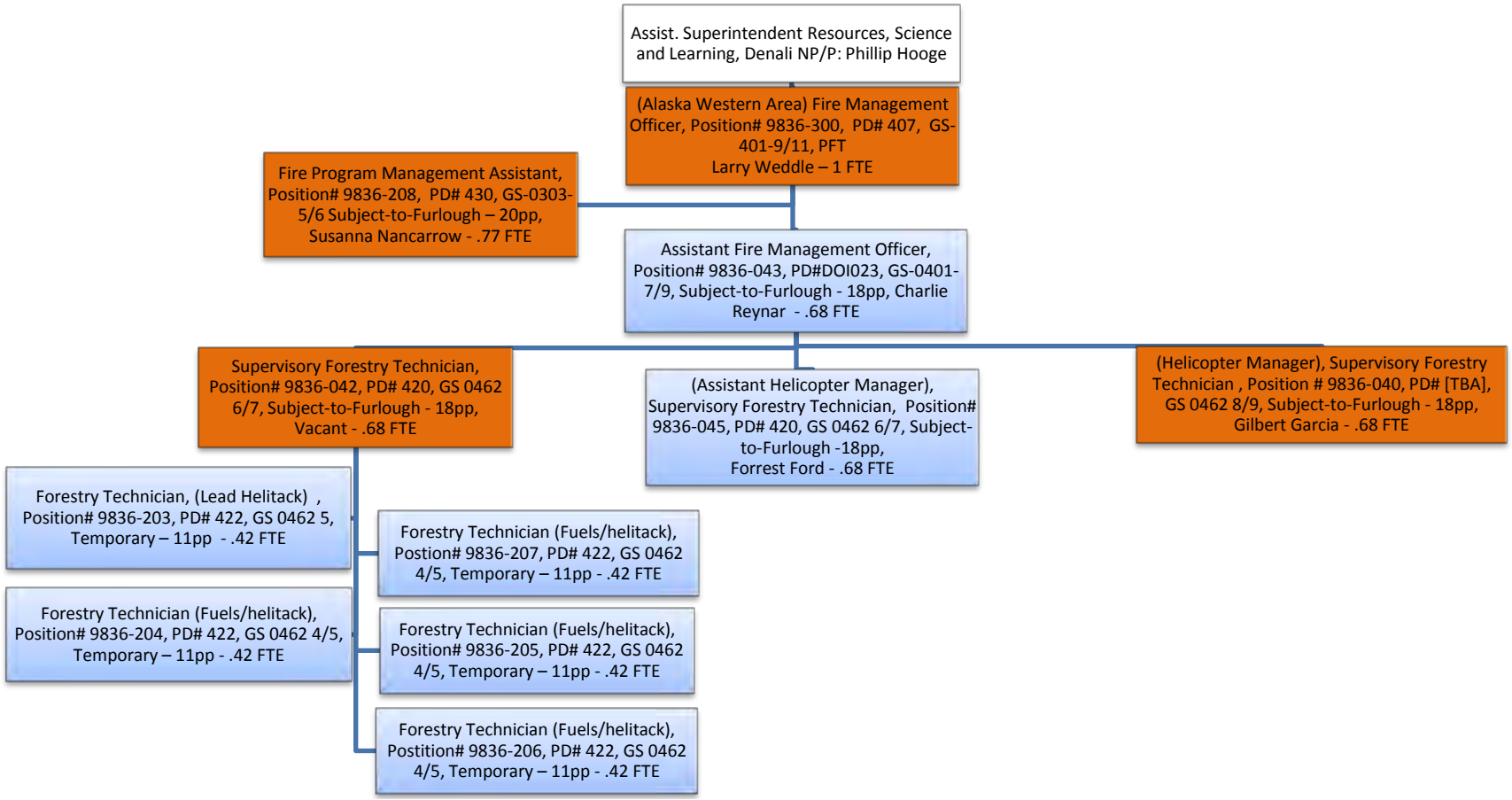
Lead Helitack (Forestry Technician) – Qualified helicopter crewmember that assists with all aspects of the fuels program and works with the fire crew. Assists as directed in all aspects of the area fire program as qualified.

Forestry Technician (Fuels/Helitack) – Qualified or trainee helicopter crewmember that assists with the implementation of hazard fuels, fire ecology, Comm/Ed and Wildland Fire programs. Assists as directed in all aspects of the area fire program as qualified.

Figure 2: Alaska Western Area Fire Management Organizational Chart

Western Area – Denali NP/P Administrative Unit

Other Parks included in the Area: Western Arctic Parks (Cape Krusenstern National Monument, Noatak National Preserve, Kobuk Valley National Park, Bering Land Bridge National Preserve) and Lake Clark NP/P



B. Relation of Fire Management Program to DENA Organization

The Western Area Fire Management officer coordinates the DENA Fire Management Program. Although administratively based in Denali National Park, the Western Area FMO also provides fire planning and support to Western Arctic Parklands, and Lake Clark. This is a shared position between all parks and no single park maintains ownership or priority over another. The Western Area FMO should be considered park fire staff in each of the units he/she is responsible for.

Table 9. Predetermined Fire Management Responsibilities

Position:	**Superintendent**
Fire management role:	The Superintendent of Denali National Park and Preserve is responsible for the planning and direction of all activities and programs and as such is ultimately responsible for any wildland fire operation at DENA. The Superintendent may, however, choose to delegate any or all fire management responsibilities to appropriate personnel (e.g., Assistant Superintendent(s), Fire Management Officer, etc.). The Assistant Superintendent may serve in the following roles and responsibilities as designated by the Superintendent.
Specific responsibilities:	• In conjunction with the protection organization FMO approves Limited Delegation of Authority and provides briefing and evaluation of Incident Management Teams. • Serves as Agency Administrator unless delegated. • Approves Non-Standard responses. • Approves prescribed fire plans. • Approves mechanical hazard fuel reduction plans. • Approves use of retardant and/or heavy equipment in non life-threatening wildland fire situations. • Participates in all official fire reviews. • Participates in NWCG functions as qualified.
Position:	**Assistant Superintendent of Resources, Science and Learning,**
Fire management role:	The Assistant Superintendent of Resources, Science and Learning supervises the day to day activities of the DENA fire management program and the Western Area Fire Management Officer. The Western Area FMO, however, provides service to the DENA, WEAR and LACL Superintendents, thus priorities will be dictated by the needs of any given area park superintendent.

Specific responsibilities:	• Serves in roles as designated by the Superintendent. • May serve as Agency Administrator for DENA incidents when feasible, and as delegated. • Assists in the integration of fire management with natural, cultural and inventory & monitoring programs.
Position:	**Area Fire Management Officer**
Fire management role:	The Western Area FMO oversees and coordinates the DENA fire management program. Responsibilities listed below may be delegated to appropriate personnel (including, typically, the Chief of Resources, area fire staff, and the Eastern Area FMO).
Specific responsibilities:	• Works with Protection Agency FMOs who will communicate intent with the Incident Commander and protection organization personnel. • May serve as Agency Administrator Representative for DENA incidents when feasible. • Ensures that DENA Superintendent/staff and key Protection Agency personnel are informed of pertinent fire conditions and/or situations. • Works with DENA staff, adjacent land owners and Protection Agency managers to determine and adjust boundaries and strategies for DENA FMUs. • Prepares Prescribed Fire Plans. • Prepares Mechanical Fuel Reduction Plans. • Represents Region and DENA on NPS or interagency task groups/committees and in agency and interagency training. • Ensures the education of DENA staff on fire management issues. • Participates in all official fire reviews. • Prepares and maintains fire records and reports. • Prepares funding proposals and manages the DENA fire accounts. • Manages the DENA fire cache and coordinates acquisition of supplies. • Ensures qualifications of staff. • Serves as liaison with regional office staff. • Ensures Federal Fire Policy is followed. • Participates in NWCG functions as qualified. Coordinates with Regional FMO to ensure that DENA fire management needs are identified and accounted for in budget preparation/allocation and are considered in regional fire management program .
Position	**Division Chiefs, Program Managers and Supervisors**
Specific Responsibilities:	• Make qualified employees available for local, regional and national incidents. • Provide additional surveillance if needed on local /DENA incidents

	• Assist with communication to local communities during incidents • Backfill local positions assigned to fire incidents • Work as Firefighter or other NWCG position as qualified. • Provide employee training needed to keep qualifications current or for the advancement of qualifications.
Position	**Local Park Fire Coordinator**
Fire management role:	The Local Park Fire Coordinator(LPFC) acts as the liaison between the Western Area FMO and the local park superintendent and staff. A close and open working relationship with the park superintendent is mandatory for this position. The LPFC functions as the conduit between Western Area FMO, Protection Agency FMO, Superintendent and other key players of the fire management program particularly if the Western Area FMO is not available. Since the Western Area FMO is administratively based at Denali, no LPFC is designated. The FMO's direct supervisor may act as a de facto LPFC. In the absence of on scene fire management staff, the LPFC may supervise DENA fire operations as qualified.
Specific responsibilities:	• Provides guidance to the Western Area FMO in fire management issues pertaining to DENA. • Advises DENA Superintendent on approval of prescribed fire and mechanical reduction plans. • Advises Agency Administrator on Use of Wildland Fire for resource benefit. • Advises Agency Administrator and Incident Commander/overhead team of location and sensitivity of significant resources during wildland fire incidents. • Participates in all official fire reviews. • Assists with the development of fire management objectives. • Participates in NWCG functions as qualified.
Position	**Regional Communication and Education Specialist**
Fire management role:	The Regional Fire Communication and Education Specialist is responsible for informing and educating media, visitors, park staff and residents within and around DENA about all fire management goals, objectives, and actions.

Specific responsibilities:	• Develops and coordinates on-going programs for educating the park staff and public about the area's fire ecology and the DENA fire management program. • Develops and coordinates a plan for disseminating information during large or complex incidents. • Informs public of current fire situation. • Participates in NWCG functions as qualified. • Coordinates with AFS/DOF on prevention efforts. • Coordinates with AFS/DOF on information distribution. • Represent DENA and NPS on NPS and interagency fire education/prevention related task group/committees
Position	**Regional Fire Ecologist**
Fire management role:	The Regional Fire Ecologist is responsible for coordinating fire effects monitoring and fire related research within DENA with other agencies.
Specific responsibilities:	• Coordinates all fire monitoring activities. • Develops fire research program for DENA. • Coordinates with other agencies on research/monitoring. • Member of the Fire Effects Task Group. • Provides ecological expertise on vegetation communities and fire effects. • Represents DENA and Alaska region on NPS and interagency fire ecology/effects task groups/committees.
Position	**Western Area Fire Staff**
Fire management role:	Area fire staff is based in Denali Park but help plan and implement fire management activities within DENA ,WEAR, and LACL.
Specific responsibilities:	• May serve as Agency Administrator or Acting FMO in the absence of the FMO, as qualified. • Serves as helicopter manager and/or crewmember during fire management and other resource management activities. • Serves as crew boss, etc. as qualified. • Supervises and assists with gathering and processing of data for use in long-term and incident-specific fire management planning. • Plans and implements hazard fuel reduction projects. • Assists with planning and supervision of prescribed fires. • Supervises and/or performs various resource management projects throughout DENA • Participates in NWCG functions as qualified. Represent DENA and NPS on NPS and interagency fire related task group/committees
Position	**Other DENA Employees**

Fire management role:	Any DENA employee may be assigned to assist with fire management activities as environmental and/or cultural specialists, logistical advisors, firefighters, support personnel, law enforcement officers, etc., depending on qualifications, skills, and regular duties.
Specific responsibilities:	• Advising FMO or Agency Administrator during planning of fire management activities. • Gathering and processing of data for use in long-term and incident-specific fire management planning • Reports ignitions (specific Lat./Long) in DENA. • Law enforcement. • Participate in NWCG functions as qualified.
Position	**Regional Fire Management Officer**
Fire Management role:	Supports the Area Fire Management Officers for the NPS Alaska Region.
Specific responsibilities:	• Makes final determinations on behalf of the NPS on fire management planning, strategy and tactics in the event the Western Area FMO, Local Park Fire Contact, or Superintendent are not available. • May sign the Fire Decision Document if Superintend or designee is not available. • Represents the Regional Director and Superintendents through Delegation of Authority on the Alaska Wildland Fire Coordination Group and the Alaska Multi-Agency Coordination Group. • Ensure that DENA and Alaska Fire Management needs and perspectives are addressed in regional, national and interagency policies, programs and procedures.

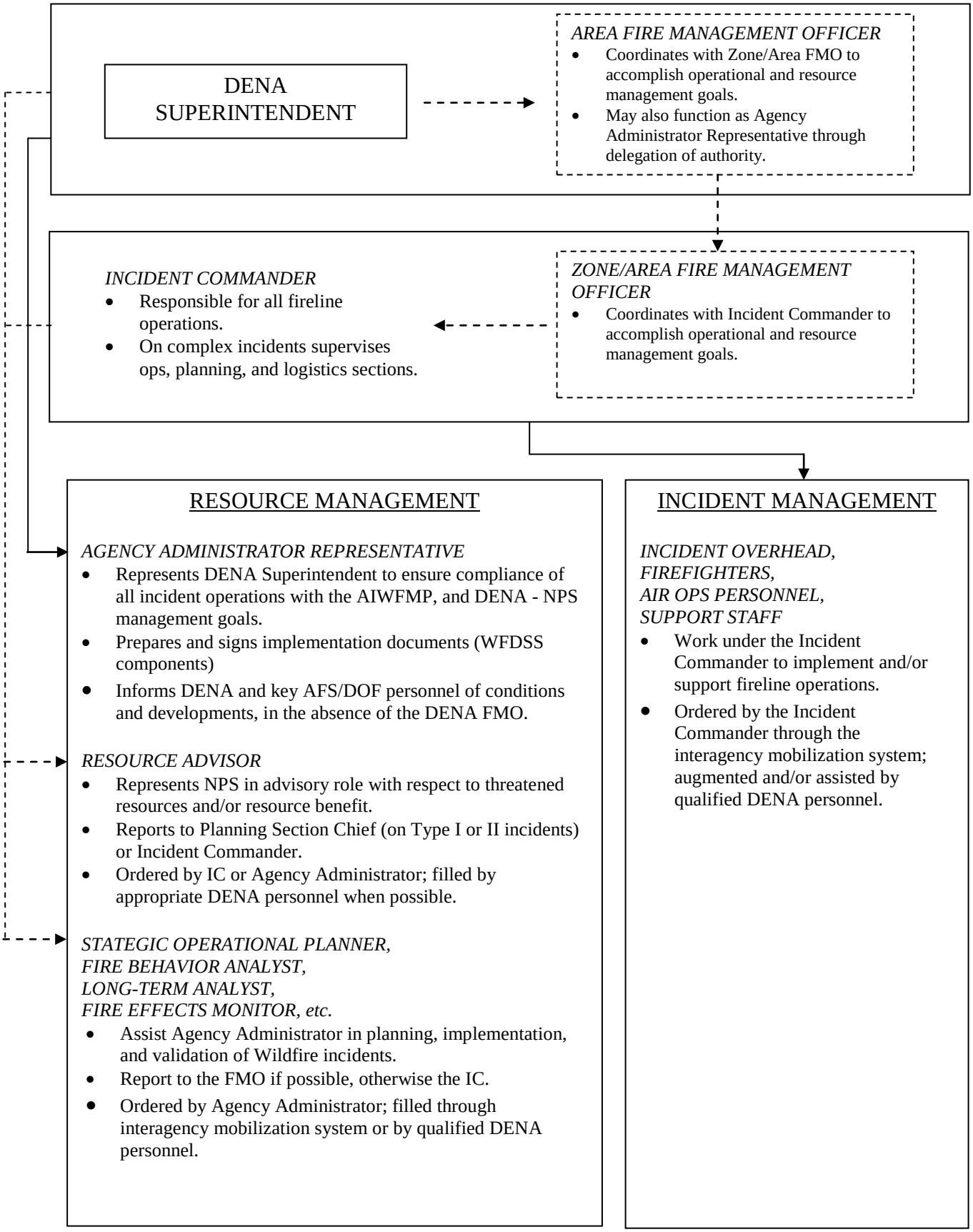


Figure 3. Incident-Specific Fire Management Functions at DENA

C. Assessment of Use of Wildland Fire

The DENA Superintendent, or delegate, is responsible for the validation and periodic assessment of Use of Wildland Fire incidents through written or verbal evaluation. This is to ensure that fire strategies and tactics meet fire and resource management goals at DENA.

D. Interagency Coordination

(See Chapter VII Section A)

E. Interagency Contacts

Pertinent interagency contacts include dispatch personnel at the Alaska Interagency Coordination Center as well as operational and dispatch personnel at the DOF Fairbanks/Mat-Su/Southwest Area and AFS Tanana fire management zone offices. Current phone numbers for these positions are listed in Appendix D.1. Pertinent contacts within the park include fire personnel, park management as well as pertinent park staff and dispatch personnel. Current phone numbers for these positions are listed in Appendix D.2.

F. Fire-Related Agreements

An Inter-Park Agreement (Appendix I.) is in effect between the Western Area Wildland Fire Management Officer and the Superintendents of Lake Clark NP/P, Western Arctic Areas and Denali NP/P to formalize the relationship, responsibilities and expectations for the wildland fire management program that provides services to the NPS units. Each Superintendent will provide a Delegation of Authority (Appendix I.) to the Area Fire Management to implement the wildland fire management program in the unit they manage. An Interagency Fire Protection Agreement is in effect in the 2011 Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement and the 2011 Alaska Statewide Annual Operating Plan to delineate purpose, authorities and responsibilities of all entities related to wildland fire management.

G. Reporting of New Ignitions

If NPS personnel, visitors, or local residents detect a new ignition they should notify the AFS Tanana or, DOF Fairbanks/Mat-Su/Southwest Area Zone Dispatch (depending on the fire's zone jurisdiction) as soon as possible. Information needed includes: an accurate location of the fire (lat., long), approximate size, resources threatened, and any other pertinent information (nearby lakes or rivers, cardinal direction from these features, color of smoke, fuels (vegetation) present, size of column, etc…). Once AFS Tanana or, DOF Fairbanks/Mat-Su/Southwest Area Zone Dispatch has this information, then contact the Western Area FMO responsible for the park wildland fire management program. If the appropriate Western Area FMO is not available contact the Regional FMO. If the Regional FMO is not available contact the Duty Officer identified on the Wildland Fire AKSO Website (http://165.83.62.205/epr/fire/fire.htm/). The Western Area FMO or Regional FMO will contact the Superintendent if they have not already been informed about the fire.

H. Limited Delegation of Authority for Incident Management Teams

Type I, II and III Incident Management Teams ordered for and/or assigned to incidents at Denali National Park and Preserve will operate under a written Limited Delegation of Authority, prepared, in consultation with the protection FMO, and signed by the DENA Superintendent or delegate. The Limited Delegation of Authority will specify pertinent priorities, concerns, and constraints for the incident and will be treated as DENA policy until the conclusion of the incident or the Superintendent's amendment of the original delegation statement through a subsequent signed statement.

VIII. FIRE RESEARCH

The implementation of the DENA Fire Management Plan will not be dependent upon the prior completion of fire research. Whenever possible, however, fire management actions at DENA will incorporate and facilitate research as well as inventory and monitoring efforts designed to increase understanding of local fire ecology, behavior and effects.

IX. MONITORING

As previously indicated, wildland fire is an integral ecological process that substantially affects DENA wildlife and plant communities. Accordingly, DENA fire managers seek to develop a monitoring program that will help managers to better understand the relationship between fire and other components of the area's ecosystem. Goals for present and future monitoring practices include but are not limited to the following:

- To integrate fire effects monitoring efforts with Central Alaska Inventory and Monitoring Network monitoring activities.
- To understand the natural variability of fire occurrence, extent, and burn severity.
- To understand fire effects on vegetation, fuel, soil and wildlife habitat in order to project changes over time.
- To develop predictive tools in terms of fire occurrence, fire behavior, fire severity and consumption for fire management.
- Determine the cumulative effects of fire on subsistence activities dependent upon wildlife distributions and other resources.
- Facilitate the prediction of fire behavior and fire effects at Denali.
- Determine the effects of fire on known archeological sites and cultural landscapes.

Specific objectives and criteria for monitoring activities are discussed within the context of Prescribed Fire Use in Chapter VI, Section B.4. These objectives and criteria will generally apply to the monitoring of Wildfire incidents, as well.

Guidelines for monitoring wildland fires, prescribed fires and mechanical treatments within DENA were developed in consultation with the Interagency Alaska Fire Effects Task Group (FETG), NPS Fire Monitoring Handbook (FMH 2001), Central Alaska Inventory and Monitoring Network personnel and the NPS Alaska Regional Fire Ecologist. These guidelines provide recommendations for minimum variables to monitor fire or treatment effects within a framework of three monitoring intensities (Level I – III). A brief description of the three monitoring levels is provided below:

Level I, Reconnaissance - This level provides a basic overview of the baseline data that is required to be collected for all wildland or prescribed fires. Specific variables are required for mechanical treatments and will be determined by the Regional Fire Ecologist in conjunction with natural resource management and inventory and monitoring staff. Information at this level includes such items as RAWS weather data, general description of the fire environment (i.e. topography and fuel types), and fire location or perimeter. Information collected at this level precludes the necessity for on the ground measurements and can be done via remote sensing or an aerial platform.

Level II, Fire and Fuel Observations - This level documents fire behavior observation, fuels, and general effects of wildland fires, prescribed fires or mechanical treatments on vegetation. Information at this level includes characteristics of fire, such as rate of spread, fire behavior, and burn severity, as well as current weather and fuel conditions. Information to assess pre and post fire or treatment includes duff depth and moisture measurements, photo points, vegetation cover, and tree parameters. This level of monitoring is recommended for all wildland and prescribed fires, but is dependent on the objectives of the burn and the resources of concern. Variables monitored at this level would require on the ground measurements of specific sites.

Level III, Short or Long-term Fire Effects – This level would be used to monitor the effects of prescribed or wildland fires in greater depth, it may also be used for mechanical treatments. Level III monitoring requires collecting information on fuel reduction, vegetative changes, and soil parameter changes; the number of variables monitored increases and the techniques are more rigorous. Information collected at this level is based upon management objectives and the resources of concern. Variables monitored at this level would require the establishment of plots. Vegetation monitoring plots established by the Central Alaska Inventory and Monitoring Network will be used to assess long-term fire effects and vegetation change.

Monitoring variables for Level II and I are specified in Table 10. These levels are cumulative, for instance all variables monitored in Level I would be included in Level II monitoring. Level I variables are minimums for all fires. The implementation of variables at Level II and Level III (not shown) would depend on the objectives of the fire and the resources of concern, and would remain up to the discretion of the Western Area FMO, DENA Resource Staff, and Regional Fire Ecologist.

Table 10. Recommended Monitoring Variables

Level	Variable	Wildland Fire	Prescribed Fire	Mechanical Treatment
I	Fire Perimeter Map (> 100 acre fire) or Point Location	X	X	X
I	Weather (RAWS)	X	X	O
I	Fuel Types	X	X	X
I	Topographic characteristics	X	X	O
II	Burn Severity Map (> 300 acre fire)	O	O	NA
II	Burn severity assessment (i.e. CBI)	O	O	NA
II	Fire Behavior Parameters	O	X	NA
II	Fire Weather Observations	O	X	NA
II	Photo points*	O	O	O
II	Duff Moisture/Depth	O	O	O
II	Vegetation/Ground Cover	O	O	O
II	Tree density	O	O	O
II	Tree canopy heights (average)	O	O	O
II	Ground to live crown/ladder fuel heights	O	O	O

* Photo points were recommended as Level I monitoring variable from the FETG, however this was for monitoring individually selected fires only. List of recommended variables to be monitored under the three fire management options, where X's are required, O's are recommended.

X. PUBLIC SAFETY

A. Safety Issues at DENA

Fire management safety concerns at Denali include threats posed by fire and smoke to visitors, local residents, employees and wildland firefighters.

B. Mitigation of Safety Issues

1. Operational safety

All personnel engaged in fire management activities within DENA will meet NWCG standards and be certified (possess a Red Card) to perform the task they are ordered to do. Every employee will work to ensure constant implementation of the 10 Standard Fire Orders and LCES (effective use of lookouts, communication, escape routes, and safety zones) and the 18 Watch-Out Situations.

2. Visitor safety

Visitor use will not be allowed near fire perimeters. An attempt will be made to inform all visitors of any known wildland fire activity within DENA, and signs will be posted on nearby roads, villages and departure points if smoke produced during wildland and prescribed fire

creates a safety concern. The Superintendent may initiate a temporary closure of the hazardous area if large or erratic fire behavior endangers visitor and employee safety to a significant degree. Closures may also apply to airspace. In the event that wildland fire threatens visitor safety evacuations may be initiated.

3. Burn Restrictions/Bans

36 CR 2.13(c) states; "During periods of high fire danger, the superintendent may close all or a portion of a park to the lighting or maintaining of a fire." Section (d) states: "The regulations contained in this section apply, regardless of land ownership, on all lands and waters within the park area that are under the legislative jurisdiction of the United States." The Alaska Wildland Fire Coordinating Group (AWFCG) established procedures for implementing statewide or regional burn restrictions/bans at Preparedness Levels IV and V. Either fire protection organizations or land managers can recommend a burn restriction/ban based upon fire indices, risk factors, air quality, forecasted weather and the regional or statewide fire situation. If the AWFCG concurs, the recommendation is forwarded to the Deputy Director of Fire and Aviation (DNR) for implementation by the State Forester. The areas affected by the burn restriction/ban will be delineated using Alaska Department of Fish & Game (ADF&G) management units along with a text description of the area. If the NPS units or a portion of NPS units are included in the burn restriction/ban area the Superintendent has the option to implement a burn restriction/ban using their regulatory authority described above. The NPS will support the regional or statewide burn restriction/ban, unless extenuating circumstances exist. Public Orders and new releases will announce the burn restriction/ban and will be posted on the AFS-BLM (**http://fire.ak.blm.gov/**) and DNR-DOF (**http://www.dnr.state.ak.us/forestry/fire/**) Internet websites. The NPS will prepare Press Releases as needed and will use NPS communication systems to inform NPS employees of the burn restriction/ban. A copy of the State of Alaska Burning Restrictions and Burn Ban Procedure, 1997 is on file in the Western Area and Regional Wildland Fire Management offices.

If burn ban proposals extend beyond NPS administered lands, at Preparedness Levels I, II, and III, local protection agency FMO after contacting local land managers or local land managers may recommend to the local protection agency FMO a burn restriction/ban. Follow Region-wide agreements for approval authority. Public Orders and press releases will be prepared by the protection organization. The Superintendent of affected NPS units will determine if the burn restriction/ban is appropriate. If it is appropriate, the Superintendent will implement the burn restriction/ban using his legislative authority.

Burn restrictions/bans will be rescinded after sufficient recovery of fire indices, improvement of air quality, reduction of risk factors and the regional/statewide fire situation. The burn restriction/ban may be rescinded for a portion of the affected geographic area, if the exempted area can be clearly delineated and articulated to the general public. Press releases will be prepared by the protection agencies to announce the rescission of burn restrictions/bans. The Superintendent will rescind the NPS burn restriction/ban and announce the rescission through press releases if necessary and NPS communication channels.

4. Evacuation procedures

The Alaska Division of Emergency Services has developed standard procedures for the evacuation of personnel and/or public due to risks posed by fire and/or smoke. Either the DENA Superintendent or the DENA Agency Administrator may request the Alaska Division of Emergency Services (ADES) to implement evacuation procedures for DENA or for adjacent communities within Denali. Any fire related evacuation effort will be coordinated with the protection organization FMO or Incident Commander.

XI. PUBLIC INFORMATION AND EDUCATION

The National Park Service Fire Management Staff will coordinate with AFS and/or DOF in all aspects of public information and education. The following steps will be taken to facilitate the awareness of DENA fire management policies, objectives, and actions:

- Western Area Fire Management Officer, Fire Management Staff, and Regional Fire Communications and Education Specialist will work together to effectively inform and educate National Park Service employees and the public about the fire management program, the role of fire in the environment and Firewise concepts.

- The Regional Fire Communications and Education Specialist will work with the Fire Management Staff, Interpreters, Education Specialists, Prevention Specialists and other interested parties, in order to feature the fire management plan, the role of fire in the environment and Firewise concepts in park brochures, exhibits, bulletin boards, interpretive presentations and off-site programs.

- The Regional Fire Communications and Education Specialist create a specific outreach/public information plan for DENA.

- During ongoing fires, the fire management staff will be responsible for fire information dissemination. The fire management staff will communicate orally and in writing the current fire situation to NPS employees, interagency partners and the media. Press releases and articles will be written by either the Regional Fire Communications and Education Specialist or the DENA Public Information Officer and released to local, and when necessary, national media. A step up plan to determine when an Information Officer is needed was developed by the Regional Fire Communications and Education Specialist (Appendix E.). If an Incident Management Team is deployed to manage a fire that affects DENA, NPS information personnel will interact with and support the team's Public Information Officer.

- When fires are visible and likely to continue, the Fire Information Officer may choose to establish a fire information center near the incident. All requests for incident information will be channeled to the center. Accurate and timely

information will be compiled, organized and disseminated to the public and news media.

XII. RURAL COMMUNITIES AND REMOTE STRUCTURES INTERFACE

Several rural communities exist adjacent to the boundaries of DENA. The NPS headquarters, park staff residences, privately-owned commercial structures and individual private residences also occur within the DENA boundaries. These communities and structures have been placed in fire management options that provide a higher priority for suppression actions. Also the NPS and the State of Alaska have cooperatively sponsored and presented community workshops to educate the general public, concessionaires and NPS employees about Firewise concepts/methods that enable an individual to assess the risk that wildland fire poses to their homes/structures and identifies what actions they can take to reduce the risk and increase the fire resistance of their home/structures. Community workshops are anticipated to occur on an annual basis. Fuels reduction treatment occurred in the NPS headquarters and residence areas in 2004. Site-specific fuel reduction treatments have and will continue to occur at remote NPS structures identified for protection by DENA management. After the initial fuels reduction treatment, routine maintenance of fuel levels is required. The routine fuels treatment is anticipated to become a significant element of the Western Area Wildland Fire Management Program. The NPS may assist the State of Alaska and local communities with development of community protection plans and pursuit of federal funds for fuels reduction projects.

The Area FMO and the Western Area wildland fire management staff are responsible for implementation of hazard fuel management projects. They also work closely with the Regional Fire Communication and Education Specialist to present and update the community workshops; assist the local volunteer fire departments with risk assessment efforts; and assist concessionaires with risk assessment and fuel reduction efforts.

XIII. PROTECTION OF SENSITIVE RESOURCES

A. Archeological/Cultural/Historic Resources

If historic fire activity is any indication, one may presume that wildland fire has, at some point, affected many of the prehistoric sites within DENA, and perhaps some of the historic sites. Wildland fire effects on the types of materials commonly found in prehistoric sites will tend to be minimal. Thus, the Fire Management Plan will have no immediate impact on the majority of archeological and non-structural historical resources within DENA.

Known historic and prehistoric properties that have the potential to be impacted by wildland fire or wildland fire management activities, such as fire suppression activities, will be identified and assessed by qualified cultural resource personnel. Wildland fire management staff in coordination with park cultural resource staff will make every reasonable effort to protect historic properties from fire suppression activities that may adversely affect these properties. Each threatened site will be assigned a fire protection category (see below) so that the Area FMO will be able to identify those cultural resources that may warrant special

attention in the event of a wildland fire. Each site will be assigned to one of the four fire protection categories using a variety of criteria, including National Register of Historic Places status and eligibility, LACL management objectives, and site or structure integrity, among others. Assigning protection categories will expedite the planning of, and subsequent response to, wildland fire incidents. The cultural resource staff will continue to update the Western Area FMO on changes to integrity and condition of these resources that may change their protection status.

In addition, where wildland fire activity threatens cultural sites that have been designated Full or Critical protection status, the Western Area FMO will immediately contact the park Cultural Resource Specialist for consultation, particularly if ground disturbing activities are required for protection or fire suppression. The Western Area FMO will also contact the Cultural Resource Specialist if fire suppression activities for the protection of inholdings/allotments might affect sites on surrounding parklands.

Some sites, due to special circumstances, may not fall into an appropriate protection category. For example some sites, particularly archeological sites that are eligible for critical protection, may be more susceptible to damage from fire suppression activities than from a fire burning the area. Park managers can lower or elevate the protection level of such sites as necessary. Final protection level designation requires consultation with the Western Area FMO, Cultural Resource Specialist, and approval by the Superintendent. The Cultural Resource specialist will ensure that change protection status will be updated on the appropriate NPS GIS layer and communicated to the Western Area FMO and protection organization (AFS/DOF) for correction on the Map Atlas.

1. Fire Protection Categories for Cultural Resource Sites

Because the protection of every known site within DENA unit boundaries is not feasible, criteria have been established to provide Cultural Resource Specialists and park management with a consistent methodology for determining which key sites will be afforded special protections from wildland fire. The criteria are as follows and may be updated or improved upon should new information come to light. Please note that although this section focuses on cultural resources that are not currently occupied, the following protection categories apply to all buildings and structures located within the park boundary. It is for this reason that "year-round residence" or "trespass structures" are listed as criteria.

CRITICAL:
Definition: Fires immediately threatening this designation will receive highest priority for protection from wildland fires by immediate and continuing aggressive actions dependent upon the availability of protection resources.
Objectives: Protect human life, inhabited property and designated physical developments without compromising fire fighter safety. Protection of the aforementioned elements is the primary objective, not control of the wildland fire.
Recommended criteria:

1. Any historic property designated as a National Historic Landmark.
2. Any cabin or building that has been specified as actively occupied on a shared use permit granted to the user by the NPS.

3. Any property that is essential to the DENA management and resource operations; examples include: ranger stations, remote base camps, etc.

FULL:
Definition: Fires immediately threatening this designation will receive aggressive initial attack dependent upon the availability of protection resources.
Objectives: Protect sites designated as Full management from the spread of wildland fires burning in a lower priority fire management option. Minimize damage from wildland fires to the resources identified for protection commensurate with values at risk.
Recommended criteria:

1. Any historic property designated, or determined eligible for, inclusion on the National Register that retains structural integrity (i.e., standing with a roof).
2. Any property that has received NPS funds for stabilization or rehabilitation, or is designated to receive funds in the future.
3. Administrative sites (i.e., public use cabins, actively used airstrips, etc.).
4. Cultural resources that are representative of historical themes established by the park unit and retain a high degree of structural integrity.

NON-SENSITIVE:
Definition: Fires immediately threatening this designation will be allowed to burn under the influence of natural forces within predetermined areas while continuing protection of human life.
Objectives: Within land manager policy constraints, accomplish land and resource management objectives through the use of wildland fire. Reduce overall suppression costs through minimum resource commitment without compromising firefighter safety. Typical suppression response is a confinement strategy.
Recommended criteria:

1. Trespass structures that do not meet any of the criteria listed above.
2. Cultural resources which are not eligible for the National Register.
3. Historic properties that lack significant structural integrity:
    a. Stand-alone log buildings/structures that consist of four courses of logs or less
    b. Stand-alone frame buildings with one or more collapsed wall(s)
    c. Stand-alone tent frames and other camp features (meat racks, fish wheels, etc.) that are less than 50% intact
    d. Stand-alone mining features (adit, penstock, flume, dam, etc.) that are less than 50% intact
    e. Multi-component properties in which the majority of the contributing structures are less than 50% intact
    f. Bridges, trestles, aerial tramways, or other transportation-related features that are less than 50% intact
    g. Machinery, vehicles, or other equipment that has degraded to the extent that function and/or interpretive value has been compromised

NON-SENSITIVE/DEFENSIBLE SPACE:
Definition: Fires immediately threatening this designation will be allowed to burn under the influence of natural forces within predetermined areas while continuing protection of human life. Defensible space will be built prior to any fire starts.

Objectives: Within land manager policy constraints, accomplish land and resource management objectives through the use of wildland fire. Allow protection of structural resources using minimum tool and ensuring firefighter safety.
Recommended criteria:

1. Cultural resources that are not eligible for the National Register, but that are representative of historical themes established by the park unit and have a decrease in structural integrity.
2. Cultural resources that are in the process of assessment for the National Register.
3. Historic properties that have a decrease in structural integrity:
    a. Stand-alone log buildings/structures with a collapsed roof
    b. Stand-alone frame buildings with a collapsed roof
    c. Stand-alone tent frames and other camp features (meat racks, fish wheels, sheds, outhouses, etc.) that are less than 75% intact
    d. Stand-alone mining features (adit, penstock, flume, dam, etc.) that are less than 75% intact
    e. Multi-component properties in which the majority of the contributing structures are less than 75% intact
    f. Bridges, trestles, aerial tramways, or other transportation-related features that are less than 75% intact

2. National Register of Historic Places and Eligible Locations

DENA has 256 known cultural resources in the park: 131 pre-historic, 25 historic, and 101 with both historic and prehistoric elements. Because cultural resource inventories have been limited to date, this number represents a small fraction of the total sites contained in the park. Known resources include archeological and historic sites associated with Athabascan Indian groups, early explorers, mining history, and the early days of the park. Major prehistoric sites include the Teklanika Archeological District, a property listed on the National Register. Many historic structures are found in the park headquarters area (a National Historic District), along the main park road, and on the boundaries of the Denali Wilderness (along the original park boundary). These are mainly patrol cabins and other structures dating back to early years of park management, mines, and related mining structures. Historic mining activity dates back to the early 1900's in the Kantishna Hills (which includes the Kantishna Historic District), the Stampede area, and the Dunkle Hills near Cantwell, AK". Protection status of eligible cabins and sites are determined using the guidelines described above. As the condition of these sites change, their fire protection status will be reassessed.

3. Undetermined National Register Status Sites

According to the Park's List of Classified Structures (LCS), most structures listed on the LCS have not been evaluated for National Register eligibility. Visiting, documenting, and researching each of these structures will be a monumental undertaking. In addition, it is likely that several of the sites reported to be in fair or good condition in the past are now completely overgrown, collapsed, or washed away by flooding. Starting 2000, Denali cultural resource staff initiated surveys of the LCS and continues surveys for evaluation for National Register eligibility. Any newly discovered sites will be incorporated into this survey or subsequent survey.

According to the current DENA cabin database, there are 258 sites containing structural components. Two hundred and fourteen of these are on National Park Service land. This number is currently being updated; the data is being compared with data from the List of Classified Structures (LCS), and the AHRS databases. Once the sites with structural elements are tallied, cultural resource staff will determine which known sites have not yet been evaluated using National Register criteria. This information along with information on wildland fire activity will be used to formulate a prioritized plan for systematic inventory and documentation of the poorly documented sites, with the sites most at risk from wildland fire as top priority. Any newly discovered sites will be incorporated into the assessment process.

In addition to the National Register of Historic Places, data on historic properties are maintained in a number of NPS lists and databases. These include, but are not limited to, the Archeological Site Management Information System (ASMIS), Cultural Landscapes Inventory (CLI), Cultural Sites Inventory (CSI), and List of Classified Structures (LCS). Protection status of *eligible* cabins and sites within these inventories and the National Register are determined using the guidelines described above. As the condition of these sites change, their fire protection status will be reassessed.

Approximately 1% of the total area of DENA has undergone systematic archaeological survey. In 2006, an archaeological survey is scheduled to begin. As sites are identified and documented, they will be added to catalog of sites in DENA. Surface structural sites that may be adversely affected by wildland fire will be evaluated using National Register criteria. Cultural Resource Specialists, park management, and fire management will work together using the fire protection criteria to determine protection status for newly discovered sites.

B. Sensitive Natural Resources

No threatened or endangered animal or plant species are known to be present in Denali National Park or Preserve. However one plant species is considered a federal species of concern (former Candidate 2 species) and four wildlife species that have been identified as federal "species of concern". Some of the wildlife species formerly listed by the U.S. Fish and Wildlife Service as Candidate 2 category species are still considered for possible future listing under the Endangered Species Act. These candidate species were designated as “species of concern”, which provides no protection under the Endangered Species Act. Under NPS policy, however, such taxa are treated as threatened or endangered until additional data on their population sizes and distributions show otherwise.

In addition, The Alaska Natural Heritage Program also maintains a list of regionally sensitive plants (S1–S3), information about which is available from the DENA Plant Ecologist and/or other resource management personnel. Surveys for these plant species are currently underway, with 47 species already documented within the park and preserve[2]. Certain plant communities within the Park/Preserve provide protective habitat for these and/or other rare plants; examples of these communities include limestone deposits, wetlands, high-elevation plateaus, scree slopes, and south-facing slopes. Designated Incident Commanders and

[2] Carl Roland, NPS botanist at Denali National Park and Preserve

Agency Administrators will make every effort to consult with appropriate resource advisors on the possible presence of any such communities and/or species.

Species of Concern

Plants
The pink dandelion *(Taraxacum carneocoloratum)*, a composite which is found on alpine slopes and coarse well-drained substrates, has been found in this region of the Alaska Range (Murray and Lipkin 1987). This species has been documented in the north side of the park and preserve in gravelly areas and scree slopes[3].

Fish and Wildlife
Sparse populations of lynx inhabit forest communities in the northern areas of the park. Little is known about lynx on the south side of the park, although lynx sign has been found in the southern development zone of Denali State Park (ADNR 1995). In general, the potential for high lynx densities on the south side is thought to be low due to low hare densities during cyclic peaks (ADFG 1995a).

Birds
Harlequin ducks are found in fast-moving clear streams and rivers in the Alaska Range, including Denali National Park and Preserve. Although population surveys have not been conducted within the park, Moose Creek in the Kantishna Hills area and other nearby clear water streams probably support breeding harlequin ducks.

In Alaska, olive-sided flycatchers nest in open coniferous forests with bog ponds and marshy streams, and in woodland/dwarf forest, usually in black spruce trees located near the drainages (Gabrielson and Lincoln 1959; Wright 1997, 1998). This species has been found breeding on the north side near Moose Creek (Benson 1999) and has been recorded annually on point counts (Benson 2000) and Breeding Bird Surveys on the north and south sides of the Alaska Range (USGS, unpubl. data).

The American peregrine falcon (*Falco peregrinus anatum*) was de-listed from the Endangered Species in August 1999 (*Federal Register* 64: 46542-46558). Although officially off the list, this species has been treated by the USFWS as a "species of concern" for the five years following delisting. Nesting peregrine falcons are relatively rare in Denali NPP, but two pairs have been found nesting on the north side near the Toklat River and near Chilchukabena Lake[4] No nest sites have been documented in the south side of the park. Foraging and transient birds may occur in that area, however; and peregrines are considered rare in Denali State Park (ADNR 1989).

Designated Incident Commanders and Agency Administrators will make every effort to consult with appropriate resource advisors on the possible presence of any of these species and/or communities and appropriately adjust fire management strategy and tactics to

[3] Carl Roland, unpublished data
[4] Carol McIntyre, NPS Raptor Biologist at Denali National Park and Preserve

minimize potential impacts. Further impacts and details on all the above species can be reviewed in the Environmental Assessment.

Ground disturbing suppression tactics pose a threat to fragile soil layers and to other ecosystem components. If ground disturbing suppression tactics are necessary the impact to sensitive natural resources will be mitigated through the use of minimum impact suppression tactics, as specified by NPS policy (see Chapter IV, Section B.4).

C. Developments and Inholdings

State of Alaska, Department of Natural Resources, will assign private property protection within DENA unit boundaries to an appropriate AIWFMP protection category.

XIV. FIRE CRITIQUES AND ANNUAL PLAN REVIEW

A. Park-level Incident Reviews

All Wildland Fire incidents requiring suppression actions within DENA will be reviewed. Prescribed fires will be reviewed as appropriate. The nature and scope of such reviews will vary in accordance with the complexity of the incident at hand, as follows.

1. Single-shift incidents
For incidents within the park/preserve lasting no more than one operational period, a critique will be conducted as quickly as practical upon completion of control and mop-up. As many personnel involved in the incident as possible will participate in the critique. The Incident Commander or Burn Boss will relay any special concerns or problems identified during the critique to the Area Fire Management Officer.

2. Low-complexity multi-shift incidents
For simple incidents lasting longer than one operational period, a critique will be conducted within three days of completion of mop-up. Key personnel involved in the critique include, the Area Fire Management Officer, Incident Commander/Burn Boss, and any others with special knowledge of or interest in the incident in question. The objective of the critique will be to determine the effectiveness of the DENA Fire Management Program and procedures; procedures for such critiques are outlined in NPS-18, Chapter 13, Exhibit 2.

3. Higher-complexity multi-shift incidents
AFS and/or DOF, in addition to DENA staff will conduct a closeout meeting with the Incident Management Team at the conclusion of each Type I or II incident to ensure the successful transition of the incident back to lower complexity fire management organization. The closeout meeting will also evaluate the Incident Management Team’s performance, evaluate DENA's response and participation in the incident, as well as identify any incomplete fire business. Refer to Chapter 13, Exhibit 1 of Reference Manual 18 for a sample.

4. All ongoing incidents
"Hotline" reviews will be used to examine the progress of ongoing fire incidents, regardless of duration, size, or complexity. This type of review will provide confirmation of the decisions being made daily in the WFDSS Decision Document and/or help determine where the decision process has been faulty. The Incident Commander in conjunction with the Western Area FMO or the Agency Administrator will conduct hotline reviews of DENA incidents. Hotline reviews don't follow pre-established procedures; results, however, will be recorded in fire reports.

B. Regional and National-level Incident Reviews
A regional or national-level incident review may be conducted under any of the following circumstances:

- Fire crosses DENA boundaries into another jurisdiction without the approval of the landowner or agency.
- An incident results in adverse media attention.
- An incident involves death, serious injury or significant property damage, or exhibits potential to do so.
- An incident results in controversy involving another agency.

Refer to Chapter 13, Reference Manual 18 for distinction between regional and national-level reviews and for examples of each. Reference the current *Interagency Standards for Fire and Fire Aviation Operations for further guidance.*

C. Entrapment and Fire Shelter Deployment Reviews

Fire shelter deployment is defined as the use of a fire shelter for its intended purpose in any situation other than training. All entrapments and fire shelter deployments will be reported to the Regional Fire Management Officer, who will in turn create a review team in cooperation with the Fire Management Program Center. The team leader will obtain reporting information from the DENA Superintendent, and the review will be conducted in accordance with the guidelines presented in Chapter 3 of Reference Manual 18 (Exhibits 4 and 5).

D. Program and Plan Reviews

An informal fire management review will be conducted annually to evaluate current procedures and to identify any needed changes to the Denali National Park and Preserve Fire Management Plan. A formal internal fire management review will be conducted every five years.

Minor changes to the DENA Fire Management Plan (including minor procedural changes, deletions, corrections, additions to appendices, etc.) may be made with the authority of the Western Area FMO. The Superintendent, however, must approve significant changes to the body of the Fire Management Plan and approve additional compliance documents.

XV. CONSULTATION AND COORDINATION

The following individuals were consulted in the preparation of this plan:

Jennifer Barnes, Regional Fire Ecologist, National Park Service, Alaska Region

Brad Cella, Fire Management Officer, National Park Service, Alaska Region

Joan Darnell, Chief of Environmental Quality, National Park Service, Alaska Region

Nancy Deschu, Hydrologist, National Park Service, Alaska Region

Terry DeBruyn Ph.D., Regional Wildlife Biologist, National Park Service, Alaska

Bruce Greenwood, Environmental Protection Specialist, National Park Service, Alaska Support Office

Marsha Henderson, Eastern Area Fire Management Officer, National Park Service, Fairbanks, Alaska

Ann Kain, Cultural Resource Specialist, National Park Service, Denali National Park and Preserve.

Jan Passek, Fire Management Officer, National Park Service, Zion National Park

Joe Rebar, Fire Staff Officer, Alaska Fire Service, Fairbanks, Alaska

Sarah Robertson, Interagency Fire Planner, National Park Service/USDA Forest Service, National Interagency Fire Center

Carl Roland, Botanist, National Park Service, Denali National Park and Preserve

Chuck Sheaffer, Biological Technician, National Park Service, Wrangell-St. Elias National Park and Preserve

Brad Smith, Protected Resources Management Biologist, NOAA Fisheries, Anchorage Alaska

Brian Sorbel, Fire Geographic Information Specialist, National Park Service, Alaska Region.

Clarence Summers, Subsistence Specialist, National Park Service, Alaska Region

Jennifer Tobey, Archeologist, National Park Service, Alaska Region

Glenn Yankus, Environmental Protection Specialist, National Park Service, Alaska Support Office

Tom Zimmerman, Fire Science/Ecology Manager, National Park Service, National Interagency Fire Center

APPENDIX A. - REFERENCES

The following sources are cited within the Fire Management Plan, were consulted during its preparation, or are otherwise pertinent to the management concerns outlined within the plan.

Alaska Interagency Fire Management Council. 1982. Alaska Interagency Fire Management Plan, Tanana/Minchumina Planning Area.

Alaska Interagency Fire Management Council. 1984. Alaska Interagency Fire Management Plan, Fortymile Planning Area.

Alaska Interagency Fire Management Council. 1986. Alaska Interagency Fire Management Plan, Matanuska/Susitna Planning Area.

Alaska Wildland Fire Coordinating Group. 1998. Alaska Interagency Wildland Fire Management Plan.

Anderson, Hal E. Aids to Determining Fuel Models.

Burgan, Robert E. and Rothermel, Richard C. Behave: Behavior Prediction and Fuel Modeling System. U.S. Forest Service. General Tech Report INT-167. 1984.

U.S. Departments of Agriculture and Interior. 1999. Wildland and Prescribed Fire Management Policy, Implementation Procedures Reference Guide.

U.S. Departments of Agriculture, Interior, Department of Commerce, U.S. Environmental Protection Agency, Federal Emergency Management Agency, National Association of State Foresters. 2001. Review and Update of the 1995 Federal Wildland Fire Management Policy.

U.S. Department of Interior. 1998. Departmental Manual, Part 620, Chapter 2: General Policies and Procedures—Alaska.

National Wildland Fire Coordinating Group. 1993. Prescribed Fire Complexity Rating System Guide.

National Wildland Fire Coordinating Group. 1996. Wildland Fire Qualification Guide.

National Park Service. 1999. Director's Order No. 41: Wilderness Preservation and Management.

National Park Service. 2002. Director's Order No. 18: Fire Management.

National Park Service. 1986. General Management Plan, Denali National Park and Preserve.

National Park Service. 2002. DRAFT Backcountry Management Plan, Denali National Park and Preserve.

National Park Service. 1997. Strategic Plan, Denali National Park and Preserve.

National Park Service. 1998. Resource Management Plan, Denali National Park and Preserve.

National Park Service. 2001. Management Policies.

National Park Service. 1999. Reference Manual No. 18: Fire Management.

National Park Service. 2000. Yukon-Charley Rivers National Preserve Fire Management Plan.

National Park Service. 2002. Wrangell - St. Elias National Park and Preserve Fire Management Plan.

U.S. Forest Service, Department of Agriculture. 1999. Ogden, Utah. Fire Effects Information System.

APPENDIX B. - DEFINITIONS

Agency Administrator: An incident-specific position filled by any qualified WEAR staff member as designated by the Superintendent. The Agency Administrator represents the WEAR Superintendent and works with the incident command team to ensure the compliance of wildland fire operations with WEAR and NPS resource management policy and AIWFMP.

Appropriate Management Response (AMR): Any wildland fire action selected and developed through either the implementation of the AIWFMP, initial decision-making process (i.e. WFIP stage I) or a WFSA. AMRs may be directed toward suppression or resource benefit, depending on predetermined parameters and incident-specific conditions.

BEHAVE: A system of interactive computer programs used for formulating fuel models based and predicting fire behavior.

Condition Class 1: Fire regimes are within an historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range.

Director's Order 18 (DO-18): A comprehensive statement of National Park Service wildland fire management policy.

Extended Attack: Any wildland fire suppression action lasting beyond one operational period.

Fire Management Officer (FMO): A permanent position with responsibility for the planning and coordination of fire management programs on NPS lands in western Alaska. A Western Area FMO based administratively in Denali provides fire management direction for WEAR as well as LACL, and DENA.

Fuel Loading: Amount of live and dead organic matter present at a particular site.

Fuel Model: A mathematically simulated fuel complex based on representative descriptors; used to estimate rate of spread and other fire behavior indices.

Initial Action: The actions taken by the first resources to arrive at a wildfire. Initial Action may include the full spectrum of responses from monitoring to aggressive containment.

Initial Attack: Initial action focused on aggressive containment of the fire perimeter.

Maximum Manageable Area (MMA): A geographical parameter established during the WFIP process and indicating the size that a fire use incident may grow to before triggering a WFSA.

Operational Period:

Prescribed Fire: Planned implementation of fire within a predetermined area and under predetermined conditions, for the accomplishment of resource management objectives and/or hazard fuel mitigation.

Reference Manual 18 (RM-18): A detailed set of guidelines for the operational implementation of the wildland fire management policies specified in DO-18. RM-18 consists of a continuously evolving on-line document.

Response to Wildland Fire: The mobilization of the necessary services and responders to a fire based on ecological, social, and legal consequences, the circumstances under which a fire occurs, and the likely consequences on firefighter and public safety and welfare, natural and cultural resources, and values to be protected.

Suppression: All the work of extinguishing a fire or confining fire spread.

Unplanned Ignition: The initiation of a wildland fire by lightning, volcanoes, unauthorized human-caused fires and escaped prescribed fires where the objective is to protect values at risk while meeting resource objectives specified in Land/Resource Management Plan

Unwanted Ignition: An ignition from any source that is unplanned and unwanted.

Use of Wildland Fire: Management of either wildfire or prescribed fire to meet objectives specified in Land/Resource Management Plans

Wildfire: Unplanned ignition of a wildland fire or escaped prescribed fire where the objective is to protect values at risk while meeting resource objectives specified in the Land/Resource Management Plan

Wildland Fire: Any non-structure fire that occurs in the wildland. Two distinct types of wildland fire have been defined and include wildfire (unplanned ignition) and prescribed fire (planned ignition).

Wildland Fire Decision Support System (WFDSS): A decision support system, utilized Nation-wide for the federal agencies after March 31, 2010.

Wildland Fire Implementation Process (WFIP): A multi-stage decision-making process triggered by the detection of a wildland fire. Initial WFIP components help managers determine initial strategies (e.g. fire use or suppression) for areas without preplanned responses; subsequent components document continued viability of fire use.

Wildland Fire Situation Analysis (WFSA): A standardized decision-making process triggered when a fire renders present management actions inadequate. WFSA components provide a means of evaluating alternative strategies and serve to document decisions, actions, and results.

Wildland Fire Suppression: Any management action based on protection goals rather than resource management concerns.

Wildland Fire Use: Any management action, related to a naturally occurring fire, implemented primarily for the accomplishment of resource objectives (including the preservation of fire in its natural role and/or the reduction of hazardous fuel loads). Also referred to as Wildland Fire Use for resource benefit (WFURB).

ACRONYMS

AICC	Alaska Interagency Coordination Center
AIWFMP	Alaska Interagency Wildland Fire Management Plan
ANILCA	Alaska National Interest Lands Conservation Act
AKSO	Alaska Support Office
AWFCG	Alaska Wildland Fire Coordination Group
BLM-AFS	Bureau of Land Management – Alaska Fire Service
DENA	Denali National Park and Preserve
DNR	State of Alaska, Department of Natural Resources
DO-18	Director's Orders 18 – Wildland Fire Management
DOF	State of Alaska, DNR, Division of Forestry
FFMC	Fine Fuel Moisture Content
FMO	Fire Management Officer
FMP	Fire Management Plan
FMU	Fire Management Units
WEAR	Western Arctic National Parklands
GMP	General Management Plan
IC	Incident Commander
LCES	Lookouts, Communication, Escape Routes, Safety Zones
LCS	List of Classified Structures
MAC	Multi-Agency Coordination Group
NEPA	National Environmental Policy Act
NHPA	National historical Preservation Act
NPS	National Park Service
NWCG	National Wildfire Coordinating Group
RAWS	Remote Automated Weather Station
RM-18	Reference Manual 18 – Wildland Fire Management
RMP	Resource Management Plan
SACS	Shared Applications Computing System
SHPO	State Historic Preservation Officer
USFS	United States Forest Service
WFDSS	Wildland Fire Decision Support System
WFSA	Wildland Fire Situation Analysis
WFIP	Wildland Fire Implementation Plan
WFU	Wildland Fire Use

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APPENDIX C.1 - ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL ASSESSMENT

FIRE MANAGEMENT PLAN

FOR

DENALI NATIONAL PARK AND PRESERVE

NATIONAL PARK SERVICE

DENALI NATIONAL PARK AND PRESERVE

August 24, 2004

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ENVIRONMENTAL ASSESSMENT

Fire Management Plan for Denali National Park and Preserve

I. INTRODUCTION

A. Purpose and Need

The National Park Service proposes implementing National Park Service Director's Order 18 (DO-18) (2002) by establishing a Fire Management Plan for Denali National Park and Preserve (DENA). This fire management plan is a comprehensive document that outlines the DENA fire management goals and describes the policies and actions by which these goals will be realized. The plan will formalize park-specific responsibilities for implementing the Alaska Interagency Wildland Fire Management Plan and will formalize park-specific fire management decision making process and procedures, redefines fire management strategies, articulates the park's fire management organization and responsibilities, and establishes the direct linkage between the resource management goals and fire management strategies. With the implementation of the proposed action, fire management within DENA will remain status quo.

The Fire Management Plan is necessary to comply with DO-18, and codifies the way fire will be managed within DENA. Although fire protection needs may arise and remain the first priority, managers need to consider that fire has long been an integral component of the area's ecosystems and is critical for the maintenance of virtually all indigenous conditions, from plant and animal populations to soil and permafrost layers. Accordingly, the scope of the preferred alternative and other considered alternative entail the planning and implementation of policies and practices flexible enough to allow the simultaneous pursuit of protection and resource management goals.

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act of 1969 and the regulations of the Council of Environmental Quality (40 CFR 1508.9). It evaluates the potential impacts to cultural and natural resource values that could result from implementing the Denali National Park and Preserve Fire Management Plan. The environmental assessment is intended to facilitate decision-making, based on an understanding of the environmental consequences of the proposal, and to determine whether preparation of an environmental impact statement is required.

B. Background

Two federal legislative acts, the Organic Act and the General Authorities Act, prohibit impairment of park resources and values. NPS Management Policies and Director's Order 12 use the terms "resources and values" to mean the full spectrum of tangible and intangible attributes for which the park is established and is managed, including the Organic Act's fundamental purpose and any additional purposes as stated in the park's establishing legislation. The impairment of park resources and values is not allowed unless directly and specifically provided by statute. The primary responsibility of the National Park Service is to ensure that park resources and values will continue to exist in a condition that will allow the

American people to have present and future opportunity for enjoyment of them. The evaluation of whether impacts of a proposed action would lead to an impairment of park resources and values is included in this environmental assessment. Impairment may occur when there are potential impacts to a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- a goal in the park's general management plan or other relevant NPS planning documents.

Originally preserved as "a game refuge", Congress drafted the Act of February 26, 1917 (39 Statute 938) establishing Mount McKinley National Park. This Act stated that Mount McKinley National Park was:

> "… set apart as a public park for the benefit and enjoyment of the people…for recreation purposes by the public and for the preservation of animals, birds, and fish and for the preservation of the natural curiosities and scenic beauties thereof…said park shall be, and is hereby established as a game refuge."

In 1980, Congress created numerous new Parks, Preserves and Monuments through the passing of the Alaska National Interest Lands Conservation Act (ANILCA). This legislation provided a comprehensive statement of purpose for all recently designated Alaskan Park, Preserve and Monument areas. Section 202(3)(a) of ANILCA specifically created the additions to Denali National Park and Preserve and ascribes to them the following missions, among others:

> "The park additions and preserve shall be managed for the following purposes, among others: To protect and interpret the entire mountain massif, and additional scenic mountain peaks and formations; and to protect habitat for, and populations of fish and wildlife, including but not limited to, brown/grizzly bears, moose, caribou, Dall sheep, wolves, swans and other waterfowl; and to provide continued opportunities including reasonable access, for mountain climbing, mountaineering, and other wilderness recreational activities."

The Denali National Park and Preserve General Management Plan (1986) specifies objectives directly relevant to the DENA fire management program: "In accordance with NPS policy, the objective for Denali is to allow natural forest and tundra fires to fulfill their ecological role in vegetational succession. Under the plan, natural fires occurring in Denali will be allowed to burn unless they threaten inholdings, certain identified historic sites, or neighboring lands that are zoned for protection. Such neighboring lands include abutting native regional and village corporation lands, which are currently managed for total fire suppression." (DENA, GMP: 60)

In the 1980's the National Park Service cooperated with Bureau of Land Management, Alaska Department of Natural Resources, Alaska Department of Fish and Game, US Fish and Wildlife Service, Bureau of Indian Affairs, and Alaska Native regional and local village corporations to produce an Interagency Fire Management Plan for the Tanana/Minchumina (1982) and Matanuska/Susitna (1986) Planning Areas. This plan provided direction for fire management activity in Denali National Park and Preserve until 1998, when a variety of documents were consolidated and approved as the Alaska Interagency Wildland Fire Management Plan (AIWFMP). Under the AIWFMP, fire protection needs are determined through annual land owner/manager reviews and lands are then placed under critical, full, modified or limited protection categories, with categorization based on presence and/or proximity of values to be protected, as well as the resource management objectives of the pertinent land management agency (see Table 1 below for description of categories). Each reported wildland fire is managed in accordance with the categorization of the sub-unit in which it occurs, with responses ranging from rapid and aggressive attack by available forces in the case of fires detected in Critical Protection areas, to periodic surveillance for certain fires detected in Limited Protection areas (See Appendix K, Maps 2 and 3 for vicinity maps of DENA units).

At present 96% of the approximate 6 million acres lands managed by DENA fall in the Limited Fire Management Option (default Wildland Fire Use on NPS lands) [5,793,469 acres]. The balance of management option acreage is delineated 1.2% Full [73,238 acres] and 2.6% Modified [157,348 acres] 0.07% is identified as Critical [4,147 acres]. Most classified Critical, Full and Modified Options areas within NPS unit boundaries are the result of inholdings, administrative facilities and other land owners' selections.

The 1977 amendments to the Clean Air Act (CAA) designated the original Mt. McKinley National Park as a Class I airshed, which requires the prevention of significant deterioration of air quality over baseline conditions. That classification was extended to cover the 1980 ANILCA additions to the park and preserve. Denali National Park and Preserve is the only national park unit in Alaska that is designated as a mandatory Class I airshed. The primary values to be protected under the Clean Air Act are human health; and the secondary values include a variety of air-quality-related values (AQRVs), such as visibility and scenic, cultural, biological, and recreational resources. Protection of visibility is also a high priority under both Alaska regulations and, most recently, new national "regional haze" regulations issued by the EPA in June 1999. Air quality degradation by fire could affect visitor use and recreation purposes.

Table 1: Alaska Interagency Wildland Fire Management Plan Options

Protection Category	Policy	Intent
Critical	Aggressive suppression of fires within or threatening designated areas. Highest priority for available resources.	Prioritization of suppression actions for wildland fires threatening human life, inhabited property, and/or other designated structures. Complete protection of designated sites.
Full	Aggressive suppression of fires within or threatening designated areas, depending upon availability of resources.	Protection of uninhabited cultural and historical sites, private property, and high-value natural resources.
Modified	Fires in designated areas receive initial attack depending on availability of resources, unless land manager chooses otherwise and documents with WFSA. After designated **conversion date**[5], operational response to Modified protection zones is identical to that of Limited zones.	Greater flexibility in selection of suppression strategies when chance of spread is high (e.g., indirect attack). Reduced commitment of resources when risk is low. Balancing of acres burned with suppression costs and with accomplishment of resource management objectives.
Limited	Wildland fires allowed to burn within predetermined areas. Continued protection of human life and site-specific values. Surveillance.	Reduction of long-term costs and risks through reduced frequency of large fires. Reduction of immediate suppression costs. Facilitation of bio-diversity and ecological health

[5] Conversion Date: The intent of the Modified management option is to provide a higher level of protection when fire danger is high, probability of significant fire growth is high, and probability of containment is low. A lower level of protection is provided when fire danger decreases, potential for fire growth decreases and the probability of containment increases. This option is meant to reduce commitment of suppression resources when risks are low. The Alaska Wildland Fire Coordinating Group (AWFCG) is responsible for the adjustment, either later or earlier to the evaluation/conversion date for Modified management option areas. An individual may request, through an AWFCG representative, that the AWFCG consider an earlier evaluation date during unusually wet fire seasons or postpone the evaluation date during unusually dry fire seasons.

This EA presents two alternatives for the application and use of wildland fire as a management tool for resource benefits. All of the alternatives discussed here, including the preferred alternative described throughout the proposed DENA fire management plan, would entail continued compliance with the AIWFMP, while at the same time bringing the DENA fire management program into compliance with recently developed National Park Service directives. **NPS Director's Order 18** (2002) mandates a distinction between **prescribed fire**, defined as any fire planned and implemented by management, and **wildland fire**, defined as any unplanned ignition, whether human or natural. Wildland fire incidents, in turn, fall into two categories: **Wildland Fire Use** entails the management of certain unplanned ignitions for the achievement of management goals, including the reduction of dangerous and unnatural accumulations of burnable vegetation and the preservation of fire in its natural role; **wildland fire suppression** entails a broad spectrum of actions aimed at protecting life, property, and sensitive resources while also ensuring firefighter safety, cost effectiveness, and minimal disturbance from suppression activities.

Each of the alternatives presented in this Environmental Assessment is comprised of a different combination of the various management strategies permitted under NPS Director's Order 18. These alternatives have been evaluated for their ability to contribute to the accomplishment of the resource management objectives described above.

C. Impact Topics Addressed and Analyzed

Impact topics were identified to focus the analysis of alternatives on the most relevant subject matter and resources of concern. A brief rationale for each impact topic follows, as well as the reasons for dismissing specific topics from further analysis.

Vegetation and Biodiversity

The National Environmental Policy Act (1969) requires analysis of impacts on all affected components of the ecosystem, including biotic communities of plants and animals. NPS Management Policies (2001) requires maintenance of these communities, including their natural abundance, diversity and ecological integrity. Fire plays an important role in changes to vegetative cover which in turn affects habitat and overall ecological health.

Cultural Resources

Cultural resources can be significantly affected by fire and play a critical role in determining fire management units and specific fire responses.

Aesthetics and Recreation

The mission of the NPS, as stated in the Organic Act of 1916, is to "conserve the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." Both the former Mt. McKinley National Park and the 1980 additions were given direction for the preservation of scenic values and the management of recreation. Scenic values, recreational activities, and general visitation within and around fire prone areas may be temporarily impacted by fire-related actions.

Local Economy

The National Environmental Policy Act (NEPA) regards impacts to the human environment to include any effects of federal actions on the social and economic well being of communities and individuals. Fires may limit economic opportunities and fire management may provide increased opportunities around bases of operation and for material suppliers.

Wetlands and Floodplains
Executive Orders 11988 and 11900 require the consideration of impacts to floodplains and wetlands. Fires in the interior of Alaska often burn the vegetation of wetlands, which may be the sites of management actions.

Subsistence Use and Wildlife Habitat
Title VIII, Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) states "in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands…the head of the federal agency…over such lands…shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs." Subsistence use may be temporarily impacted, by fire management decisions.

Air Quality
The 1963 federal Clean Air Act (42 U.S.C. 7401 *et seq.* as amended) stipulates that federal land managers have an affirmative responsibility to protect a park's air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse air pollution impacts. Specifically, Denali National Park and Preserve is classified as a Class I airshed, minimizing acceptable levels of pollutants to these areas by very specific parameters and forcing the NPS to hold air quality to a high standard. Air quality would potentially be affected in the short-term during any type of ignition event.

Water Quality and Fisheries
National Park Service policies require the protection of water resources consistent with the Clean Water Act. Increased erosion following a fire may affect water quality.

Wilderness Resource Values
National Park Service Director's Orders 41, on Wilderness Preservation and Management, states that "Fire management activities conducted in wilderness areas will conform to the basic purposes of wilderness". Denali National Park and Preserve contains large areas of designated and suitable wilderness which would be affected by any likely ignition event.

D. Impact Topics Considered and Dismissed

Threatened and/or Endangered Species
The Endangered Species Act (1973) requires disclosure of impacts on all federally threatened or endangered species. NPS policy also requires the analysis of effects on federal species, as well as state-listed threatened, endangered, candidate, rare, declining and sensitive species. Currently there are no listed threatened or endangered species found in Denali National Park and Preserve.

Environmental Justice. Executive Order 12898,

Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations requires all federal agencies identify and address disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. This project would not be expected to result in significant changes in the socioeconomic environment of the project area, and, therefore, would not be expected to have any direct or indirect impacts to minority or low-income populations or communities.

II. RANGE OF ALTERNATIVES

A. Introduction.

Each alternative consists of a different combination of the fire management strategies as mandated by NPS Director's Order 18 (DO-18), with each alternative representing a different application of fire as a management tool. The alternatives differ in their respective approaches to the management of wildland ignitions and in their allowance or preclusion of prescribed fire.

B. Actions Common to all Alternatives

Under each alternative, mechanical fuel reduction may be used to mitigate hazard fuel buildup or recreate historical landscapes/conditions in areas where prescribed fire or wildland fire would pose an unreasonable threat to the property or resources.

All fire management actions at DENA will be conducted in full compliance with local, state, and interstate air pollution control regulations as required by the Clean Air Act, 42 U.S.C. 7418. Currently, no local or interstate air pollution control regulations exist in Alaska.

DENA will employ three primary strategies in order to protect archeological, cultural, and historic sites from damage by fire or fire suppression activities. First, culturally significant structures will be assigned Critical or Full Protection status, as dictated by the recommended criteria for fire protection of structural resources within DENA. Second, personnel conducting detection and/or reconnaissance flights within DENA will be directed to remain alert for the presence of any undiscovered cultural resource sites or structures and to report their presence to the Western Area FMO. Third, designated Incident Commanders will consult with appropriate resource advisors regarding the identification and sensitivity of previously unknown sites, and will cooperate with the Agency Advisor to mitigate any damage to such sites.

Certain fire suppression activities could pose a threat to fragile soil layers and to other ecosystem components. This type of risk will be mitigated through the use of minimum impact suppression tactics as specified by NPS policy.

C. Alternatives

Alternative 1: Wildland Fire Suppression
Natural ignitions occurring in certain areas and under predetermined conditions would be managed for the accomplishment of resource management goals, including the preservation of fire in its natural role and the reduction of hazardous accumulations of burnable vegetation. Any fire posing a threat to life or property would be immediately suppressed. The suppression response is described in the Alaska Interagency Wildland Fire Management Plan. Prescribed fires would not be implemented.

Alternative 2: Combination of Prescribed Fire Use, Wildland Fire Use, and Wildland Fire Suppression (NPS Preferred Alternative and No Action Alternative)
All three of the major management actions (Wildland Fire Suppression, Wildland Fire Use and Prescribed Fire) described under DO-18 would be allowed, as determined by a combination of pre-established and incident-specific decision making criteria. This alternative represents no change in the on-the-ground implementation of fire management activities; however, it does define the strategy for Wildland Fire Use. Wildland fires that do not pose a threat to life, property, or significant resources would be managed for the accomplishment of resource management goals, including the preservation of fire in its natural role and the reduction of hazardous accumulations of burnable vegetation. Prescribed fire would be implemented, in certain cases, under the direction of National Park Service personnel for the purpose of reducing hazardous fuel loads. Suppression would continue in or near developed areas and near DENA boundaries when neighboring administrative units with different fire management objectives adjoin NPS land. In areas known to contain fire sensitive cultural and/or archeological resources that warrant protection, or whenever insufficient resources are available to ensure the effective, long-term management of wildland fire to meet resource management objectives, suppression action would continue.

D. Alternatives Considered but Rejected.

Full Wildland Fire Suppression
All ignitions, including those of natural origin, would be suppressed and no prescribed fire would be implemented. Reduction of flammable vegetation would be accomplished strictly by mechanical means (e.g. through the use of chain saws, cross cut saws or other tools). Mechanical reduction would be limited primarily to the protection of historic and/or archeological sites and DENA unit boundary areas. In some cases, however, mechanical reduction could be used to restore selected landscapes to historic conditions.

This alternative is rejected for the following reasons: 1) the increased risk of catastrophic wildland fire which would result from the exclusion of the area's natural burn cycle; 2) the prohibitively high cost of large-scale mechanical fuel reduction; 3) non-conformance with the existing interagency management scheme and a potential to cause an impairment of park resources and values.

Full Wildland Fire Suppression and Prescribed Fire
All ignitions, including those of natural origin, would be suppressed. The effects of natural wildland fire would be simulated through the use of planned ignitions conducted by park personnel in defined zones. Such fires would be ignited under predetermined fuel and weather conditions; control problems would thereby be minimal.

This alternative was rejected for the following reasons: 1) the inability to maintain a natural burn cycle through only prescribed burns; 2) the increased risk of catastrophic wildland fire which would result from the exclusion of the area's natural burn cycle; 3) the prohibitively high cost of large-scale mechanical fuel reduction and prescribed burns; 4) non-conformance with the existing interagency management scheme and 5) a potential to cause impairment of park resources and values such as the continuation of a naturally functioning ecosystem, of which fire is an important part..

E. Environmentally Preferred Alternative

Alternative 2 is the environmentally preferred alternative because it provides the full spectrum of fire management strategies and practices to accomplish DENA fire and resource management objectives while protecting human life and identified resources/values. The potential use of prescribed fire would permit managers to reduce the risk of catastrophic fires around important cultural resource sites as well as limiting the severity of fire in natural resource areas such as floodplain forests

III. AFFECTED ENVIRONMENT

A. Introduction.

Denali National Park and Preserve encompasses 6 million acres, about the size of the state of New Hampshire. This large size enables a spectacular array of flora and fauna to live together in a healthy natural ecosystem and provides excellent opportunities to study large subarctic ecosystems in settings primarily undisturbed by humans. Because of these values, the United Nations Man and the Biosphere Program designated the park and preserve an International Biosphere Reserve. However, within its boundary, the land exhibits complex ownership patterns with native corporation lands, native allotments, lodge properties and other inholdings, and unpatented mining claims. Located in central Alaska, this management area can be remote. Access ranges from private and chartered aircraft year round to motorized and non-motorized boats and 4-wheel drive vehicles in the summer to snow machine and sled dogs during ice and snow covered months. Some native villages are found just beyond the park/preserve boundaries along major river corridors and lakes where transportation options are not limited to aircraft travel. DENA Park Headquarters is located two miles west of the park entrance along the George Parks Highway which is about 14 miles south of Healy, Alaska. The Alaska Railroad also serves a depot in the Headquarters District. With regular road, rail and air service from either Anchorage or Fairbanks, the park entrance area serves as the most suitable focal point and transportation hub for travel to and from the park/preserve.

B. Natural Environment

Denali National Park and Preserve encompasses a vast expanse of ecotypes and terrain features within its boundaries of six million acres. DENA is dominated by three physiographic provinces in central Alaska, the Alaska Range, Northern Foothills of the Alaska Range, and the Tanana-Kuskokwim Lowlands, while portions of the park extend into

the Cook Inlet-Susitna Lowlands, the Broad Pass Depression, and the Kuskokwim Mountains. Of these areas, the Nenana, Kantishna and Kuskokwim (North Fork) Rivers drain three major watersheds on the north side of the range. The Chulitna and Yentna Rivers drain two major watersheds on the south side of the park. . Seventeen per cent of the park and preserve is covered by glaciers and permanent snowfields. Rugged mountains and subsequent rolling hills give way to broad valleys of glacial origin that range from 2 to 10 miles in breadth. The Tanana-Kuskokwim Lowlands to the north of the foothills form a broad region of flat to gently rolling lowlands drained by the Tanana and Kuskokwim Rivers. Mosaic displays of tundra and taiga communities, healthy riparian areas and Alaskan Interior boreal spruce forest typify vegetation. Controlled by the interaction of climate, topography, substrate and site history, these communities vary considerably across the landscape of the park.

Permafrost, where ground temperatures remain below 32°F for at least two years, occurs in most areas of Denali National Park and Preserve. However, permafrost is discontinuous (50–90% of area), relatively warm (30–32°F), and of low ice content (0-10% excess ice) in the Tanana-Kuskokwim Lowlands, northern foothills, and the Alaska Range (Ferrians 1965, Ferrians et al. 1969, Brown et al. 1997). There are, however, some isolated areas of permafrost with moderate ice contents in the Tanana-Kuskokwim Lowlands, which makes that terrain more susceptible to thermokarst[6]. In these areas, permafrost typically is found in wet, low-lying areas with fine-grained soils, on steep north facing slopes and at high elevations. Permafrost occurs sporadically (10-50% of area) in the Cook Inlet-Susitna Lowlands. Exact permafrost thickness has not been documented, but thickness layers of up to 100 feet have been recorded near the eastern entrance to the park. Permafrost hinders subsurface drainage, causing unstable soil conditions on sloping surfaces. Consequently, when surfaces are disturbed and permafrost is allowed to melt, soils often collapse. Notably, fires are common disturbances that initiate thermokarst.

The climate in DENA consists of four distinct seasons with relatively short cool summers and long severe winters. Spring and autumn come and go rapidly with the quick increase and decrease in sunlight and temperature. DENA receives nearly continuous sunlight (20 hours) during the summer for approximately 30 days.

Numerous species of large and small mammals occur within DENA. Large mammals include Dall sheep, moose, lynx, coyote, caribou, wolves and black and brown bear. Smaller mammals, such as snowshoe hare, wolverine, red fox, porcupine, weasel, river otter, ground squirrel, mink, marten, marmot, muskrat, vole, lemming, shrew and many others are abundant throughout the park area. In addition, over 10 species of fish and 155 species of bird, and 1 amphibian are also present.

C. Cultural Environment

[6] Thermokarst is the degradation of permafrost layer due to warming and melting of the permafrost and subsequent subsidence of the ground surface.

Denali National Park and Preserve is home to a host of cultural resources that date back to the earliest period of human settlement of North America. Many of these resources are from prehistoric periods – archeological investigations conducted in and immediately adjacent to the park strongly suggest that sites dating from the Paleoarctic tradition (11,000 years before present) through the Protohistoric period (200 years before present) exist in the park.

There are approximately 265 known cultural sites and structural units or complexes in the park. Though this may constitute only a fraction of what actually exists within the park, these resources illustrate most major elements of the region's prehistory and history.

Many cultural sites relate to prehistoric occupation of hunters/gatherers that used the area on an intermittent basis. There are at least 80 prehistoric sites throughout the park. These sites contain lithic remains such as scrapers, microblades, and flakes, and other lithic remains of early hunters. Some sites have been determined potentially eligible for nomination to the National Register.

D. Historical Role of Fire

Fires are relatively frequent occurrences within the management boundaries of DENA. The park's northwest corner lies within the southernmost belt of Interior Alaska, where fire has played a critical role in ecosystem sustainability. (See Appendix J: Fire Statistics & Graphs)

Fire has been a driving force of change in the Alaskan interior and sub-arctic for thousands of years. It is a key environmental factor in these cold-dominated ecosystems. Periodic fires have served to select plants and animals that are adapted to fire-caused change. Without fire, organic matter accumulates, the permafrost table rises, and ecosystem productivity declines. Vegetation communities become much less diverse, and their value as wildlife habitat decreases.

Fire rejuvenates these systems. It removes some of the insulating organic matter and elicits a warming of the soil. Nutrients are added both as a result of combustion and by increased decomposition rates. Vegetative re-growth quickly occurs, and the cycle begins again.

The impact of aggressive suppression on the Alaskan interior at large and DENA in particular is, difficult to assess. Organized suppression has occurred on a large scale in Alaska since 1939; however, effects of suppression efforts are not clear. Alaska fire management personnel postulate that the fire ecology of the area may be relatively unchanged from its condition prior to the development of organized suppression efforts.

E. Wildland Fire Management Situation

The seasonal fire cycle in the Alaskan interior consists of four “micro” seasons or phases, each varying with the changing weather patterns and the stages of vegetation development for the growing season. The first begins in mid-May with the loss of snow cover, and ends in mid June when green-up begins. During the transition from 100% winter-cured fuels to green-up, human-caused fires occur frequently. These fires are usually relatively easy to suppress. Spring fires that are not suppressed, however, often grow later in the season as fuels become dryer. The second and third fire-cycle phases are primarily lightning driven.

Suppression of such fires is more difficult. Fires occurring after mid June, the second period, usually do not develop the intensity of later summer fires; during hot, dry, and windy conditions, however, June wildland ignitions can result in extreme fire behavior. The third period of fire activity begins in early July and runs through the first part of August. This is the period of maximum fire activity. The final micro-season runs from early to late August with few occasional starts into September on dry warm years. These fires are generally easy to control except during particularly dry autumn weather.

IV. ENVIRONMENTAL CONSEQUENCES

A. Impacts of Alternatives

Alternative 1. Wildland Fire Use and Wildland Fire Suppression

Vegetation and Biodiversity
Certain wildland fires would be managed for the accomplishment of resource management goals, including the preservation of fire as a natural process and the reduction of burnable vegetation therefore maintaining a naturally functioning ecosystem. However, in the Full Protection Units the exclusion of prescribed fire may result in an unacceptable increase in vegetation thereby increasing the threat to the resources found within these units.

A purpose of DENA is to "assure the optimum functioning of entire ecological systems in undisturbed natural habitats…and shall not be jeopardized by human use." (Congressional Record- House, H10549, November 12, 1980) Fire is an inextricable component of the fire dependant ecosystem of this area and is known to maintain a balanced, naturally functioning ecosystem. This alternative would manage ignitions within established resource objectives to maintain the natural function of the ecosystem in DENA.

Conclusion: Minor impacts are expected with the use of this alternative due to an increase in vegetation resulting from no prescribed fire. The level of impacts to vegetation and biodiversity anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Cultural Resources
The prohibition of prescribed fire could hamper the protection of historic and/or archeological resources and the restoration and/or protection of historic landscapes and conditions. Mechanical techniques employed in place of prescribed fire would tend to be more expensive, possibly more destructive, and may not sufficiently mimic the effects of fire. However, certain wildland fires would be managed for the accomplishment of resource management goals including the role of natural processes thereby better protecting the cultural resources from catastrophic fire.

A purpose of DENA is to protect and interpret historic archeological sites for the use benefit, education, and inspiration of present and future generations.

Conclusion: Minor impacts would occur due to an increase in vegetation resulting from no prescribed fire. The level of impacts to cultural resources anticipated from this alternative

would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Aesthetics and Recreation

Under this alternative, impacts would include the occasional closure of specific areas due to fire activity or smoke concentrations for the safety of visitors resulting in an inconvenience for the visitors or cause them to alter their plans. Smoke will for short time periods degrade visibility which also may inconvenience visitors or cause them to alter their plans. Fire naturally occurs within DENA ecosystems and degradation in air quality as the result of smoke is part of the function of a fire dependent ecosystem.

Through careful application of mechanical clearing to reduce hazardous fuels minor aesthetic impact may occur in the form of thinning vegetation.

Conclusion: This alternative may result in a minimal impact by closing certain areas temporarily and more vegetation may be burned decreasing aesthetics in limited areas. The level of impacts to aesthetics and recreation anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Local Economy

There would be a slight influx of revenue for businesses in communities near an incident resulting from occasional suppression operations. Conversely, closures of areas due to wildfire activity may affect recreational oriented businesses.

Conclusion: Fire management in DENA under this alternative is expected to have a minor beneficial impact to the local economy.

Wetlands and Floodplains

There would be a minor impact to these area due if fire suppression operations occur (handline construction). There may be impacts due to erosion after fire has burned through a wetlands or floodplain. Once vegetation in these areas re-establishes erosion is expected to return to normal levels.

Fire is an inextricable component of the fire dependent ecosystem of this area and is known to maintain a balanced, naturally functioning ecosystem. Managing wildland fire within established resource objectives would encourage the natural function of the ecosystem in DENA.

Conclusion: There would be temporary minor impacts due to a loss of vegetation and temporarily increased erosion. The level of impacts to wetlands and floodplains anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or is critical to the natural or cultural integrity of the park.

Subsistence Use and Wildlife Habitat

A short-term impact on game species and plants in specific areas could occur due to the decrease of vegetation within burned areas. However, this alternative would more adequately

facilitate the long-term preservation of the area's natural processes by allowing fire to play its natural role in the ecosystem. Suppression actions may adversely affect subsistence activities during the life of the incident by the increase of human activity and air traffic in the immediate area. Fire is an inextricable component of the fire dependent ecosystem of this area and is known to contribute toward the maintenance of a balanced, naturally functioning ecosystem.

Conclusion: There is less than one percent of lands in the critical a management option and 1.5 percent of full protection lands within DENA, thus limiting negative impacts as a result of suppression actions. This would not disrupt the natural function of the ecosystem in DENA, therefore maintaining wildlife habitat and subsistence use within the management area. There would be a negligible short-term impact resulting from a displacement of wildlife in the burned area. This, however, would replicate a naturally functioning ecosystem and subsistence regime. The level of impacts to subsistence and wildlife habitat anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Air Quality

Under this alternative, smoke would be monitored for trajectory, mixing height, and impact to overall air quality. Certain wildland fires would be managed for the accomplishment of resource management goals, including the preservation of fire in its natural role. This would reduce the possibility of catastrophic fire thereby reducing the chance for long-term, intense decrease of air quality.

Conclusion: No long term impacts to air quality are expected. The level of impacts to air quality anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are critical to the natural or cultural integrity of the park.

Water Quality and Fisheries

Under this alternative certain wildland fires would be managed for the accomplishment of resource management goals including the preservation of fire in its natural role and the reduction of burnable vegetation. This would result in a greater number of low-intensity wildland fires thereby reducing the potential for erosion along streams.

Selection of this alternative would not disrupt the natural function of the ecosystems within DENA. Fire is a common occurrence in this ecosystem and does result in some erosion, affecting water quality and fisheries habitat. Short-term negligible impacts of increased sedimentation may occur initially after the fire and prior to reestablishment of vegetation. Under this alternative, the amount of erosion is expected to continue at the same natural level and will not result in an impairment of the stated park purpose.

Conclusion: Long term impacts to water quality and fisheries are not expected. The level of impacts to water quality and fisheries anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Wilderness Resource Values
Under this alternative certain wildland fires would be managed for the accomplishment of resource management goals including the preservation of fire as a natural process.

Vast amounts of Denali are designated wilderness or are suitable for such designation. The wilderness character of the area reflects natural conditions and a vast undeveloped sub-arctic landscape without permanent human residence. A sense of solitude and distance from modern civilization and its modifications of the natural world dominate the recreational experience. Under this alternative natural fire would be allowed to continue and would continue as an integral part of the wilderness experience.

Conclusion: Long-term impacts to wilderness resource values are not expected. Short-term impacts during fire suppression activities may occur but will be mitigated by adhering to special concerns outlined in the DENA FMP and by the use of minimum tool/minimum requirement analysis. The level of impacts to wilderness character anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are critical to the natural integrity of the park.

Alternative 1, Cumulative Impacts: The on-going and future activity that would have a cumulative effect on resources of concern within and outside of DENA unit boundaries analyzed in this Environmental Assessment is the adjacent landowners' fire management option selection. All public land management agencies in Alaska are signatories of the Alaska Interagency Fire Management Plan, which allows for fire to burn on the landscape in limited management units. Much of the public lands surrounding DENA are in a limited management unit and may result in multiple large fires in the area, especially with an increase in vegetation due to no prescribed burns. The results of these multiple fires may be greater than fires managed just within DENA boundaries.

Alternative 2. Prescribed Fire Use, Wildland Fire Use, and Wildland Fire Suppression (NPS Preferred Alternative)

Vegetation and Biodiversity
This alternative would have the least impact on vegetation with the maximum potential for maintaining diversity, by way of careful implementation of prescribed fire in areas ill suited to Wildland Fire Use. Wildland fire that poses a potential threat to life, property, or sensitive resources would be suppressed, while continued implementation of Wildland Fire Use in remote portions of DENA would ensure the cost-effective preservation of the area's natural fire ecology as well as the reduction of potentially dangerous fuel loads.

A purpose of DENA is to "assure the optimum functioning of entire ecological systems in undisturbed natural habitats…and shall not be jeopardized by human use." (Congressional Record- House, H10549, November 12, 1980) Fire is an inextricable component of the environment of this area and is necessary to maintain a balanced, naturally functioning ecosystem. Selection of this alternative to use prescribed fire; Wildland Fire Use within established resource objectives, and wildland fire suppression would result in a natural functioning ecosystem within DENA.

Conclusion: A balanced and naturally functioning ecosystem would be maintained with the use of this alternative. The level of impacts to vegetation and biodiversity anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Cultural Resources

There would be improved long-term protection of cultural resources with the use of prescribed fire near and surrounding cultural resources. The occasional use of prescribed fire would allow a relatively cost-effective means of reducing fuel loads and preserving historic landscapes and conditions where the presence of values to be protected prohibits the implementation of Wildland Fire Use.

Conclusion: Long-term protection of cultural resources would result from this alternative. This is anticipated to not result in an impairment of park resources, fulfilling specific purposes identified in the establishing legislation, or is key to the natural or cultural integrity of the park.

Aesthetics and Recreation

The impacts would be similar to Alternative 1 with the addition of the occasional use of prescribed fire that would allow a relatively cost-effective means of reducing fuel loads where the presence of values to be protected prohibits the implementation of Wildland Fire Use.

Conclusion: This alternative may result in minor impacts by closing certain areas and some vegetation may be burned decreasing aesthetics in limited areas. The level of impacts to aesthetics and recreation anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Local Economy

The impacts would be similar to Alternative 1 with the addition that the occasional use of prescribed fire would allow a relatively cost-effective means of reducing fuel loads where the presence of values to be protected prohibits the implementation of Wildland Fire Use.

Conclusion: The increase in revenue to communities supporting fire management operations would result in a minor beneficial impact.

Wetlands and Floodplains

The impacts would be similar to Alternative 1 with the addition that the occasional use of prescribed fire would allow a relatively cost-effective means of reducing fuel loads where the presence of values to be protected prohibits the implementation of Wildland Fire Use.

Conclusion: There would be temporary minor impacts due to a loss of vegetation. The level of impacts to wetlands and floodplains anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Subsistence Use and Wildlife Habitat
The impacts would be similar to Alternative 1 with the addition of the occasional use of prescribed fire would also allow a relatively cost-effective means of reducing fuel loads where the presence of values to be protected prohibits the implementation of Wildland Fire Use.

Conclusion: The natural function of the ecosystems within DENA would not be disturbed, therefore maintaining wildlife habitat and subsistence use within the Park/Preserve. There would be a minor short-term impacts resulting from a displacement of wildlife in the burned area. This, however, would replicate a naturally functioning ecosystem and subsistence regime. Additional impacts may result from suppression actions; however, limited acreage of critical and full protection designation minimizes suppression needs. The level of impacts to subsistence and wildlife habitat anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Air Quality
The impacts would be similar to Alternative 1 with the addition of the occasional use of prescribed fire would allow a relatively cost-effective means of reducing fuel loads where the presence of values to be protected prohibits the implementation of Wildland Fire Use. Fire is a naturally occurring event in the DENA ecosystem. Degradation in air quality at the levels expected would be similar to a natural occurrence.

Conclusion: No long-term impacts to air quality are expected. The level of impacts to air quality anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the park.

Water Quality and Fisheries
The impacts would be similar to Alternative 1 with the addition of the occasional use of prescribed fire that would allow a relatively cost-effective means of reducing fuel loads where the presence of values to be protected prohibits the implementation of Wildland Fire Use.

Selection of this alternative would not disrupt the natural function of the ecosystem within DENA. Fire is a common occurrence in this ecosystem and does result in some erosion, affecting water quality and fisheries habitat. The erosion is expected to continue at the same natural levels.

Conclusion: Long term impacts to water quality and fisheries are not expected. Short-term negligible impacts of increased sedimentation may occur initially after the fire and prior to reestablishment of vegetation. The level of impacts to water quality and fisheries anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural or cultural integrity of the management area.
Wilderness Resource Values
The impacts would be similar to Alternative 1 with the addition of the occasional use of prescribed fire that would allow a relatively cost-effective means of reducing fuel loads

where the presence of values to be protected prohibits the implementation of Wildland Fire Use.

The wilderness character of the area reflects natural conditions and a vast undeveloped sub-arctic landscape without permanent human residence. A sense of solitude and distance from modern civilization and its modifications of the natural world dominate the recreational experience. Under this alternative natural fire would be allowed to continue and will not result in an impairment of the stated park purpose.

Conclusion: Long-term impacts to wilderness character are not expected. Short-term impacts during fire suppression activities (e.g. surface disturbance by handlines) may occur but will be mitigated by adhering to special concerns outlined in the DENA FMP and by the use of minimum tool/minimum requirement analysis. The level of impacts to wilderness character anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of the park.

Alternative 2 Cumulative Impacts: The on-going and future activity that would have a cumulative effect on resources of concern within and outside of DENA boundaries analyzed in this Environmental Assessment is the adjacent landowners' fire management option selection. All public land management agencies in Alaska are signatories of the Alaska Interagency Fire Management Plan, which allows for fire to burn on the landscape in the limited suppression option. Much of the public lands surrounding DENA are in a limited suppression option, which has the potential to result in multiple large fires in the area. The results of these multiple fires may be greater than fires managed just within DENA boundaries.

B. Cumulative Impact Mitigation

The convening of a Multi-Agency Coordinating (MAC) group can mitigate potential cumulative impacts. As directed in the Alaska Interagency Fire Management Plan, "A statewide Multi-Agency Coordinating (MAC) group may be convened to implement a temporary change from the selected management options for a specific geographic area(s) during periods of unusual fire conditions (e.g., numerous fires, predicted drying trends, smoke problems, unusually wet conditions or suppression resource shortages)."

C. IMPACTS OF ALTERNATIVES SUMMARY

	Alternative 1: Wildland Fire Use and Wildland Fire Suppression	Alternative 2 (Preferred): Prescribed Fire Use, Wildland Fire Use, and Wildland Fire Suppression
Vegetation and Biodiversity	Minor impact: continued potential for minimal loss of diversity through fire exclusion in or near Critical and Full Protection Units and sites.	Least impact: maximum potential for diversity through careful implementation of prescribed fire in areas ill-suited to Wildland Fire Use.
Cultural Resources	Minor impact: Increased potential for	Improved long-term protection of registered and unregistered historic

	uncontrolled fire due to increased fuels through fire exclusion in or near Critical and Full Protection Units and sites.	and/or archeological sites; improved maintenance of historical landscapes and conditions.
Aesthetics and Recreation	Minor impact: occasional closures of specific areas; vegetation burned may decrease aesthetics.	Minor impact: occasional closures of specific areas; vegetation burned may decrease aesthetics.
Local Economy	Minor impact	Minor impact
Wetlands and Floodplains	Minor impact: may be some erosion until vegetation returns.	Minor impact; may be some erosion until vegetation returns.
Subsistence Use and Wildlife Habitat	No long-term impact; some potential for short-term displacement of game from specific areas.	No long-term impact; some potential for short-term displacement of game from specific areas.
Water Quality and Fisheries	No long-term impact; some short-term erosion.	No long-term impact; some short-term erosion.
Air Quality	Minor impact.	Minor impact.
Wilderness Character	No long-term impact; some short-term impact from fire suppression activities.	No long-term impact; some short-term impact from fire suppression activities.

V. CONSULTATION AND COORDINATION

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LITERATURE CITED

Alaska Interagency Fire Management Council. 1982. Alaska Interagency Fire Management Plan, Tanana/Minchumina Planning Area.

Alaska Interagency Fire Management Council. 1984. Alaska Interagency Fire Management Plan, Fortymile Planning Area.

Alaska Interagency Fire Management Council. 1986. Alaska Interagency Fire Management Plan, Matanuska/Susitna Planning Area.

Alaska Wildland Fire Coordinating Group. 1998. Alaska Interagency Wildland Fire Management Plan.

Department of Interior. 2003. Interagency Standards for Fire and Fire Aviation Operations.

National Park Service. 2002. Director's Order 18: Fire Management.

National Park Service. 1986. General Management Plan, Denali National Park and Preserve.

National Park Service. 2002. DRAFT Backcountry Management Plan, Denali National Park and Preserve.

National Park Service. 1997. Strategic Plan, Denali National Park and Preserve.

National Park Service. 1998. Resource Management Plan, Denali National Park and Preserve.

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APPENDIX C.2 - ANILCA 810

ANILCA Title VIII Section 810 (a) Summary Evaluation and Findings

I. INTRODUCTION

This section was prepared to comply with Title VIII, Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA). It summarizes the evaluations of potential restrictions to subsistence activities that could result from the implementation of the proposed fire management plan in Denali National Park and Preserve (DENA).

II. EVALUATION PROCESS

Section 810(a) of ANILCA states:

In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands…the head of the federal agency…over such lands…shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands, which would significantly restrict subsistence uses shall be affected until the head of such Federal agency—

(1) gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to section 805;

(2) gives notice of, and holds, a hearing in the vicinity of the area involved; and

(3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

In 1980,ANILCA established the boundaries and purposes of new and expanded conservation system units in Alaska, including specific language for the additions in Denali National Park and Preserve:

“To preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation, including those species dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest, and coastal rainforest ecosystems; to protect the resources related

to subsistence needs; to protect and preserve historic and archeological sites, rivers, and lands, and to preserve wilderness resource values and related recreational opportunities…; and to maintain opportunities for scientific research."

ANILCA also provides direction for the preservation of historic and archeological sites and access to subsistence resources within Denali. Sections 101 (a), (b), and (c) of ANILCA charges all national park units in Alaska with the preservation of historic and archeological sites. Subsistence uses by local residents shall be permitted in the additions, where such uses are traditional (ANILCA, sec 202(3)(a)).

The potential for significant restriction to subsistence resources must be evaluated for the proposed action's effect upon subsistence uses and needs, the availability of other lands for the purposes sought to be achieved and other alternatives which would reduce or eliminate them.

III. PROPOSED ACTION ON FEDERAL LANDS

The National Park Service requires every administrative unit with burnable vegetation to develop a fire management plan—a unit-specific document outlining fire management goals and describing the policies and actions by which these goals will be realized (Director's Order 18). Since 1982, the DENA fire management program has operated under the jurisdiction of various statewide interagency documents, including the Alaska Interagency Wildland Fire Management Plan, or AIWFMP (1998). Under the AIWFMP, fire protection needs at Denali National Park and Preserve are determined by NPS and Bureau of Land Management (BLM) and/or State of Alaska, DNR, Division of Forestry (DOF) managers; lands within DENA are categorized as **critical**, **full**, **modified**, or **limited** protection, depending on the proximity of values to be protected and on overall resource management objectives.

The proposed action consists of the establishment of a Fire Management Plan for Denali National Park and Preserve. The preferred alternative and the other considered alternatives (see Appendix C1, Environmental Assessment, this document) specify continued adherence to the AIWFMP as well as compliance with recently developed National Park Service directives. Specifically, NPS Director's Order 18 mandates a distinction between **prescribed fire** (planned and implemented by management) and **wildland fire** (unplanned ignitions), with wildland fire incidents further categorized, in turn, as either wildland **fire use** or wildland fire **suppression**. Each of the considered alternatives mandate a specific configuration of DO-18 management options and relates these options to the policies and procedures outlined in the AIWFMP.

The preferred alternative allows for the continued management of wildland fire at Denali National Park and Preserve through a combination of wildland fire suppression, wildland fire use, and prescribed fire use. This statement of Summary Evaluations and Findings addresses the impact of these fire management policies and actions on subsistence activities within the management area.

IV. AFFECTED ENVIRONMENT

A summary of the affected environment pertinent to subsistence uses is presented here.

The original Mount McKinley National Park was established in 1917 primarily as a refuge for large mammals. In 1980, ANILCA enlarged the Old Park to more than 6 million acres, and re-designated the area as Denali National Park and Preserve. Subsistence uses within Denali National Park and Preserve are permitted in accordance with Titles II and VIII of ANILCA. Lands within former Mount McKinley National Park are closed to subsistence uses.

A regional population of approximately 300 eligible local rural residents qualifies for subsistence use of park resources. Resident zone communities for Denali National Park and Preserve are Cantwell, Minchumina, Nikolai, and Telida. By virtue of their residence, local rural residents of these communities are eligible to pursue subsistence activities in the new park ANILCA additions. Local rural residents who do not live in the designated resident zone communities, but who have customarily and traditionally engaged in subsistence activities within the park additions, may continue to do so pursuant to a subsistence permit issued by the Superintendent.

The NPS realizes that Denali National Park and Preserve may be especially important to certain communities and households in the area for subsistence purposes. The resident zone communities of Minchumina and Telida use park and preserve lands for trapping and occasional moose hunting along area rivers. Residents of Nikolai have used park resources in the past. Residents of Cantwell, hunt moose and caribou, trap, and harvest firewood and other subsistence resources in the ANILCA park additions. he important subsistence species include moose, caribou, salmon (coho, king, pink and sockeye), Burbot, Dolly Varden, grayling, lake trout, northern pike, rainbow trout, whitefish, beaver, coyote, land otter, weasel, lynx, marten, mink, muskrat, red fox, wolf and wolverine, ptarmigan, grouse, ducks and geese.

The NPS recognizes that patterns of subsistence use vary from time to time and from place to place depending on the availability of wildlife and other renewable natural resources. A subsistence harvest in any given year many vary considerably from previous years because of such factors as weather, migration patterns and natural population cycles. However, the pattern is assumed to be generally applicable to harvests in recent years with variations of reasonable magnitude.

Denali National Park and Preserve is located in the interior of Alaska and is dominated by an east to west line of towering glaciated mountains known as the Alaska Range. The range rises abruptly from lowlands 500 to 2,000 feet in elevation to the pinnacle of Mount McKinley, North America's highest mountain, at 20,320 feet. The range is perpetually snow clad above approximately 7,000 feet on the north and 6,000 on the south. Glaciers are numerous and tend to be larger and longer on the south side of the range than on the north.

Moisture from the Gulf of Alaska is blocked by the Alaska Range causing a continental climate to the north of the range and more of a maritime climate to the south. Moisture laden air from the south results in greater levels of precipitation on the southern flanks of the range. The average annual precipitation at park headquarters is 15 inches, while at some higher

elevations in the park, the total precipitation exceeds 80 inches and snowfall exceeds 400 inches. Normal snowpack throughout the region averages between 20 and 40 inches.

Vegetative cover in Denali is typical of interior Alaska taiga. Lowland floodplains are dominated by dense, deciduous or coniferous forest, or by a mixed forest of balsam poplar and white spruce. Upland forests tend to be more open with mixed or continuous stand of black spruce, white
spruce, or aspen. Upland forests give way to shrub communities at elevations above approximately 2,400 feet. Glacial rivers flowing from the Alaska Range create broad floodplains that are sparsely vegetated. Tall shrub communities of willow and alder grow on moist slopes and along drainages, and low shrub communities of dwarf birch and willow grow at higher elevations or on dry slopes. Alpine tundra, composed of dryas and dwarf willow shrub, mat and cushion species, or grass and sedge mixes grows on slopes and ridges to about 6,000 feet. More than 650 species of flowering plants inhabit the slopes and valleys of the park.

DENA area was used by several Athabascan Indian groups. The Ahtna people of Cantwell arrived from the east, the Tanana people came into the area from the north traveling up the Nenana and Toklat Rivers, the Koyukon people who lived at Lake Minchumina ascended the McKinley-Foraker-Herron Rivers, the Upper Kuskokwim people who still live in Nikolai and Telida, approached the park from the west, and the Dena'ina people approached the park from the south. Subsistence activities included large mammal hunting, fishing, and small game trapping.

More comprehensive descriptions of the affected environment within Denali National Park and Preserve can be found in the following park documents:

- Draft Backcountry Management Plan/ EIS, Chapter 3. 2001.
- Environmental Impact Statement (EIS) on the Entrance Area and Road Corridor Development Concept Plan for Denali National Park and Preserve, 1996.
- EIS on the South Side Denali Development Concept Plan, 1996.
- EIS on the Cumulative Impacts of Mining in Denali National Park and Preserve, 1990.
- An Overview and Assessment of Archeological Resources, Denali National Park and Preserve, Alaska, Research/Resources Management Report AR-16, Kristen Griffin, 1990.
- EIS on the Wilderness Recommendation, Denali National Park and Preserve, Alaska Planning Group, 1988.
- General Management Plan, Land Protection Plan, Wilderness Suitability Recommendation, Denali National Park and Preserve, 1986.
- Land Use in the North Additions of Denali National Park and Preserve: An Historical Perspective, Research/Resources Management Report AR-9, William Schneider, Dianne Gudgel-Holmes and John Dalle-Molle, 1984.

The majority of DENA lies within the Limited Protection Fire Management Unit. Under the proposed action, wildland fire ignitions occurring within this unit would be managed for the accomplishment of resource management goals, including the preservation of the natural fire regime, and the perpetuation, in turn, of healthy and biologically diverse plant communities and fish and game habitat.

V. SUBSISTENCE USES AND NEEDS EVALUATION

To determine the potential impact on existing subsistence activities, three evaluation criteria were analyzed relative to existing subsistence resources that could be impacted.

The evaluation criteria are:

- The potential to reduce important subsistence fish and wildlife populations by (a) reductions in numbers, (b) redistribution of subsistence resources, or (c) habitat losses;

- The effect the action might have on subsistence fisherman or hunter access; and

- The potential for the action to increase fisherman or hunter competition for subsistence resources.

1) Potential to Reduce Populations:

The National Park Service has generally found populations of plants and animals important to subsistence activities to be healthy. However, site-specific information on populations, distribution, and harvest is lacking for many of these species; therefore, recognition of declining populations has been difficult.

The actions that would be implemented under the preferred alternative would be aimed directly at the safe and cost-effective preservation of the area's natural fire ecology. As such, DENA enactment of the preferred alternative would have a beneficial effect on the long-term viability of plant and animal populations pertinent to subsistence use within DENA. The occasional displacement of plant and animal populations from specific locales by wildland fire is a natural and inevitable occurrence within the fire-dependent ecosystems of DENA. Although current populations may experience some adverse effects, usually those effects are greatly offset by the benefits accrued to future generations of populations.

Under the proposed action, land managers could mitigate potential losses to subsistence users through the consideration of hunting and trapping activities in the planning and implementation of wildland fire use and prescribed fire incidents. There are a few users who have permits for the use of public structures within the management area. These structures are protected under Critical Suppression as noted in the accompanying Fire Management Plan (FMP, Section XVI Protection of Sensitive Resources). In the event of loss of or damage to this structure, the Superintendent of the Preserve may permit reconstruction of this structure. The long-term benefits of fire to the wildlife habitats of DENA outweigh any short-term losses by subsistence users and, therefore, will not be the sole reason for suppressing a wildland fire. However, subsistence use is an important factor in the determination of prescribed fire within DENA.

2) Restriction of Access:

NPS lands are managed according to legislative mandates, NPS management policies, and guidelines. The proposed action is not anticipated to significantly restrict access of

subsistence users to natural resources on NPS lands. Under the proposed action, restrictions would be minimized by the continual reduction of hazardous fuels on the landscape by allowing fire to fulfill its natural role. This in turn would reduce the possibility of widespread, catastrophic fire due to heavy fuel build up, in the future.

3) Increase in Competition:

NPS regulations and provisions of ANILCA provide the tools for adequate protection for fish and wildlife populations on Federal Public lands while ensuring subsistence priority for local rural residents. The enactment of the preferred alternative would not significantly increase competition for the use of subsistence resources. Displacement of plant and animal populations from specific sites would be short-term, and, in fact, in most cases the long-term viability of the populations in question depends directly on the natural processes that the proposed plan is intended to safely perpetuate.

VI. AVAILABILITY OF OTHER LANDS

As stated earlier, wildland fire is an inevitable component of the plant and animal communities of Denali National Park and Preserve. Consequently, the availability of other lands is not a pertinent consideration in this particular case.

With respect to the question of subsistence use, the scope and intensity of wildland fire incidents managed for resource benefit (i.e., fire use incidents) will generally be of small significance when considered within the context of overall available acreage. Prescribed fires will be planned and managed so as to avoid any significant hardship to subsistence users.

VII. ALTERNATIVES CONSIDERED

This section discusses the considered alternatives with respect to their respective reduction or elimination of the need to use public lands necessary for subsistence purposes.

Alternative 1 (a combination of prescribed fire use and wildland fire suppression) would perhaps result in the least short-term disruption of subsistence activities, with suppression responses preventing the spread of multiple wildland fire ignitions. The long-term impacts of this alternative, however, would be negative, with the exclusion of wildland fire leading to the gradual decline of biodiversity and viable habitat throughout all areas within DENA utilized by subsistence hunters and trappers.

Preferred alternative (a combination of wildland fire use, wildland fire suppression, and prescribed fire use) would yield the same favorable long-term effects on lands used for subsistence activities as alternative two, while allowing more effective protection and restoration of significant fire-sensitive sites and/or landscapes.

Alternative 2 (a combination of wildland fire use and wildland fire suppression) would not significantly differ from the preferred alternative with respect to the reduction or elimination of the need to use public lands for the accomplishment of fire management goals.

VIII. FINDINGS

This analysis concludes that the proposed action will not result in a significant restriction of subsistence uses.

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National Park Service
U.S. Department of the Interior

Denali National Park and Preserve

Alaska

Finding of No Significant Impact

Fire Management Plan Environmental Assessment

September 2004

Recommended: _____ 9/29/04
Superintendent, Denali National Park and Preserve — Date

Approved: _____ 9/30/04
Regional Director, Alaska — Date

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APPENDIX D.1 - INTERAGENCY CONTACTS

Alaska Interagency Coordination Center (AICC):

Center Manager	Dave Curry	356-5677
Initial Attack Dispatcher	Bruce Amsbary	356-5670

Alaska Fire Service - Tanana Fire Management Zone:

Fire Management Officer	Mike Butteri	356-5574
Assistant FMO	Marlene Eno-Hendren	356-5569
Tanana Lead IA Zone Dispatcher	Amber Sunderland	356-5554
Tanana Zone FAX		356-5556

DOF - Fairbanks Area Forestry:

Fire Management Officer	Robert Schmoll	451-2636
DOF Fairbanks Area Dispatch		451-2626
DOF Fairbanks Area Dispatch (Alternate Phone Number)		451-3024

DOF - Matsu Area Forestry:

Fire Management Officer	Norm McDonald	761-6302
DOF Matsu Area Dispatch		761-6240
DOF Matsu Area (Report a fire)		761-6311

DOF - Southwest Area Forestry:

Fire Management Officer	Ray Kraemer	524-0300
DOF Southwest Area Dispatch		524-3366
DOF Southwest Area (Report a fire)		524-3366

National Park Service:

Fire Management Officer, Alaska Region	Dan Warthin	644-3409
Fire Management Officer, Denali National Park	Larry Weddle	683-9548

APPENDIX D.2 –DENALI NATIONAL PARK AND PRESERVE CONTACTS

Alaska Western Area Fire Management Staff

Fire Management Officer	Larry Weddle	683-9548 907-460-1688 Cell phone
Assistant Fire Management Officer	Charlie Reynar	683-9549 907-240-4555 Cell phone
Helicopter Manager	Gilbert Garcia	683-6220 907-240-7655 Cell phone
Fire Program Management Assistant	Susanna Nancarrow	683-6215 509-750-5648 Cell phone

Regional Fire Staff

Fire Management Officer, Alaska Region	Dan Warthin	644-3409 907-444-8788 Mobile phone
Fire Communication, Education and Prevention Specialist	Morgan Miller	644-3418 907-347-7997 Mobile phone

Administrative Staff

Superintendent	Paul Anderson	683-9581
Assistant Superintendent	Philip Hooge	683-9581
Assistant Superintendent	Elwood Lynn	683-9581

Other Management Staff

Chief Ranger	Richard Moore	683-9527

Other Park Contacts

Communication Center (Dispatch)		683-9555
Cultural Resources	Amy Craver	683-9544
Cultural Resources	Jane Bryant	683-9538
Wilderness Coordinator	Joe Van Horn	683-9539
Public Information Officer	Kris Fister	683-9583

APPENDIX E. – INFORMATION OFFICER STEP UP PLAN

Information Officer Step Up Plan
for
Alaska NPS Fire Management

In many Alaskan towns and villages, residents are more familiar with wildland fire than with NPS employees. Some AK NPS employees are not familiar with wildland fire and park staffs may not have experienced wildland fire events during their tenure in Alaska. Furthermore, Information Officers may be unfamiliar with Alaska wildland fire behavior and management and may require some assistance from AK NPS Fire Management staff. It is of utmost importance to keep these factors in mind while assessing the need for an Information Officer.

A wildland fire ignites on National Park Service land and AK NPS Fire Management and protection organizations initiate the appropriate response based upon the Alaska Interagency Wildland Fire Management Plan and NPS policy. During this process, AK NPS Fire Management and park staff must anticipate fire and smoke events and distribute information to internal and external audiences before the events impact them. Consider Information Officer assistance when:

Sizing Up the Fire

- Fire threatens structures
- Many large or small fires throughout the area
- Fire or smoke visible from town
- Fire moves towards a town or village
- Smoke impacts health or transportation in town, village or throughout the area
- Fire triggers media interest

Evaluating AK NPS Fire Management

- Fire Management staff anticipate not being able to, or cannot accomplish all outreach tasks.
- Internal and external communication methods such as local NPS Fire News updates (via Lotus Notes) and national NPS Fire News (located on the internet at http://data2.itc.nps.gov/fire/public/pub_firenews.cfm) no longer fulfill the needs of the incident.
- AK NPS Fire Management staff receives more calls or comments of concern regarding the management of the fire than they can sufficiently handle.

Evaluating AK NPS Employees

- NPS staff receives more calls or comments of concern regarding management of the fire than they can sufficiently handle.
- NPS staff cannot adequately respond to the number of information requests from local residents, visitors, and other park staff.
- NPS staff cannot fulfill fire related outreach needs.
- NPS staff voice concern about wildland fire management.

- A number of NPS employees or in particular, key staff members, are unfamiliar with AK wildland fire management and wildland fire in the boreal ecosystem.

Evaluating the Community

- Community vocalizes concern about the management of the fire.
- An incident of this nature has not recently occurred in this area.
- Community (at large) is unfamiliar with wildland fire and smoke thus reacts to it in either a negative or positive manner.
- Fire management activities or smoke impacts the community for more than a few days.
- Incident affects the economic viability of the community.
- Community has negative opinions about the NPS or government.
- Similar incidents occurred in the area and community members were affected in a negative way and still harbor and vocalize those emotions.
- Health impacts occur and/or evacuations are planned for or initiated.
- Incident directly affects the community. Such as…
    - Threat or perceived threat to personal property or welfare
    - Impacts planned events or historical happenings
    - Creates resource management issues
    - Their quality of life
    - Effects on their value systems
- Incident will impact the common thread that holds this community together. Such as…
    - Hunting grounds, berry picking opportunities, recreational areas, natural beauty of the surrounding areas

During a fire incident that warrants an Information Officer, things AK NPS Fire Management, Information Officer and park unit must do in order to be successful…

- Listen, listen, listen to internal and external audiences.
- Make personnel available to answer questions.
- Actively seek out leaders in the community such as Village Councils, Tribal Council, Community Elders to communicate with.
- Always try to make sure the community hears it from NPS or involved agency first.
- Evaluate the most effective means of communicating to town or village residents and residents in the surrounding areas, for example, local radio station, local newspaper, Alaska Rural Communication System.
- Involve community members when giving out information.
- Continually assess community information needs.
- Work closely with all affected agencies (other land managers and protection organizations).

An Information Officer can be informally requested or resource ordered. Situations that may warrant an informal request include:

- AK NPS Regional Fire Communication and Education Specialist is available because this person is considered a local NPS resource.
- AK NPS employee where incident occurs is available and the workload does not warrant a full time IOF.

Situations that may warrant a resource order include:

- FMO must look for assistance outside of park/preserve experiencing fire incident
- Workload demands a full time IOF be present.
- Size or complexity of the incident exceeds the experience, training or capabilities of the local IOF.
- Size of the information staff needed exceeds the capabilities of the local IOF.
- When local conditions (political or social) indicate that a non-local IOF may have more success in delivering pertinent fire related messages.

If and when it is determined that an Information Officer is needed, there are several potential candidates to choose from. A suggested prioritization of available Information Officers is listed here:

1. AK NPS Regional Fire Communication and Education Specialist
2. AK NPS employee where incident occurs
3. AK NPS employees
4. AK agency employees and/or residents
5. NPS or other agency employees

The AK NPS Fire Management Officer has the discretion to select an IOF1, 2, 3, or trainee for the fire incident. The size and complexity of the fire incident often foretells what type of Information Officer is needed.

Once the IOF arrives, encourage him/her to seek out support from local NPS employees, other local agency employees and community members. AK NPS Fire Management staff should continue to provide information about the fire to the best of their ability and as needed by the Information Officer in order to fulfill the information needs of the community, visitors, and park/preserve staff. AK NPS employees should be strongly encouraged to participate in information activities as they are initiated by the Information Officer.

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APPENDIX F. – FUEL TREATMENT PLAN

Fuel Treatment Plan
Denali National Park & Preserve

Introduction

The purpose of Denali National Park and Preserve's Fuel Plan is to provide firefighter/public safety and to increase the probability of protecting the built environment of the park. By implementing the fuel treatment prescription to reduce or remove vegetation, a defensible space will be created and maintained around the park structures. This space allows radiant heat from a wildfire to dissipate, and reduces crown fire potential, thus keeping the building from igniting. It also prevents structural fires from igniting other structures, and provides a safe area for suppression crews to work. Creation of this space reduces the risk of property damage in the event of a wildland fire, improves security for visitors and residents, and reduces the risks for firefighters. This plan also describes implementation and maintenance schedules for specific sites.

This plan documents how to implement the fuel reduction program in Denali National Park and Preserve. An Environmental Assessment was been prepared according to the National Environmental Policy Act of 1969 and regulations of the Council on Environmental Quality (40 CFR 1508.9). The Environmental Assessment received a Finding of No Significant Impact (FONSI) February, 2003.

Denali National Park and Preserve's Fuel Plan complies with NPS policies and guidelines and provides guidance for treating vegetative fuels. The Alaska NPS Structure Protection Procedures were approved in 2005 by the Alaska Regional Director and provide direction to the park superintendents concerning structure protection.

The wildland urban interface is the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. The vegetation near structures is referred to as fuel. In some areas in Denali National Park and Preserve this vegetation is particularly thick and may touch or overhang buildings. While the vegetation may provide privacy and a sense of seclusion, it significantly complicates the ability of fire fighters to control a wildland fire and protect the structures. Many of the buildings in Denali have been built within the forest or close to the forest edge, or the forest has since expanded to the proximity of the structures. Due to the remoteness and difficulty of access, it takes a significant amount of time, effort, and resources to protect cabins and structures during a fire.

General Concept

In support of the FireWise Community Action Program, the National Park Service will remove hazardous vegetative fuel that surrounds structures in the developed and backcountry areas within Denali National Park and Preserve.

Scope

The proposed area of fuel treatment is focused on the Park Development Zone which incorporates approximately 40 acres and isolated historic and cultural sites located throughout the park, totaling an area of about approximately 10 acres. To continue the benefits of hazardous vegetative fuel

reduction, a maintenance program involving periodic repeated removal of vegetation in these same areas is addressed in this plan. Similar treatments will be applied if additional structures are determined to warrant protection.

Treatment Zones

The area around each structure is divided into three fuel treatment zones.

Zone 1 is a one foot radius immediately adjacent to the structure. Zone 1 is free of all vegetation (including grass) around the foundation of the structure. This area could be mineral soil or perhaps covered with pea gravel. This zone applies only to frontcountry structures.

Zone 2 extends an additional 29 feet from Zone 1. Combustible vegetation will removed from Zone 2 to create a 30-foot buffer around the structure. This area could be manicured lawns, gardens, flowerbeds, or naturally occurring groundcovers (herbaceous plants, low shrubs, and/or leaf litter).

Zone 3 extends a minimum of an additional 60 feet from Zone 2 for a minimum distance of 90 feet from each structure. In Zone 3 the fuel will be thinned out and limbed up to 6 feet. Crown spacing will be no less than 20 feet. (Crown spacing is measured from the furthest branch of one tree to the nearest branch on the next tree.)

Depending on the availability of natural barriers, the extent of Zone 3 may have to be modified. Modification of Zone 3 on slopes will expand the treatment area. The increase of space on slopes is needed to accommodate the increase intensity in fire behavior on slopes. As heat rises, fuel on slopes preheats and ignites quickly, causing fires to travel faster upslope. Enlarged defensible space around structures on slopes is needed especially on the downhill side. Figure 2-1 indicates the minimum distances that Zone 3 should be extended depending on the percent slope and position of the slope relative to the structure.

Areas around each structure will be individually evaluated to design defensible spaces within the context of that structure's use, location, and cultural significance. It is important to evaluate each structure on its own relative to the proximity of green lawns, driveways, roads or natural fuel breaks. For example, a spruce tree may be left in Zone 2 if lawn and driveway extended the largely vegetation-free area beyond the 30-foot point. Limited numbers of trees may remain as long as they are not leaning toward the structure or do not have branches that extend over the roof. Efforts will be made to work with residents to identify trees that could remain around their house. Should a fire occur and approach a particular structure, residents need to understand that there is a high probability that even those trees that are not removed in advance will have to be removed to protect the structure.

The 30-foot buffers around 28 backcountry structures[7] comprise an area of approximately 1.86 acres. The area of 100-foot buffers is approximately 18.89 acres. Total approximate acreage affected for frontcountry structures is 17.2 acres for the 30-foot buffers and 68.5 acres for 100-foot buffers. The acreage for the 100 foot buffer includes the area within the 30 foot buffer. These calculations do not account for slope, aspect, or type of vegetation cover.

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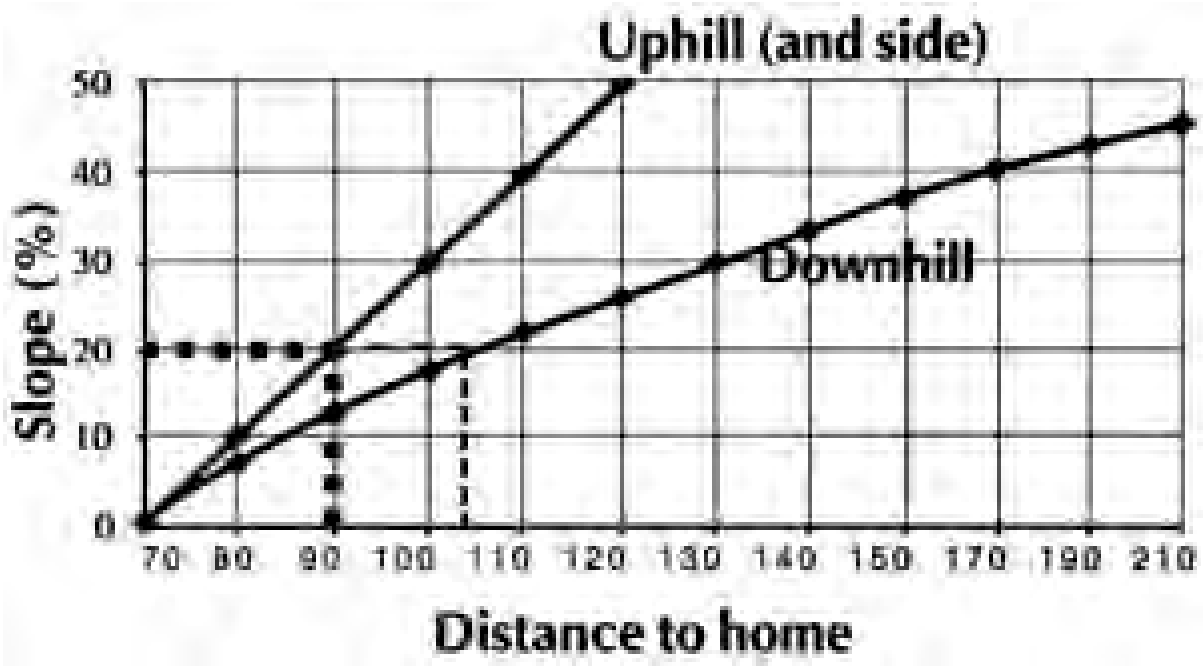
[10] Twenty-eight backcountry structures have been identified thus far as requiring treatment; however additional structures may be added to the Cultural Sites Inventory. All structures would be evaluated to determine treatment priority using the criteria listed below.



Criteria Used to Determine Treatment Priority for Structures

Because the protection of every known structure within the park cannot happen at the same time, criteria have been established to provide managers with sound methodology for determining which structures to treat first. The criteria are as follows and may be updated or improved should new information become available (Appendix G. Alaska NPS Structure Protection Procedures) .

TOP PRIORITY (CRITICAL FIRE MANAGEMENT OPTION IN THE ALASKA INTERAGENCY WILDLAND FIRE MANAGEMENT PLAN, AIWFMP)

1. The structure(s) is a primary domicile.
2. Structure(s) is designated as a National Historic Landmark.

SECOND PRIORITY (FULL FIRE MANAGEMENT OPTION IN THE AIWFMP)

1. The structure has been determined eligible for or is on the National Register of Historic Places, has structural integrity (e.g. intact roof and walls, a reasonable probability for defense), is at potential risk from wildland fire and has been identified for or undergoing routine maintenance/restoration.
2. NPS administrative (e.g. patrol cabin) or public use structures – public funds expended to construct or maintain.
3. The use of the structure is provided for under NPS permit or an approved Mining Plan of Operations.

The following types of structures would not receive treatment under this Fuel Plan:

1. Trespass structures
2. Abandoned structures that are not eligible for inclusion on the National Register of Historic Places.

3. Structures without structural integrity or they have not been identified for or are undergoing routine maintenance/restoration. (It is difficult to put a sprinkler system on a structure without a roof.)

On-site Evaluation

Site reconnaissance will be completed to evaluate actual field conditions and determine planned actions. For example, trees selected for removal and areas selected for clearing and thinning will be identified and inspected to confirm planned actions. Representatives from Cultural Resources and Fire Management will review all actions in the field and agree on the designations made for each area or building perimeter. The number of trees removed will vary at each location depending on the type and characteristics of the vegetation, slope and aspect, and degree of significance of the structure. Each site, structure, and situation is unique (for example, fire history, roadside screening, roof material, siding material, continuum of fuel, location of road, privacy, aesthetic considerations) so the treatment of the site will be tailored accordingly. Paramount consideration will be for the safety of personnel protecting the structure should a fire occur.

Specific aspects of removal and clearing to be evaluated include, but are not limited to: resulting vegetative edge conditions, integration of root systems, and canopy constraints.
Resulting vegetative edge conditions should be reviewed to ascertain potential weakness of remaining plant materials that would be exposed to wind, sunlight and a change in precipitation levels. Roots of a number of trees may in fact share a singular root system and may require careful evaluation before removing single specimens. Consideration of canopy form and aesthetic appearance of those trees that remain should be evaluated to determine whether extensive pruning and/or limbing would be required.

Fire Management staff will devise a site protection plan for each backcountry structure at the initial clearing. This plan would estimate the amount of time and resources needed for protection (and maintenance) of the site.

Site Access

Staff and/or contractors involved in the removal/clearing of vegetation will be provided with the locations of all accessible routes into the area. Locations for staging, stockpiling, parking, landing, and administrative functions should also be identified so that activities are restricted from areas that will continue to be used by public/park staff during the removal period or that contain resources that are to remain undisturbed.

The following measures would be taken to mitigate noise intrusion and resource damage by motorized equipment in areas of designated and suitable wilderness:

- Strictly limit work to only necessary sites. The sites where work is proposed constitute the most critical needs. No work is proposed at less important sites.

- Control means of access. For initial clearing, the following sites within the Denali Wilderness would be reasonably reached by hiking during the summer:

Upper Windy Creek Cabin	Moose Creek Cabin	Lower Windy Creek Cabin
Riley Creek Cabin	Thorofare Cabin	
Mouth of Rock Creek Cabin	Lower Savage Cabin	

- Helicopter access would not be permitted for the evaluation and long term maintenance program for any sites within the Denali Wilderness.

- Crews may perform long-term maintenance at some backcountry sites during winter. This may include debris pile burning.

- In backcountry areas outside of the Denali Wilderness, use of aircraft for long-term maintenance will be subject to the minimum requirement/ minimum tool. If aircraft are used, such use will be scheduled to coincide with other uses of aircraft.

- Where feasible, subsistence permit holders will be encouraged to maintain the defensible space around the cabins, in accordance with the standards identified in this plan. This would reduce NPS administrative presence and associated helicopter use. NPS fire management staff is available to consult with permit holders to identify needed treatment and if it benefits the NPS, fire management staff may assist with the treatment.

Use of Tools

Motorized tools such as chainsaws and "weed eaters" will be permitted for the initial fuel reduction at both designated and suitable wilderness sites. This exception allows motorized use and is based on weighing the need to accomplish the work expeditiously in order to avoid catastrophic harm by fire against the desire to reduce the impacts of motorized noise on wilderness users. Factors considered include labor required to accomplish the work by hand, utility of the buildings and infrequency of visitor presence. The use of mechanized and motorized tools to remove hazard fuels will be subject to the minimum requirement/ minimum tool.

Subsequent maintenance work should be accomplished only with non-motorized hand tools at all sites within the designated Denali Wilderness.

Motorized tools will be permitted for subsequent work at sites outside the Denali Wilderness. These tools are commonly used at many of the inholdings and cabin sites by landowners and subsistence users. The projected level of additional use connected with the proposed action would not be significant, and would not diminish the suitability of the portions of the park where these other sites are located from being considered for wilderness designation in the future.

Protection of Resources

Removal of vegetation will be completed in a manner that does not damage or disturb the remaining vegetation, other natural resources, historic and cultural resources, or infrastructure/improvements. If observation by archaeologists, cultural resource specialists, or other park staff is anticipated, they will coordinate with the fuels reduction crew will minimize/facilitate site visits. Park staff will be responsible for properly identifying specific resources that are to be protected and informing the fuels reduction crew.

Fuel reduction crews will be briefed about cultural resources concerns such as the need to use care when removing vegetation growing on, under, or next to structures; the types of artifacts that may be encountered when working around historic structures; and the requirement that trees and shrubs be cut off at ground level and not uprooted.

The crews will be instructed to not disturb artifacts and to immediately contact the supervisor if artifacts are found. Sensitive areas will be identified to the crew to minimize foot traffic and dragging of brush over these sites. Tree felling will be accomplished in such a way that trees would be dropped in directions away from identified sites. Vehicles in front country areas will remain on paved or designated roadways in order to prevent driving over cultural features. This is particularly important at C-Camp where historic tent foundations are present. A cultural monitor will be requested if historic properties are discovered or unanticipated effects on historic properties are found.

Removal Techniques

Beyond routine and accepted techniques per arboricultural standards, removal of trees will be accomplished in a manner that minimizes disturbance of administrative and public activities. Removal operations will generally occur during normal business hours. Re-routing traffic and controlling access to removal areas will be the responsibility of the involved contractor/park staff. All necessary safety precautions will be taken to protect the public, staff and contracted workers.

Trees designated for removal will ideally be felled with the stump grubbed or cut flush with the existing grade, hashed with saw cuts, and covered with dirt and forest floor debris. This will facilitate recovery of groundcover and will be consistent with the treatment and appearance of cultural landscape that is to be interpreted. Felling should be accomplished in a manner that minimizes leaving permanent markings or indentations on any surface of the ground. At remote sites logs will be bucked up, allowed to dry, and used as firewood at patrol cabins. Larger tree trunks may be saved for renovation of historic structures. Logs from trees at residences may be bucked up and used as firewood by the residents.

Successional changes at treated sites will continue through the selection of seedlings and saplings that will not be removed from Zones 2 and 3. Identified seedlings/saplings will be permitted to grow and develop naturally to replace trees and shrubs that die off.

Park residents are encouraged to discuss the details of fuel removal with fire management staff to assure that both fire protection and aesthetic concerns are addressed when fuel reduction decisions are made. The Park Superintendent will retain the authority to determine if or extent of fuel management treatments if conflicts occur .

Limb and Branch Pruning

Trees may require pruning of lower limbs, damaged or imbalanced branches, previously cut knobs, and sucker growth. Clean cuts will be kept close to the trunk or connecting branch. Trees that may be retained within the 30-foot clear zone of a building will be limbed up a minimum of 6 feet from the ground. Limbing of trees between 30 and 100 feet away from a building will be evaluated on an individual basis; however, a rule of thumb is the closer to the building, the higher the limbing. Some snags may remain on the outer edges of Zone 3 as long as they do not pose a safety or fire hazard. Snags will not remain in Zone 2 since they are an ideal source of burning embers that pose too great a threat to firefighters and structures.

Burning

Fire prevention measures ~~as~~ identified in a certified burn plan will be taken to assure that a wildland fire is not ignited by burning of shrub and branch debris. The burn plan will address

appropriate weather conditions, adequate clearing around debris piles, limiting the number of piles that are burning at one time, and presence of trained personnel with appropriate fire fighting apparatus and personal protective equipment.

Where feasible, shrubs and branches may be scattered rather than burned if the surrounding fuel loading is not adversely affected by additional bio-debris and fire hazard is not increased. Shrubs and branches, if burned, will be piled in locations distant enough from structure areas to prevent damage to the structures. Shrub and branch piles may be burned between mid-August and mid-May, during a time when visitation is the lowest and fire danger is low. Burning will be done in compliance with National Park Service policies and Alaska Department of Conservation Open Burning regulations.

Clean Up

All tree, limb, and branch debris will be removed from non-paved areas. Additionally, the aforementioned materials plus twigs, leaves, needles, chips, and other organics will be removed from all paved areas, rooftops, and site furnishings. Ruts, depressions, or other impressions to the natural grade will be filled, raked, and, if necessary, mulched or seeded. All refuse generated or brought on site in the form of packaging, equipment parts, or worker supplies will be removed from the park. No maintenance on equipment engines/motors would be allowed in backcountry areas.

Periodic Maintenance

Park staff responsible for front country landscape maintenance will be instructed on the requirements of the cultural landscape plan and the fire management plan prior to every growing season. In each case, specific criteria for evaluation of vegetation will be adequately outlined so that any staff person, whether permanent or seasonal, can properly inspect, maintain, care for, and if necessary, repair damage to vegetation.

Sites outside the Headquarters Historic District will be revisited two years following fuel removal. An evaluation of limb, sapling and shrub re-growth will occur and a determination will be made regarding removal cycles. It is generally anticipated that re-treatment may be necessary roughly every two to five years. In the Denali Wilderness, only non-motorized hand tools will be used for follow up treatments, unless there is a fire emergency. Hand tools may include hand saws, scythes, axes and pruning tools. In non-wilderness backcountry areas power hand tools may be used. Reduction in the height and density of herbaceous plants, grasses, and small shrubs may be done annually via mowing in developed areas.

Special Considerations for Headquarters Historic District

The goal for this area is to attain simultaneously the goals for cultural landscape rehabilitation and FireWise landscaping. The guidelines listed above for On-Site Evaluation, Site Access, Use of Tools, Protection of Resources, Removal Techniques, Limb and Branch Pruning, Burning, Clean Up, and Periodic Maintenance will be followed.

Annual maintenance will consist of an onsite visual review of the historic district to determine the extent of vegetative management required. Areas designated for cleared overstory and thinned understory may receive regular mowings during the season and will be inspected for watering, re-seeding, and fertilization. Areas designated for thinned overstory and understory will be culled of most emerging plants in those categories.

Routine maintenance on remaining overstory and understory vegetation includes pruning according to cultural landscape/fire management standards, and removal of damaged limbs or branches. As determined by the cultural landscape and fire management staff, periodic maintenance may be required to retain essential landscape elements or landscape treatments in the historic district. For example, areas of thinned overstory and understory vegetation could be mowed on a rotational schedule to ensure vigorous yet controlled growth of grasses and low shrubs. Plans for each effort will be updated to reflect changes in National Park Service policies, park planning documents, and current maintenance technologies.

Park	UNIT_ID	Name		Priority (high or low)	Order	2010	2011	2012	2013	2014
AK-DEP		HQ Historic District	WUI	High	1	/Burn/Maintena	/Burn/Maintena	/Burn/Maintenale	/Burn/Maintenanle	/Burn/Maintenan
AK-DEP		HQ Residential	WUI	High	2	/Burn/Maintena	/Burn/Maintena	/Burn/Maintenale	/Burn/Maintenanle	/Burn/Maintenan
AK-DEP		Ccamp and Admin. Structures	WUI	High	3			Evaluate	Maintenance	le/Burn/Maintenan
AK-DEP		Toklat Road Camp	WUI	High	4		Evaluate	Maintenance		
AK-DEP		Rock House	WUI	High	5	Evaluate	Maintenance			
AK-DEP		Visitor Center Area	WUI	High	6	Evaluate	Cut/Pile			
AK-DEP		MSLC	WUI	High	7	Evaluate	Maintenance			
AK-DEP		Wilderness Access Center	WUI	High	8	Evaluate	Maintenance			
AK-DEP		HQ/Ccamp Water Facility	WUI	High	9			Evaluate		
AK-DEP		MSLC Water Facility	WUI	High	10		Evaluation/Maintenance			
AK-DEP		Frontcountry Critical FMU	WUI	High		Planning	Planning	Planning	EA Development	Unit 1 (20 Acres)
AK-DEP	DENA-005	New Thorofare River Patrol Cabin	Non-WUI	High		Cut/Pile	Burn			
AK-DEP	DENA-040	Parker's Cabin	Non-WUI	High				Burn		
AK-DEP	DENA-082	Crooked Creek	Non-WUI	High	11			Cut/Pile/Burn		
AK-DEP	DENA-074	Collins (12 mile slough)	Non-WUI	High	12			Evaluate		
AK-DEP	DENA-076	Collins Slippery Creek Cabin	Non-WUI	High	13					Evaluate
AK-DEP	DENA-077	Carlson's Slippery Cabin	Non-WUI	High	14					Evaluate
AK-DEP	DENA-095	Birch Creek Cabin	Non-WUI	High	15			Evaluate	Maintenance	
AK-DEP	DENA-241	New Birch Creek Cabin	Non-WUI	High	16	Burn				
AK-DEP	DENA-199	Barb Cabin	Non-WUI	High	17		Evaluate	Cut/Pile	Burn	
AK-DEP	DENA-009	Moose Creek Patrol Cabin	Non-WUI	High	18		Finish Cut/Pile/Burn			
AK-DEP	DENA-127	Lower East Fork Patrol Cabin	Non-WUI	High	20				Evaluate	Maintenance
AK-DEP	DENA-081	Lower Toklat Patrol Cabin	Non-WUI	High	21					Evaluate
AK-DEP	DENA-126	Sushana Patrol Cabin	Non-WUI	High	22				Evaluate	Maintenance
AK-DEP	DENA-149	Stampede Mine	Non-WUI	High	23			Evaluate		
AK-DEP	DENA-110	Riley Creek Patrol Cabin	Non-WUI	High	25					
AK-DEP	DENA-100	Lower Windy Creek Patrol Cabin	Non-WUI	High	27	laintenance/Burn				
AK-DEP	DENA-101	Upper Windy Patrol Cabin	Non-WUI	High	40					
AK-DEP	DENA-202	Pearson Cabin	WUI	High	30					
AK-DEP	DENA-122	Lower Savage Patrol Cabin	Non-WUI	High	31		Burn			
AK-DEP	DENA-207	Igloo Patrol Cabin	Non-WUI	High	32					
AK-LCP	LACL 271	NPS Former Field Office	WUI	High	1	Evaluate				Cut/Pile
AK-LCP	LACL 272	NPS Duplex	WUI	High	2	Evaluate				Cut/Pile
AK-LCP	LACL 074	Bly House (The Point)	WUI	High	3		Evaluate	Maintenance		
AK-LCP	LACL 218	Snipe Lake Cabin	Non-WUI	High	4	Evaluate		Cut/Pile	Burn	
AK-LCP	LACL 212	Telaquana Ranger Cabin	Non-WUI	High	5	Evaluate		Cut/Pile	Burn	
AK-LCP	LACL 155	Hermit Lake	Non-WUI	High	6	Evaluate			Cut/Pile	Burn
AK-LCP	LACL 203	Lower Twin Ranger Cabin	Non-WUI	High	7	Evaluate			Cut/Pile	Burn
AK-LCP	LACL 208	Dick Proenneke	Non-WUI	High	8	Evaluate				
AK-LCP	LACL 216	Igitna River - Kenibuna Lake Cabin	Non-WUI	High	9	Evaluate				
AK-LCP		Priest Rock Cabin	Non-WUI	High		Cut/Pile	Burn			
AK-LCP	LACL 079	Woodward Cabin	WUI	High		Cut/Pile	Burn			
AK-WEAR	KOVA-001	Onion Portage Ranger Cabin/Giddings Cabin	Non-WUI	High	1	Burn				
AK-WEAR	BELA-005	Fairhaven Ditch Cabin #1	Non-WUI	High	2		Cut/Pile	Burn		Evaluate
AK-WEAR	BELA-006	Fairhaven Ditch Cabin #2 & #3	Non-WUI	High	3		Cut/Pile	Burn		
AK-WEAR	KOVA-022	Kantner Cabin 1	Non-WUI	High	4					
AK-WEAR	KOVA-023	Kantner Cabin 2	Non-WUI	High	5					
AK-WEAR	KOVA-024	Kantner Cabin 3	Non-WUI	High	6					
AK-WEAR	NOAT-002	Kelly River Ranger Station	Non-WUI	High	7	Burn				Evaluate
AK-WEAR	NOAT-048	Nakolik Shelter Cabin (Wolf Control Cabin)	Non-WUI	High	8					Cut/Pile
AK-WEAR	KOVA-013	Portage Shelter Cabin	Non-WUI	High	9					Cut/Pile

APPENDIX G. – ALASKA NPS STRUCTURE PROTECTION PROCEDURES

Alaska NPS Structure Protection Procedures

The following procedures provide guidance to NPS Park Management, Alaska Fire Service (AFS), the Alaska Division of Forestry (DOF), the USDA Forest Service (FS) and Incident Management Teams concerning structure protection priorities for wildland fire suppression activities on lands managed by the National Park Service (NPS) in Alaska. These procedures does not pertain to non-federal lands within NPS unit boundaries. This document was prepared in cooperation with regional and park wildland fire, resource management and cultural resource management staffs.

1. The safety of the public and fire suppression personnel is the first priority in fire suppression/structure protection decisions and implementation. Regardless of the protection status of a structure, if humans are present at a structure threatened by wildland fire, human safety is the priority. Firefighter safety will not be compromised for structure protection.

2. The priority of structure protection is determined by the selected fire management options (Alaska Interagency Wildland Fire Management Plan, 1998) and dependent upon the availability of resources. Firefighting resources may not be available or able to safely access the structure(s) identified for protection.

3. The appropriate laws, regulations and policies in conjunction with General Management and Resource Management plan(s) will be referenced for decisions regarding protection of structures.

4. The determination of the wildland fire management options for lands and resources managed by the NPS is the responsibility of NPS park management in conjunction with NPS wildland fire and park personnel. The NPS will determine the fire management option for structures on NPS managed lands using the following criteria:

    a. The structure(s) is a primary domicile (Critical Management Option).
    b. National Historic Landmarks that may be threatened by wildland fire (Critical Management Option).
    c. The structure has been determined eligible for or is on the National Register of Historic Places, has structural integrity (e.g. intact roof and walls, a reasonable probability for defense), is at potential risk from wildland fire and has been identified for or undergoing routine maintenance/restoration (Full Management Option).
    d. NPS administrative (e.g. patrol cabin) or public use structures – public funds expended to construct or maintain (Full Management Option).
    e. The use of the structure is provided for under NPS permit or an approved Mining Plan of Operations (Full Management Option).
    f. The structure is undergoing an eligibility or management assessment and has structural integrity (e.g. intact roof and walls, a reasonable probability for defense) or is involved in a legal process (Full Management Option).

5. Unauthorized structures will not be protected.

6. In a wildfire situation, if information on the fire map atlas is not sufficient, the suppression organization fire management officer will contact the appropriate NPS Area or Regional Fire Management Officer for a decision.

7. If in a wildfire situation, an undesignated structure is discovered on NPS lands, appropriate NPS Area or Regional Fire Management Officer will be notified. NPS will determine fire management option for the structure using criteria listed in #4. If the structure has intact roofs and walls, it will be afforded protection commensurate with Full Management Option until a final determination is reached.

8. NPS wildland fire and park personnel will initiate the actions to reduce hazardous fuels adjacent to structures on NPS managed lands that have been identified for protection. The NPS will clarify hazardous fuel reduction responsibilities of NPS permit holders within their permit stipulations. The NPS may assist permit holders with fuel reduction activities. The NPS also may assist non-federal entities with fuel reduction activities that are mutually beneficial to both parties.

9. The NPS wildland fire management officers are responsible for providing current NPS fire management option selections to the suppression organizations, ensuring changes are incorporated into the map atlas, and maintaining the NPS wildland fire management databases. The fire management options for structures will be recorded on the fire map atlas. Structures that do not warrant protection will be identified as "non-sensitive" on the map atlas. Changes in wildland fire management options and updating of map atlas should be part of the annual fire management plan review.

10. Any fire operations that included structure protection actions in the preceding year will be evaluated to determine if the fire management category is appropriate and if the operations were safely and efficiently conducted.

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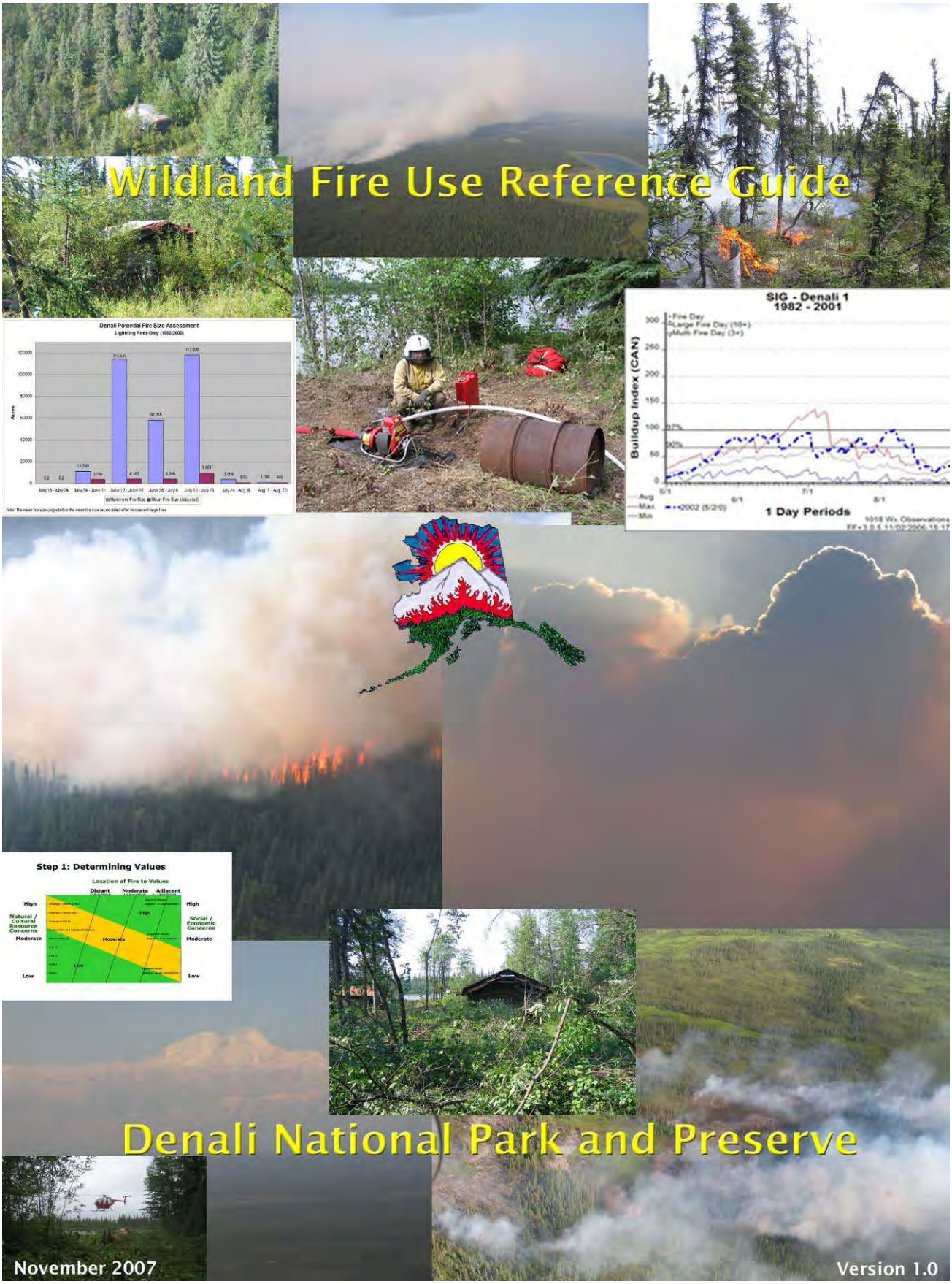
APPENDIX H. – WILDLAND FIRE USE REFERENCE GUIDE



Forward

The Alaska Western Area Fire Management program (AWAFM) supports (Denali and Lake Clark National Park and Preserves, Bering Land Bridge and Noatak National Preserves, Kobuk Valley National Park and Cape Krusenstern National Monument, approximately 22.8 million acres with 14.7 million burnable acres. The fire-dependent landscape is large forest and tundra ecosystems with resources requiring protection usually widely dispersed. Since 1982 many fires, including large fires (+20,000 acres), have been managed to allow fire to fulfill its natural role as an agent of change. Since most fires have few resources at risk, require little on the ground actions and park-specific Fire Management Plans have been completed – they are managed as Wildland Fire Use following the Wildland Fire Use Implementation Procedures Reference Guide. In 2005, the AWAFM managed multiple Wildland fire use fires and completed numerous Wildland Fire Implementation Plans. During and after the season it was recognized by NPS fire management staff that a standardized risk assessment process and procedures specific to Alaska's fire environment was needed. Denali National Park & Preserve is the prototype for developing a park-specific "Fire Use Reference Guide" in the Alaska Region. This guide incorporates Alaska and Denali specific issues and concerns, and provides a consistent method for Wildland fire use practitioners in Denali to assess the factors associated with Wildland Fire Relative Risk, Planning Needs and the Fire Manager Decision Charts. The guide was developed though an analysis of fire history records, historical weather, Canadian Forest Fire Danger Rating System indices, MODIS and current political, social and management issues specific to Denali National Park & Preserve. Paramount in the development of the guide was to ensure that the planning level (i.e. Stage I, Stage II or Stage III), fire staff work load, and the Fire Use Manager Decisions are commensurate with the Wildland Fire Relative Risk. An additional guiding principle in the development of this reference guide was to ensure that all fire(s) with high Relative Risk are identified and receive the appropriate planning and implementation. The guide will also assist Fire Use Managers to consistently apply the planning process with values appropriate to Alaska - values that may be very different from those previously encountered by Fire Use Managers not familiar with Denali.

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Appendix A: Formulation of Alaska Values **20**

Introduction

This guide is intended to be used in conjunction with the Wildland Fire Use Implementation Procedures Reference Guide. Remember, this is only a guide, other procedures may be used in the assessment process if they better reflect the values, hazards and probability and ultimate relative risk in the fire assessment. The format of this guide follows the steps outlined in the Wildland Fire Use Implementation Procedures Reference Guide Appendix A: Wildland Fire Implementation Plan.

There are nine factors (i.e. Natural/Cultural and Resource Concerns, Fire Behavior, ...) to evaluate during the Wildland Fire Relative Risk Assessment process. Denali National Park & Preserve specific information/instruction is provided for six of the nine factors. Following the Wildland Fire Relative Risk Assessment process two additional fire characteristics (Potential Fire Duration and Fire Activity) are evaluated for the Planning Needs Assessment and the Fire Use Manager Decisions Charts. Denali specific information/instruction is provided for potential fire duration. The Denali specific information/instruction is provided under the written description for each of the factors. Further guidance is given in the figures provided with the text.

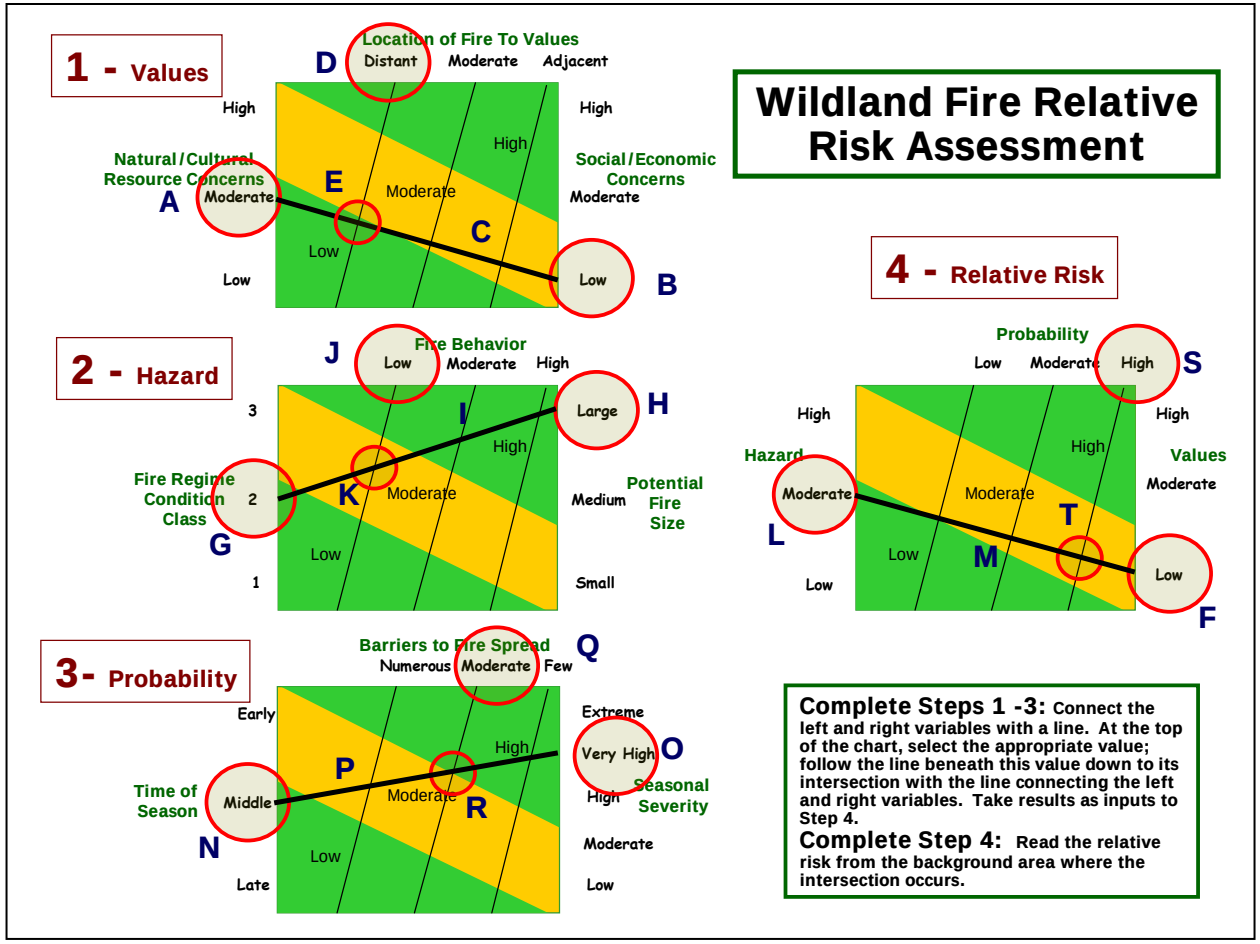
To complete the Wildland Fire Relative Risk Assessment, Planning Needs Assessment and the Fire Use Manager Decisions process follow the steps provided in *Figure 1* and reference the following pages for descriptive information.

The accompanying *Appendix A: Formulation of Alaska Values* provides an outline of the procedures used in the development of the values and threshold used in this Fire Use Reference Guide.

Figure 1: Step by Step Instructions for Completing the Wildland Fire Relative Risk Assessment

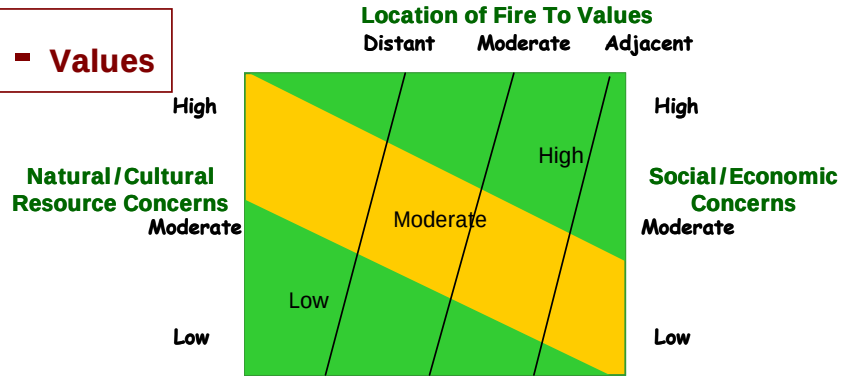
A	Step 1	Locate Natural/Cultural Resource Concern level
B	Step 1	Locate Social/Economic Concern level
C	Step 1	Draw line connecting left and right variables
D	Step 1	Locate Location of Fire to Values level
E	Step 1	Follow interior line down to intersection with line connecting left and right variables, locate Value Assessment output (Low, Moderate, High)
F	Step 4	Take Step 1 - Value Assessment output to Step 4 as Value input
G	Step 2	Locate Fire regime condition class level
H	Step 2	Locate Potential Fire Size level
I	Step 2	Draw line connecting left and right variables
J	Step 2	Locate Fire Behavior level
K	Step 2	Follow interior line down to intersection with line connecting left and right variables, locate Hazard Assessment output (Low, Moderate, High)
L	Step 4	Take Step 2 - Hazard assessment output to Step 4 as Hazard input
M	Step 4	Draw line connecting Value and Hazard levels
N	Step 3	Locate Time of Season level
O	Step 3	Locate Seasonal Severity level
P	Step 3	Draw line connecting left and right variables
Q	Step 3	Locate Barriers to Fire Spread level
R	Step 3	Follow interior line down to intersection with line connecting left and right variables, locate Probability Assessment output (Low, Moderate, High)
S	Step 4	Take Step 3 – Probability assessment output to Step 4 as Probability input
T	Step 4	Follow interior line down to intersection with line connecting left and right variables, locate Relative Risk Assessment (Low, Moderate, High)

Step-By-Step Instructions for Completing the Wildland Fire Relative Risk Assessment

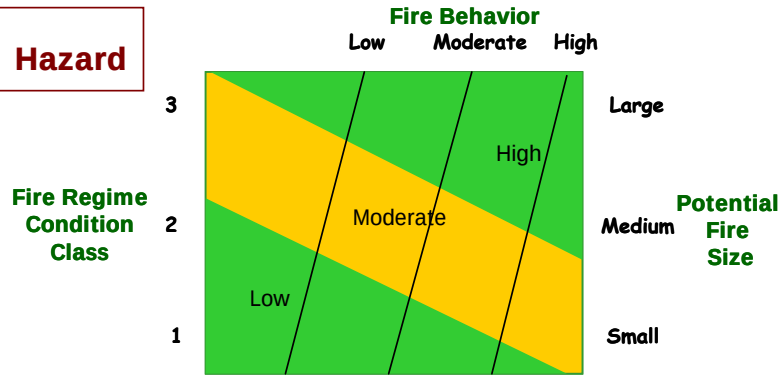


Wildland Fire Relative Risk Assessment

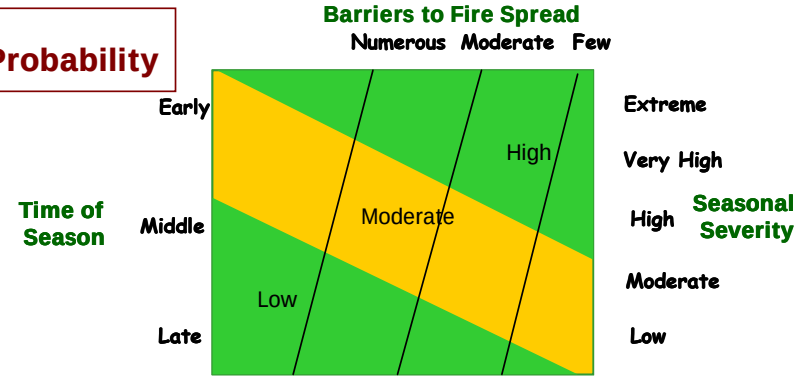
1 - Values



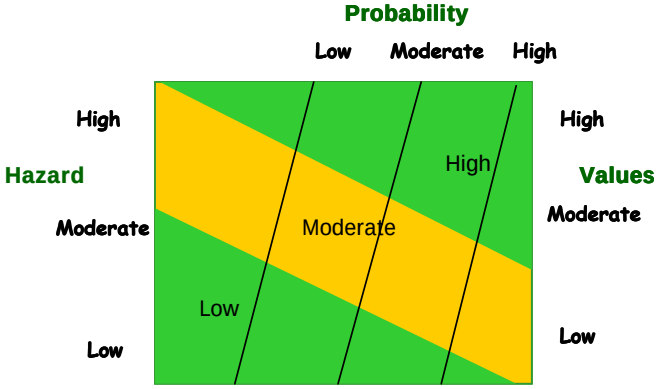
2 - Hazard



3- Probability



4 - Relative Risk



Complete Steps 1 -3: Connect the left and right variables with a line. At the top of the chart, select the appropriate value; follow the line beneath this value down to its intersection with the line connecting the left and right variables. Take results as inputs to Step 4.

Complete Step 4: Read the relative risk from the background area where the intersection occurs.

Figure 2: Black Wildland Fire Relative Risk Assessment Charts

Step 1: Determining Values

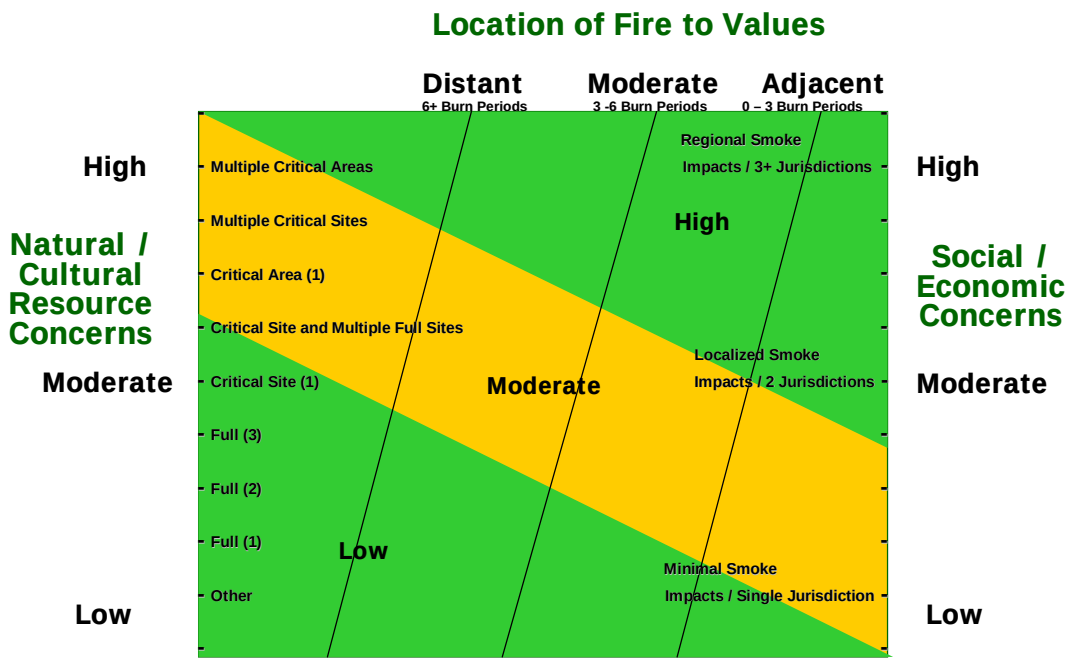


Figure 3: Values Assessment with Denali Specific Values

PART 1: VALUE ASSESSMENT: Values are those ecologic, social, and economic effects that could be lost or damaged because of a fire. Ecologic values consist of vegetation, wildlife species and their habitat, air and water quality, soil productivity, and other ecologic functions. Social effects can include life, cultural and historical resources, natural resources, artifacts, sacred sites. Economic values make up things like property and infrastructure, economically valuable natural and cultural resources, recreation, and tourism opportunities. This assessment area allows opportunity for the local agency administrator to identify particular local concerns. These concerns may be identified in the fire management plan or other planning documents.

NATURAL/CULTURAL RESOURCE CONCERNS - key resources potentially affected by the fire. Typical resources in Denali that are affected by fire include historical, administrative and private structures and areas that are designated for a full or critical fire suppression management option. However other key resources, treated in an additive fashion to the aforementioned key resources, could include, but are not limited to habitat or populations of threatened, endangered, or sensitive species, water quality, erosion concerns, and invasive species.

Denali Information/Instructions: Natural and Cultural sites are pre-identified with site protection variables (i.e., Critical, Full, Non-Sensitive or Unknown) and site characteristics. These are available to the fire management staff in the following forms: (1) Hardcopy site information is available through the cultural resources staff and (2) Geospatial site protection information is maintained of the Park and Preserve network drive and maintained in the regional spatial (GIS) dataset. The Fire Management Option Areas are defined in the Denali National Park & Preserve Fire Management Plan based on the Alaska Interagency Fire Management Plan and is available in the following locations: Geospatial Fire Management Option Areas is maintained of the Park and Preserve network drive and maintained in the regional spatial (GIS) dataset. *Note: The Fire Management Option Areas are reviewed and changes are made annually, ensure assessments are made on the latest information.*

Low	*Moderate*	*High*
Resource concerns are few, no sites are threatened and generally do not conflict with management of the fire. Mitigation measures are effective.	*A critical site concern exists, but there is little conflict with management of the fire. Mitigation measures are generally effective.*	*Multiple critical area concerns exist, some of which may conflict with management of the fire. The effectiveness of needed mitigation measures is not well established.*

SOCIAL/ECONOMIC CONCERNS - the risk of the fire, or effects of the fire, impacting the social or economic concerns of an individual, business, community or other stakeholder involved with or affected by the fire. Social concerns may include degree of support for the Wildland Fire Use program or resulting fire effects, potential consequences to other fire management jurisdictions, impacts to tribal subsistence or gathering of natural resources, air quality regulatory requirements and public tolerance of smoke. Infrastructure impacts may be costs to repair or replace sediment catchments, wildlife guzzlers, corrals, roads, culverts, power lines, domestic water supply intakes, and similar items. In addition fires are often managed over large areas with more than one suppression agency and multiple land owners. The goals/objectives amongst the various land owners may vary.

Denali Information/Instructions: The categories defined in the table below provide a starting point for the Social/Economic Concerns Assessment. Concerns, in addition to those expressed above include: Complaints, agency administrator's assessments and other special concerns. All concerns listed above are treated in an additive nature. For example: In the social/economics concerns analysis the fire manager identifies that the fire(s) is contributing to localized smoke impacts, the fire has moved off of NPS administered land onto BLM administered lands (i.e. Two jurisdictions) and the park and preserve has received smoke complaints from a few local residents and visitors. The localized smoke impacts and two jurisdictions indicate a "Moderate" concern plus an increase commensurate with the level of additional concern due to the "smoke complaints", *See Figure 4*)

Figure 4: Example of determining Social/Economic Concern Values

Low	*Moderate*	*High*
The fire is expected to remain within a single jurisdiction or agreements are in place to allow the fire to move across several jurisdictions. Few structures or business ventures are potentially affected by the fire. There are few impacts to recreation and tourism. Minimal smoke impacts exist.	*The fire involves two jurisdictions, cooperator, or special interest group and additional agreements need to be developed if the fire is expected to move across additional jurisdictions. Some business ventures have been affected by the fire. Smoke impacts are localized.*	*The fire involves at least three jurisdictions, cooperators, and special interest groups and agreements requiring significant negotiation need to be developed if the fire is expected to move across additional jurisdictions. Smoke impacts are regional and may become a concern for higher level air quality regulatory agencies.*

LOCATION OF FIRE TO VALUES - the location of the fire from values is expressed in burn periods. An Expected Burn Period ($BP_{(Exp)}$) is defined by the observed or expected number of miles the fire(s) can travel. As mitigations actions occur and the value or site is no longer deemed at risk (i.e. the fire has burned passed the site and the area around the value/site is secured) the value/site/area will not be considered in the location of fire to values analysis.

Denali Information/Instructions: The Burn Period (BP) has a historic range of 0 ($BP_{(Min)}$) to 6 ($BP_{(Max)}$) miles/day with a majority of the days burning less then ½ mile/day. The Expected Burn Period ($BP_{(Exp)}$) will be determined based on current observation of fire behavior parameters, current and expected weather, continuity of fuels and/or computer modeling. The $BP_{(Exp)}$ can be further refined based on CFFDRS indices (particularly the Initial Spread Index (ISI)), historical observations within specific time periods and/or weather conditions.

Note: The two largest fires on record occurred in 2002 and 2005. Both fires experienced a 1 to 2 day period of rapid growth under a similar weather event (Daily average winds 10+ MPH where hourly winds regularly exceeded 12 mph with less than 30 RH). If these conditions are predicted or anticipated the $BP_{(Exp)} = BP_{(Max)} = 6$ miles/day.

Distant	*Moderate*	*Adjacent*
Fire location is greater than six burn periods to values to be protected or fire is located where it is highly unlikely that it would reach the values.	*Fire location is 3 to 6 burn periods to values. Location is such that, based on historical data, fire could potentially reach the values but will take multiple burning periods and sustained fire activity to reach the values.*	*Fire location is 0 to 2 burn periods to values. Without mitigation actions, fire will be expected to reach the values.*

Step 2: Determining Hazard

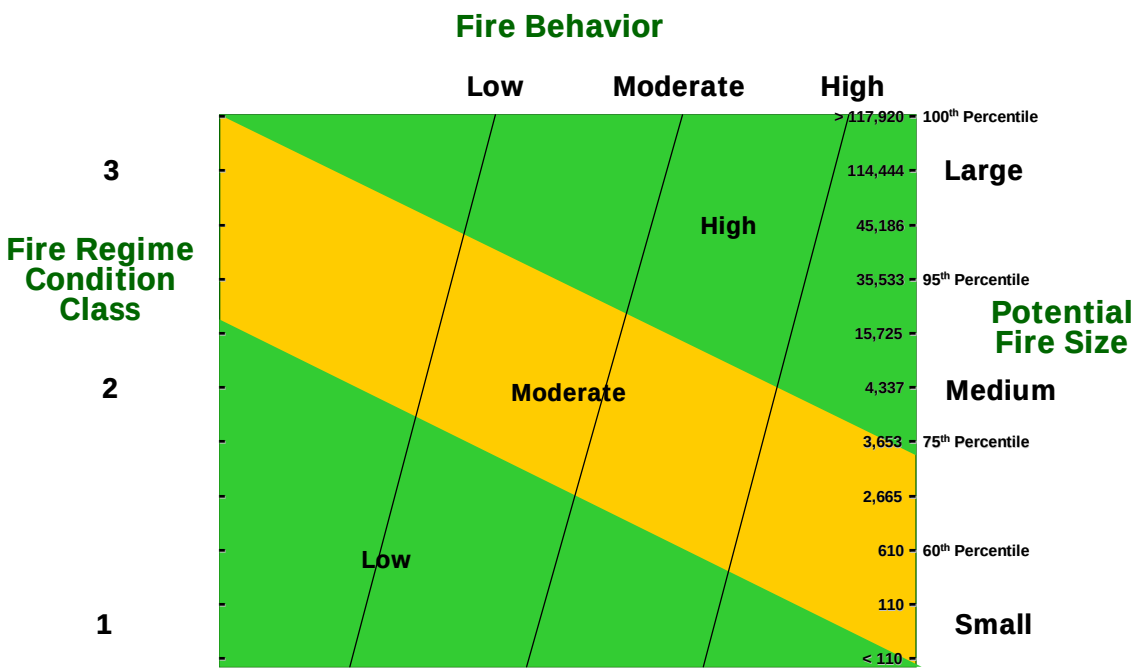


Figure 5: Hazard Assessment with Denali Specific Values

PART 2: HAZARD ASSESSMENT: The hazard in wildland fire is made up of the conditions under which it occurs and exists, its ability to spread and circulate, the intensity and severity it may present, and its spatial extent.

CURRENT FIRE BEHAVIOR – the current fire behavior or that most recently observed. Changing fire behavior is addressed through repeated completion of the Periodic Fire Assessment.

Low	*Moderate*	*High*
Short duration flaming front with occasional torching. Fuels are uniform and fire behavior can be easily predicted and tactics implemented.	*Short range spotting occurring. Moderate rates of spread are expected with mainly surface fire and torching. Fuels and terrain are varied but don't pose significant problems in holding actions.*	*Long range spotting > ¼ mile. Extreme rates of spread, and crown fire activity are possible. Fuels, elevation, and topography vary throughout the fire area creating high resistance to control.*

FIRE REGIME CONDITION CLASS – a measure of ecological functions at risk based on changes in vegetation.

Denali Information/Instructions: Wildland Land Fire Use is considered appropriate in areas classified as Fire Regime Condition Class 1. To date no areas in Denali have been classified either Fire Regime Condition Class 2 or 3.

1	*2*	*3*
Vegetative composition and structure are resilient and key components are at low risk of loss. Few, if any, fire return intervals have been missed and fuel complexes are similar to historic levels.	***Both the composition and structure of vegetation has shifted towards conditions that are less resilient and more at risk of loss. Some fire return intervals have been missed, stand structure and composition, and fuel complexes have been altered and present potential for fires of severity and intensity levels in excess of historic levels.***	***The highly altered composition and structure of the vegetation predisposes the landscape to fire effects well outside the range of historic variability, potentially producing changed fire environments never before measured.***

POTENTIAL FIRE SIZE - the potential fire size by the end of the season in comparison to historical fire occurrence.

Denali Information/Instructions: The potential fire size analysis is a four step process as follows:

Step 1. Determine the fire start date.

Step 2. Select the maximum and average fires size values in the time period of the start of the fire from *Figure 6* below.

Step 3. From the Canadian Forest Fire Danger Rating System determine how the indices are tracking compared to high, low and average fire years, review seasonal forecasts, departure from greenness and other pertinent seasonal information.

Step 4. Select either the average or maximum fire size value, or extrapolate between the two values based on how the indices are tracking or other environmental factors such as state of greenness. Plot this value on the scale provided on the figure at the beginning of this section.

For example: If a fire is found and the start date is declared to be June 21st the range of values for the potential fire size will be between the historical average fire size and maximum fire size for that time 4,160 and 114,443 acres respectively. If the CFFDRS indices (Primarily the BUI, DMC and DC) are tracking near or below normal the potential fire size used will be at or near the historical average fire size of 4,160 acres. However, if the indices are tracking near maximum historical values then the potential fire size used will be near historical maximum fire size of 114,443 acres. Note: The CFFDRS indices may be used in conjunction with other information for determining potential fire size. For instance if a sustained wet weather system is predicted to remain in place for the foreseeable future in the example above where the indices are tracking near maximum the potential fire size would be below the 114,443 acres. In this instance a reasonable potential fire size, depending on the duration of the “wet weather system” and predicted future trends, could be approximately 60,000 acres.

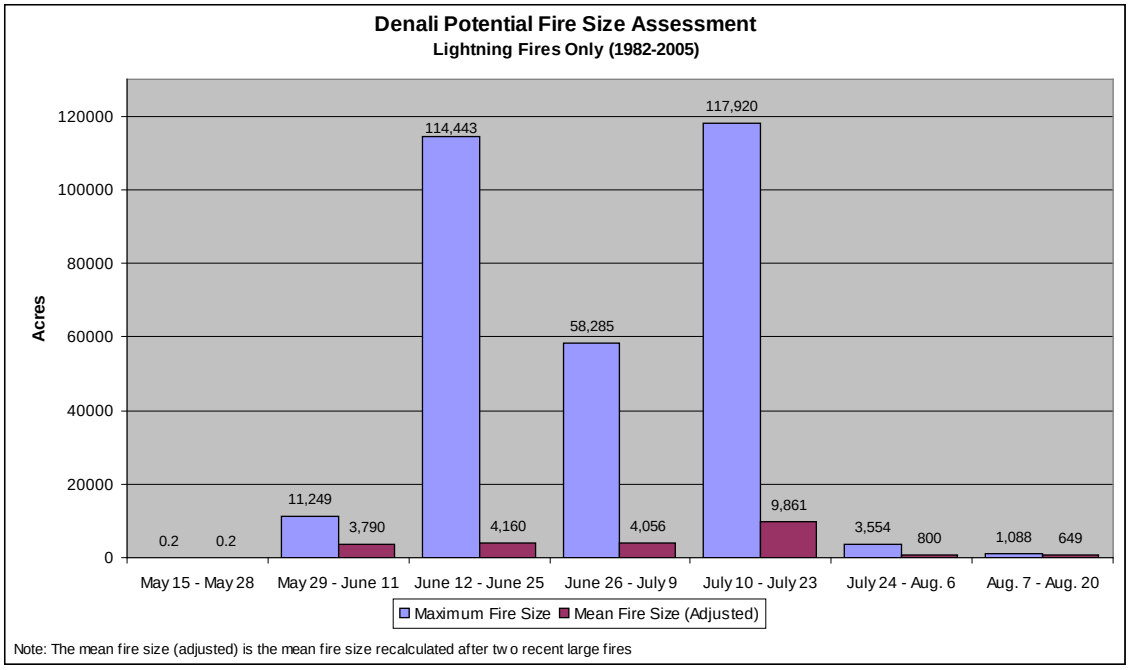


Figure 6: Potential Fire Size Assessment (Mean and Maximum Values). Mean fire size values are calculated subtracting the two largest fires on record. If weather conditions warrant, the two largest fires would be added back into the mean fire size calculation for analysis purposes.

Small	*Medium*	*Large*
Fire size is expected to be small for the dominant fuel type involved or approximately 110 acres.	*Fire size is expected to be in the mid-range for the dominant fuel type involved or approximately 4,500 acres.*	*Fire size is expected to be large for the dominant fuel type involved. Or approximately 100,000 acres.*

Step 3: Determining Probability

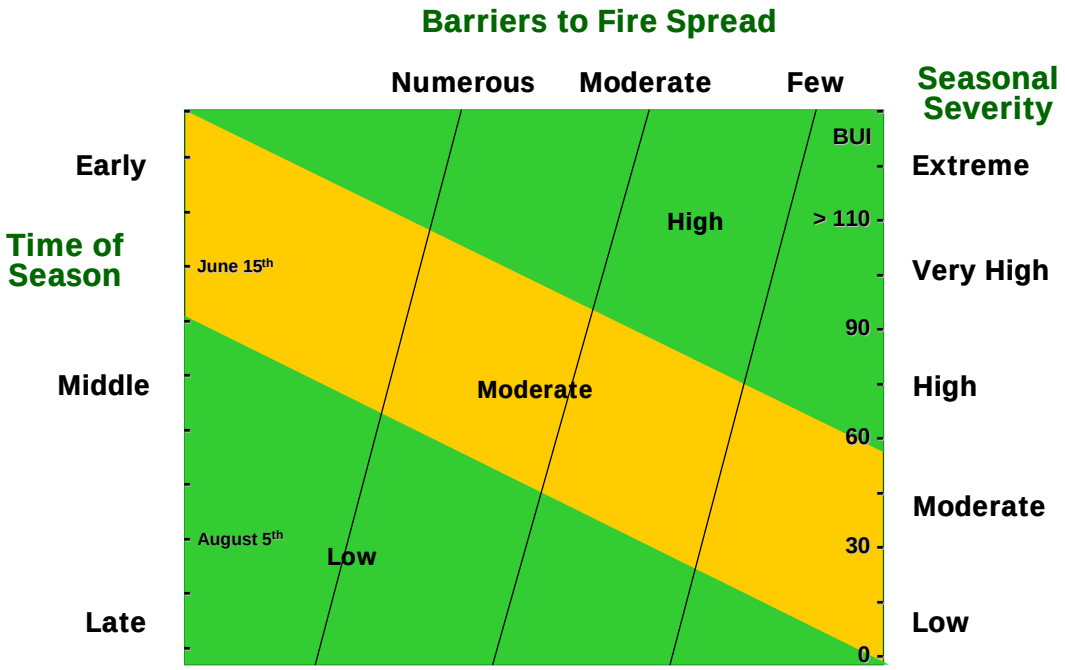


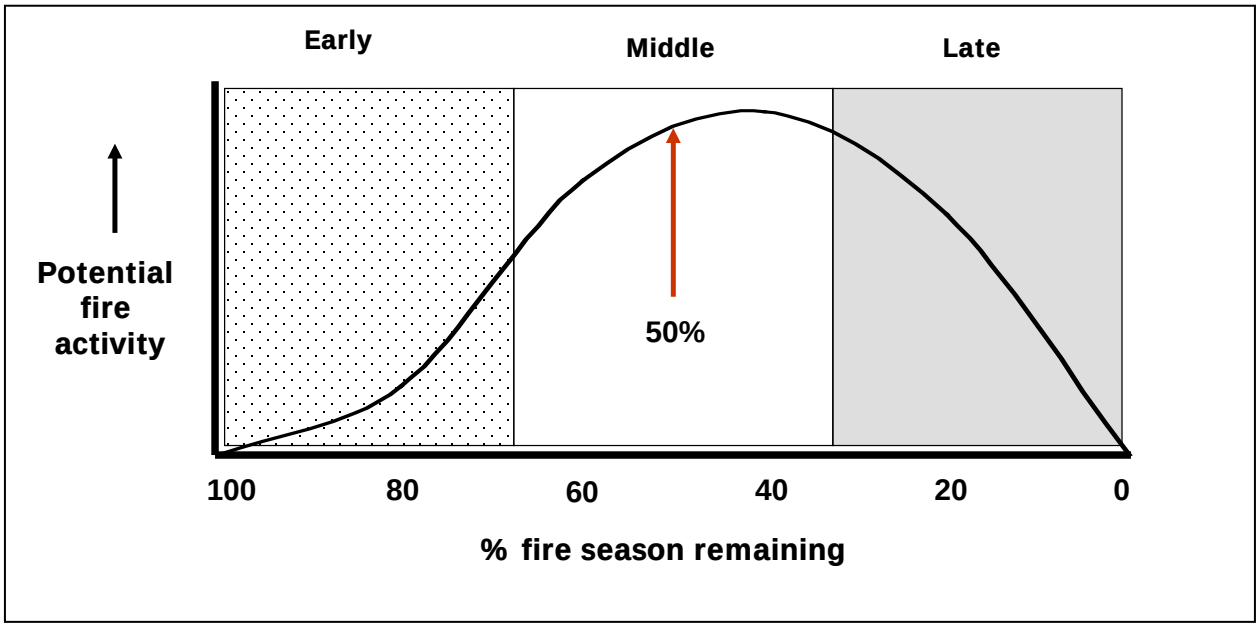
Figure 7: Probability Assessment with Denali Specific Values

PART 3: PROBABILITY ASSESSMENT: Probability refers to the likelihood of a fire becoming an active event having potential to adversely affect values.

TIME OF SEASON - the current time in relation to the historical fire season. The chart below the guidelines reinforces the importance of time of season. During the early part of the fire season, the peak of burning activity is still to come, thus the fire could present substantial variation in behavior and activity. In the middle of the season, the peak of burning activity may or may not have occurred while in the late part of the season, the peak of fire activity generally has occurred and managers can reasonably expect diminishing fire activity and behavior as time progresses. As the amount of fire season remaining decreases or as the time of season progresses from early to late, management concerns and issues associated with potential fire activity decrease.

Denali Information/Instructions: The typical fire season in Denali starts in late May and ends in mid August to late September. An analysis of the available MODIS imagery indicates that little growth occurs following August 5th. Therefore fires starts prior and up to June 15 are considered early season and ongoing fires on August 5th and later are considered late season. July 10th is the peak of the season with the middle season defined as June 16th – August 4th. The values for time of season may be modified if seasonal predictions and/or CFFDRS trend analysis indicates a departure from normal.

Early	*Middle*	*Late*
The current date is in the early portion of the historic fire season, at least 2/3 of the established fire season remains and the peak of burning activity is still to come. Denali – on or before June 15th.	*The current date is in the middle of the historic fire season, at least 1/3 of that period has passed and no less than 1/3 remains. The peak burning activity period either has occurred, is occurring now, or will occur very soon. Denali Peak– July 10th. Denali – June 16th – August 4th.*	*The current date is in the latter part of the historic fire season. At least 2/3 of the historic period has passed, the peak burning activity period has occurred, and the probability of a season-ending or fire-ending event is increasing quickly. Denali – on or after August 5th.*



SEASONAL SEVERITY - a measure of the potential burning conditions as expressed by factors such as ERC, drought status, live fuel moistures, dead fuels moistures, soil moisture, stream discharge, and similar types of measures.

Denali Information/Instructions: Local weather stations are used to generate CFFDRS indices. The BUI (Build up index) is a good measure of fire business. In Denali the Denali Park Road Corridor and the east end of the park, are within the Alaska Range Mountains and has a "Special Interest Group" based on the Wonder Lake and Denali Visitor Center RAWS stations. The northwest portion of the park and preserve, where most of the fires occur, has a special interest group composed of the McKinley River, Lake Minchumina and the Wein Lake RAWS. If a single station tends to better reflect the weather on the fire(s) then that station alone can be used to generate the seasonal severity. See *Figure 8* for values for BUI in seasonal severity.

Seasonal severity, in addition to those expressed above, can include drought indicator trends (CFFDRS Drought Code DC), drought predictions and greenness factors. All concerns, aside from BUI are treated in an additive or subtractive nature.

For example, on the day of the assessment of seasonal severity the BUI is recorded as 45, the DC trend line as graphed in FireFamily Plus is tracking slightly above normal and the analysis of Relative Greenness maps for the area indicates that green-up has not occurred prior to historical average therefore not starting to cure due to senescence. In this example the *starting* season severity value would be "Moderate" (BUI=45), plus an increase of one "tick mark" (DC tracking slightly above normal) and a slight decrease (Relative Greenness behind historical average). A reasonable estimate for the seasonal severity would likely be near Moderate or slightly above.

BUI Build Up (Index)		
Low (0-30)	Very High (90-110)	
Moderate (30-60)	Extreme (+110)	
High (60-90)		

Figure 8: Seasonal Severity Determination with Denali Specific Values

Low	*High*	*Extreme*
Measures of fire danger are below to somewhat above seasonal averages. Drought status is within seasonal norms with no long-term drought present. Denali – See chart below.	*Measures of fire danger are well above seasonal averages but not setting new records. The area is in short-term drought (1-2 years of drought) but not considered to be in long-term drought. Denali – See chart below.*	*Measures of fire danger are setting new records. The area is considered to be in long-term drought (3 or more years of drought). Denali – See chart above.*

BARRIERS TO FIRE SPREAD – a measure of the natural defensibility of the fire location and an indication of degree of potential mitigation actions needed.

Numerous	*Moderate*	*Few*
The location of the fire and presence of natural barriers and fuel breaks limit the horizontal fuel continuity, minimal mitigation actions on-the-ground will be needed.	*The location of the fire and presence of some natural barriers and fuel breaks limit the horizontal fuel continuity on some, but not all fire flanks, some mitigation actions on-the-ground will be needed to protect threats to boundaries and sensitive areas.*	*The location of the fire and presence of only limited natural barriers and fuel breaks will permit fire spread across continuous fuels. Mitigation actions on-the-ground will be needed but are expected to be effective.*

Step 4: Determining Wildland Fire Relative Risk

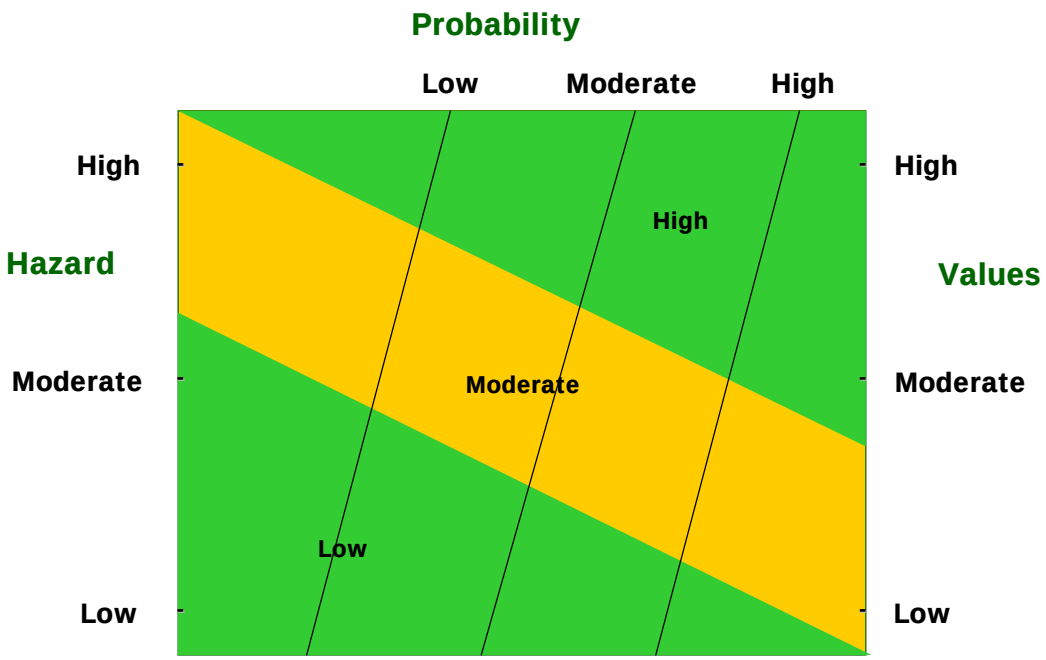


Figure 9: Relative Risk Assessment with Denali Specific Values

Low, moderate or high for each of the hazard, probability and values assessments is plotted on *Figure 9* on the corresponding axis. To complete the chart, connect the left and right variables with a single line. Select the appropriate probability at the top of the chart and follow the line beneath that value down to its intersection with the line connecting the left and right variables. Read the Relative Risk from the background area where the intersection occurs.

Planning Needs Assessment Chart

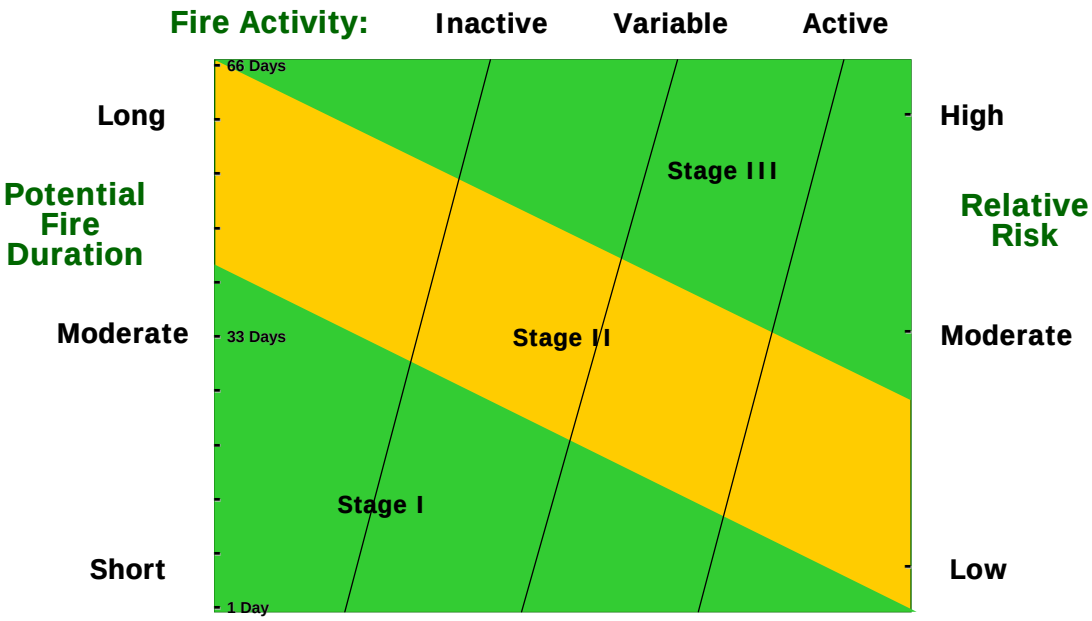


Figure 10: Planning Needs Assessment with Denali Specific Values

Minimum interagency qualification requirements for wildland fire use planning at each stage of the WFIP process. This information should be used with the Planning Needs Assessment Chart to determine appropriate levels of planning qualifications. Higher qualified personnel can always be used to complete the various planning levels if desired. Duty Officer qualifications are defined in local unit Fire Management Plans.

Table 1: WFIP minimum planning qualifications

WFIP Stage	Minimum Planning Qualifications
WFIP Stage I	Unit Duty Officer
WFIP Stage II	Fire Use Manager Type 2 (FUM2)
WFIP Stage III	Fire Use Manager Type 2 (FUM2)

Guidelines for Planning Needs Assessment Chart.

POTENTIAL FIRE DURATION – the estimated length of time that the fire may continue to burn in comparison to historical fire durations and amount of fire season available for a given area.

Denali Information/ Instructions: The potential fire duration analysis is a four step process as follows:

Step 1. Determine the fire start date.

Step 2. Select the maximum and average fires duration values in the time period of the start of the fire from *Figure 11*.

Step 3. From the Canadian Forest Fire Danger Rating System determine how the indices are tracking compared to high, low and average fire years, review seasonal forecasts, departure from greenness and other pertinent seasonal information.

Step 4. Select either the average or maximum fire duration value, or extrapolate between the two values based on how the indices are tracking or other environmental factors such as state of greenness. Plot this value on the scale provided on the figure at the beginning of this section.

For example: If a fire is found and the start date is declared to be June 21st the range of values for the potential fire duration will be between the historical average fire duration and maximum fire duration for that time 32 and 82 days respectively. If the CFFDRS indices (Primarily the BUI, DMC and DC) are tracking near or below normal the potential fire duration used will be at or near the historical average fire duration of 32 days. However, if the indices are tracking near maximum historical values then the potential fire duration used will be near the historical maximum fire duration of 81 days. Note: The CFFDRS indices may be used in conjunction with other information to determine potential fire duration. For instance if a sustained wet weather system is predicted to remain in place for the foreseeable future in the example above where the indices are tracking near maximum, the potential fire duration might be below the 81 days. In this instance a reasonable potential fire duration, depending on the duration of the "wet weather system" and predicted future trends, could be approximately 50 days.

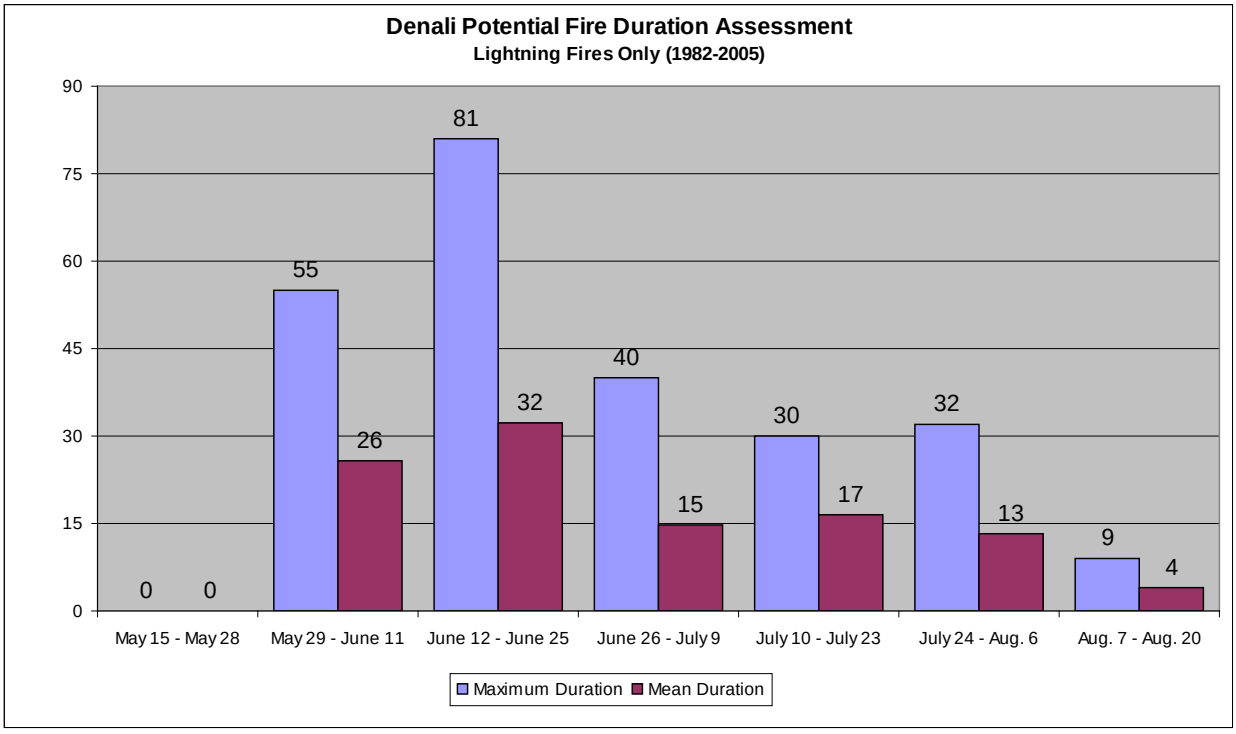


Figure 11: Potential Fire Duration Assessment (Mean and Maximum Values)

Short	*Moderate*	*Long*
Fire is expected to persist for only the shortest time in comparison to historical fire durations. This may be as short as only a few days. Fuels may be limiting, weather may be limiting, or time of fire season may be limiting. Generally, this could be referenced as less than the historical average fire length for a given area.	*Fire is expected to last for a time period similar to the historical average length of fires.*	*Fire is expected to last for a time period longer than the historical average length of fires.*

RELATIVE RISK – a measure of the relative risk, determined directly from the Wildland Fire Relative Risk Assessment, so no range of values is listed here.

FIRE ACTIVITY - the relative activity of the fire in terms of intensity and spread over time.

Inactive	*Variable*	*Active*
Fire is burning with very low intensity, little or no spread, and little or no increase in burned area. Fire is confined to surface litter and duff layers.	*Fire is burning predominantly in surface litter and duff layers, with low intensity and little or no spread but has occasional periods of increased intensity and spread. Growth of burned area is not constant but occurs in response to increased activity. Area increase may be static for moderately long periods and then increase for short periods. Fire size usually increases by less than 50% during active periods.*	*Fire is burning in all fuel strata (litter, surface, and crown) with periods of sustained flaming fronts, perimeter growth, and area increases that can exceed 100% at times. Infrequent periods of low activity occur but spread is generally constant.*

Fire Use Manager Decision Chart

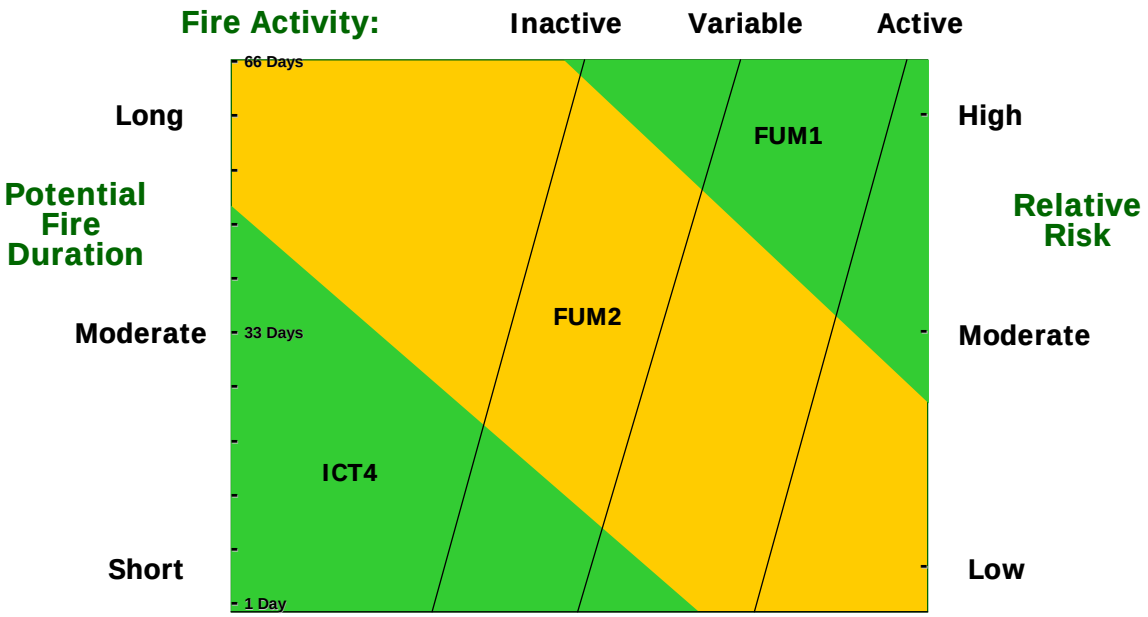


Figure 12: Fire Use Manager Decision Chart with Denali Specific Values

Minimum level of implementation. Table 2 shows the **minimum** level of implementation qualifications. During implementation, as fire activity and management needs escalate, implementation qualification needs ascend to a higher level. But as conditions moderate and management needs drop, implementation qualifications can descend to lower levels. Table 2 and Figure 12 are used jointly as fire situations and conditions escalate. When conditions are moderating or lessening, Table 2 and Figure 12 provide the necessary qualification levels for implementation, regardless of what level of the WFIP has been completed (i.e. Stage I, II or III). Qualifications can descend back to an ICT4 after either Stage II or Stage III has been completed, but must be guided by Figure 12.

Table 2: WFIP implementation minimum qualifications

WFIP Stage	**Minimum Implementation Qualifications** (Use Fire Use Manager Decision Chart to determine recommended position)
WFIP Stage I	Incident Commander Type 4 (ICT4) **(Must have local knowledge or prior experience in implementing WFIPs and managing wildland fire use events)**
WFIP Stage II	Incident Commander Type 4 (ICT4) **(Must have local knowledge or prior experience in implementing WFIPs and managing wildland fire use events)**
WFIP Stage III	Incident Commander Type 4 (ICT4) **(Must have local knowledge or prior experience in implementing WFIPs and managing wildland fire use events)**

Guidelines for Fire Use Manager Decision Chart.

POTENTIAL FIRE DURATION – the estimated length of time that the fire may continue to burn in comparison to historical fire durations and amount of fire season available for a given area.

Denali Information/Instructions: The potential fire duration analysis is a four step process as follows:

Step 1. Determine the fire start date.

Step 2. Select the maximum and average fires duration values in the time period of the start of the fire from *Figure 11*.

Step 3. From the Canadian Forest Fire Danger Rating System determine how the indices are tracking compared to high, low and average fire years, review seasonal forecasts, departure from greenness and other pertinent seasonal information.

Step 4. Either select the average or maximum fire duration value or extrapolate between the two values based on how the indices are tracking or other environmental factors such as state of greenness. Plot this value on the scale provided on the figure at the beginning of this section. (*See example under the Guidelines for Planning Needs Assessment Chart, Potential fire Duration, Denali Information/Instructions*)

Short	*Moderate*	*Long*
Fire is expected to persist for only the shortest time in comparison to historical fire durations. This may be as short as only a few days. Fuels may be limiting, weather may be limiting, or time of fire season may be limiting. Generally, this could be referenced as less than the historical average fire length for a given area.	***Fire is expected to last for a time period similar to the historical average length of fires.***	***Fire is expected to last for a time period longer than the historical average length of fires.***

RELATIVE RISK – a measure of the relative risk, determined directly from the Wildland Fire Relative Risk Assessment, so no range of values is listed here.

FIRE ACTIVITY - the relative activity of the fire in terms of intensity and spread over time.

Inactive	*Variable*	*Active*
Fire is burning with very low intensity, little or no spread, and little or no increase in burned area. Fire is confined to surface litter and duff layers.	*Fire is burning predominantly in surface litter and duff layers, with low intensity and little or no spread but has occasional periods of increased intensity and spread. Growth of burned area is not constant but occurs in response to increased activity. Area increase may be static for moderately long periods and then increase for short periods. Fire size usually increases by less than 50% during active periods.*	*Fire is burning in all fuel strata (litter, surface, and crown) with periods of sustained flaming fronts, perimeter growth, and area increases that can exceed 100% at times. Infrequent periods of low activity occur but spread is generally constant.*

Appendix A: Formulation of Alaska Values

Note: To ensure consistency the base values assigned within each assessment needed to be quantifiable /measurable. It was recognized that not all concerns were quantifiable/measurable, therefore provisions are provided, at the discression of the fire manager, to further refine the assessments to best reflect the situation. The following section(s) outline the discussions, analysis and thought process in the development of the **final** values used in the guide.

PART 1: VALUE ASSESSMENT:

1. Natural/Cultural Resource Concerns

   Most concerns for natural/cultural resources includes threats to cultural structures, administrative structures and facilities, private residences and property, commercial structures and property, native allotments, and Village and Regional Corporation lands. A template system for assessing these concerns is provided in the Alaska Interagency Fire Management Plan (AIFMP, October 1998) and the 2005 NPS Alaska Regional Memo "Alaska NPS Structure Protection Procedures" (Both documents are available in hardcopy formation in the offices of Alaska Western Area Fire Management). See these documents for further information. Site and area fire management planning and protection are integral in the interagency management of fire in Alaska. Therefore for simplicity and to remain consistent with the AIFMP all "site(s)" and "area(s)" concerns are addressed on the Natural/Cultural Resource Concerns axis. The scale on the axis represents the prioritization for site and area protection and growing complexity, when moving up the axis, to accomplish and support site and area protection. Generally the AWAFM staff can provide protection for up to three to four sites (near "Moderate" concerns on the axis). Additional resources and support could be needed above the Moderate level.

2. Social/Economic Concerns

   Generally few Social/Economic Concerns as defined in the guide are encountered throughout the duration of the fires in Denali. Denali is a remote Park, the closest town with a population greater than 50 people is over 70 miles from the area where fires typically occur. In addition, due to the public and commercial "conditioning" of the presence and/or evidence (smoke) of wildland fire in interior Alaska and support for fire management activities statewide, fire use, a fire management application not unlike fire management strategies applied over the last 24 years, is locally well supported. In Denali two Social/Economic factors two emerged that provided a good index of Social/Economic Concerns. These factors include smoke management and management complexity due to multi-jurisdiction fires. One of the consequences of the 2004 fire season, the largest fire season on record in Alaska, required fire and land managers to readdress the management of Wildland and Prescribed emissions (smoke) and subsequently smoke management guidance was developed by Alaska Wildland Fire Coordinating Group (AWFCG) in 2005. Smoke management will continue to be an issue in Alaska, particularly in Denali (Class I Airshed) and will continue to change as policy and regulation evolve. The complexity of managing fires increases as additional land managers and fire suppression managers become involved in multi-jurisdiction fires.

3. Location of Fire to Values

   The location of fire to values is better described by the time it would take to for the fire to reach a particular value or resource to be protected. The evaluation of distance was discarded because distance is a poor measure of a threat to a resource when fires can travel from 0-7 miles in one burning period. Therefore the describing of the "location of fire to values" is expressed in time, in this case "Burn Period". One burn period is equal to the number of miles/day the fire is expected to travel. The scale used corresponds to the time needed to complete mitigating actions. Generally it takes one to two days to treat each site that needs a mitigating action. When the fire

gets within 6 burn periods from a site it triggers a mitigating action. By the time the fire is less than 3 burn periods away the mitigating action will have been completed and prepared for the approaching fire. The site will need to be continually monitored from this point in time until the fire has burned past the site and the area at the site is secured. Once the site/area has been burned around and secured the site no longer is at risk from the fire therefore no longer is considered in the "location of fire to values" analysis.

PART 2: HAZARD ASSESSMENT

1. Current Fire Behavior – *No Denali National Park & Preserve Specific Guidance.*

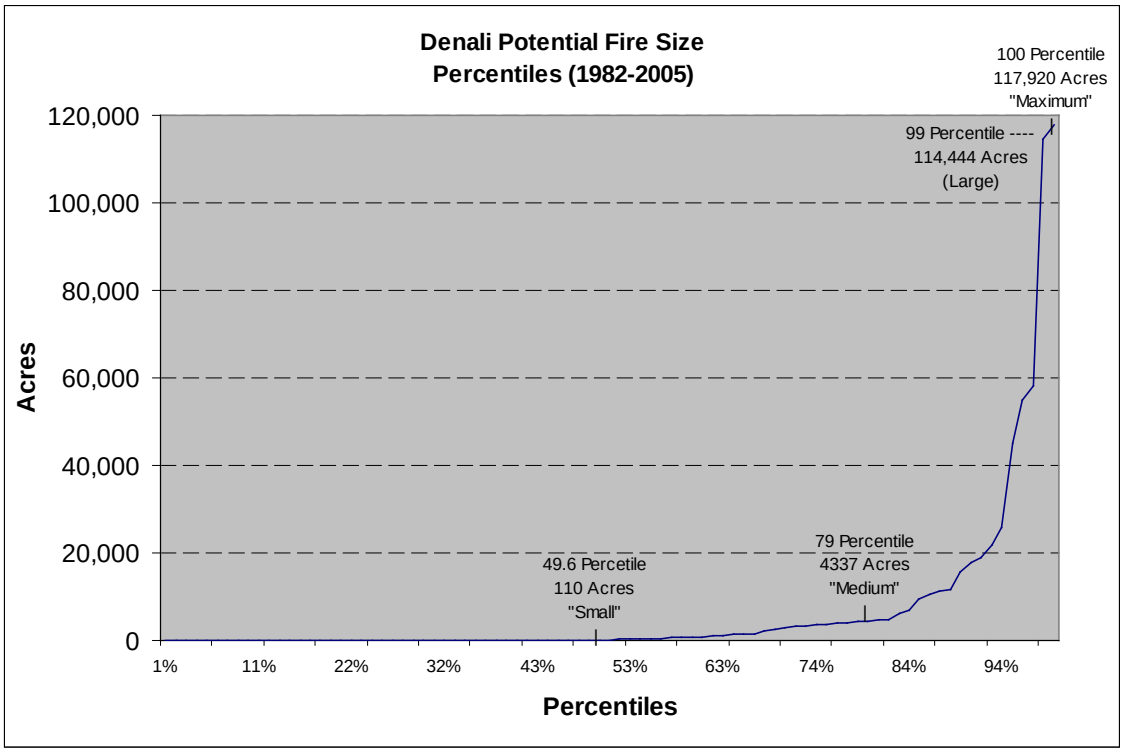
2. Fire Regime Condition Class – *No Denali National Park & Preserve Specific Guidance.*

3. Potential fire size

   Following the adoption of the Alaska Interagency Fire Management Plan – Tanana/ Minchumina Planning Area, in 1982 most fires were allowed to fulfill their role as an agent of change. Few fires were suppressed and the potential size of fires is readily deduced by the analysis of total acres burned/fire. It became clear shortly in the analysis that the length of time the fire is burning is related to the size of the fire. Fires early in the year had the potential to become large fires and fires late in the year typically were smaller fires. Therefore the start date became a factor in the potential fire size. Fire size analysis was completed for two week "bins" (Bin = 2 week period) starting at the beginning of the fire season to the end of the fire season. A maximum and average fire size for each bin was calculated based on fire history records. Two fires were greatly outside the maximum fire sizes for previous years. Therefore the mean fire size values were calculated subtracting the two largest fires on record. However if weather conditions warrant, the two largest fires would be added back into the mean fire size calculation for analysis purposes. The variance in fire size for each bin was great and further factors were needed to approximate potential fire size. An analysis of seasonal severity trends (departure from normal analysis) was developed to help determine if a fire would be more likely to be approach the maximum or be at or below average in size.

   > The CFFDRS indices, primarily the BUI, DMC and DC, are fairly good indicators of mid to long term trends in seasonal severity. The software FireFamily Plus is capable of completing the trend analysis of the indices in a general sense. Currently FireFamily Plus does not allow: (1) yearly snow free dates to be entered (Snow Free Dates are necessary in the calculation of the CFFDRS indices), (2) start up values for different years, or (3) modify indices value later in the season. Early in the season the discrete values will be in error, though the trend will be evident. As the season progresses the discrete values of the indices will approach actual values at the station.

   The key factor considered was the departure from normal analysis of the fire season. The authors recognize there are many tools/information sources to consider regarding the analysis of the fire seasons departure from normal thus did not specify a specific tool for the analysis. Rather to use the tool(s) most appropriate to help guide the fire manager to select a potential fire size within the range of values, within the bins, calculated from the fire history records.

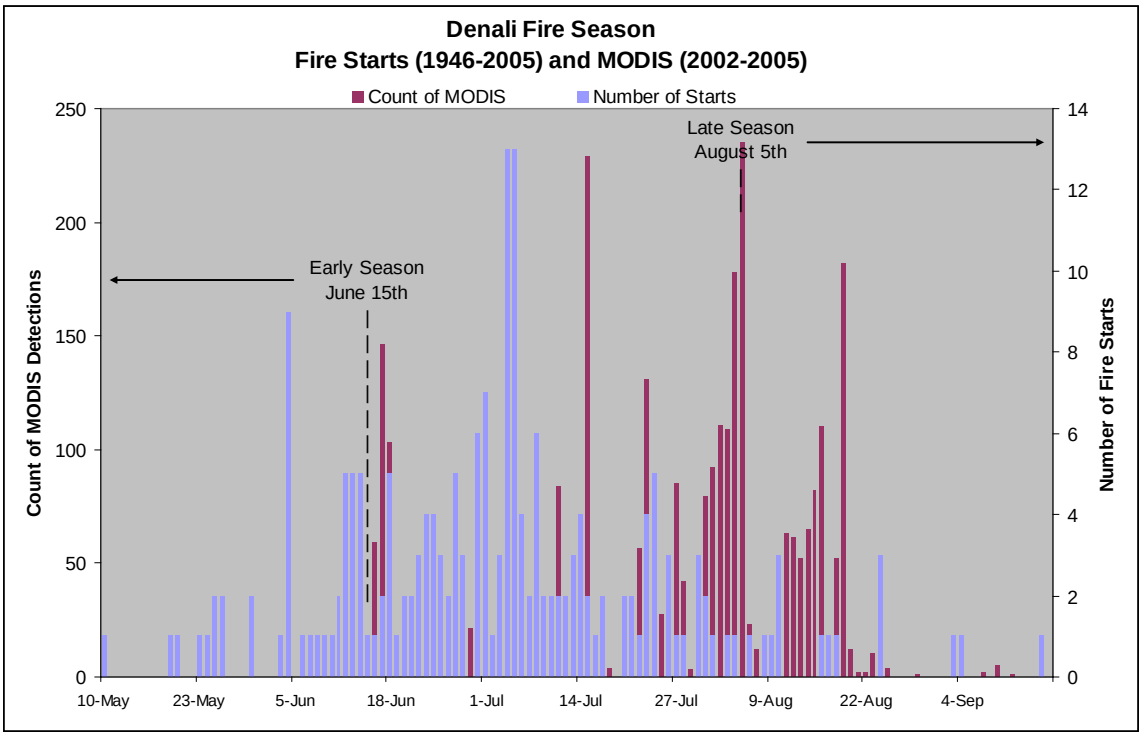


The scale was set on the potential fire size axis through three processes. First the maximum fire size, based on fire records, was applied to the maximum potential fire size position on the chart. Secondly, the small fires, the 50th percentile fire size of 110 acres was applied to the "Small" potential fire size position on the chart. Finally through testing the values, by running various fire scenarios, a breakout of potential fire sizes were applied throughout the scale. The final variable values for potential fire size are commensurate to the hazard given the various fire behavior conditions.

PART 3: PROBABILITY ASSESSMENT

1. Time of Season

Fire history records and MODIS imagery led to the establishment of values for the time of season analysis. The fire season was defined by the when the season starts (fires detected) to when the season ends (fires declared out). The declared out date in the fire records is problematic in remote areas of Alaska on late season fires. Fires that continue to burn in to the late season, beyond the beginning of September, are monitored infrequently, if at all when no resources are at risk. Since declared out dates were problematic, an alternative method was used to estimate the end of the season. An analysis of MODIS imagery from 2001 to 2005 over the park and preserve indicates that the late season fire's activity is in decline by August 5th though MODIS detections are still evident through September 11th. It is likely that the fires are still burning beyond September 11th though with reduced activity and are likely to be out shortly thereafter. The start of the middle of the season is readily available through referencing the fire history chart of fire starts. Not unlike other localities in the US there are two fire seasons in Alaska. These seasons are separated by "green-up". The early season is short, prior to green-up, and is generally characterized of consisting of mostly human caused starts. The second season starts mid to late green-up and for Denali is characterized of consisting of predominately lightning caused fires. The second season generally starts mid June but can vary based on the timing and duration of green-up. The scale was set using the beginning of the second season as the minimum value (June 15th) and the maximum value, for late season, of August 5th.



These values closely follow the season analysis described in the Wildland Fire Use Implementation Procedures Reference Guide.

2. Seasonal Severity

In Alaska the Canadian Forest Fire Dander Rating System is used to track fire indices. The indices Initial Spread Index (ISI), Buildup Index (BUI) and Fire Weather Index (FWI) are derived from various moisture codes (Fine Fuel Moisture Code (FFMC), Duff Moisture Code (DMC), and the Drought Code (DC)) and weather parameters. The BUI (an index derived with DMC and DC components), DMC and the DC are not as readily influenced by transient weather conditions. The BUI represents a numerical rating of the total fuel available for combustion. Though the BUI has not been formally tested compared to other indices in Denali, the BUI has been determined to be a good measure of fire business in the state. The scale for the chart was derived from fire potential changes due to changes in the BUI based on literature by fire managers in Alaska. Like the potential fire size analysis as previously discussed the key factor is considering the departure from normal analysis of the BUI. However, the seasonal severity should not be based on BUI alone. Other factors to consider, but not limited to, include: Drought Code, Duff Moisture Code, local and/or state fire workload, and/or observed fire behavior is inconsistent with indices.

3. Barriers to Fire Spread – *No Denali National Park & Preserve Specific Guidance.*

PART 4: RELATIVE RISK ASSESSMENT

Guidelines for Planning Needs Assessment Chart

1. Potential Fire Duration

Fire duration analysis is problematic in Alaska where monitoring on the shoulder seasons, particularly the end of the season, is infrequent. Fire records for fires that continue into the late fall can have "Declared out" dates that are inaccurate. Therefore in order to determine reasonable

fire duration dates for those fires that continued burning into the fall, where monitoring was infrequent, weather analysis was completed to determine term dates for fires. Through weather analysis from the nearest weather station with a continuous data set it was determined that a precipitous and relative continuous decline in the BUI generally signals an end of the fire season. For the years where declared out dates were in question an estimated declared out date was developed. The estimated declared out date was calculated by the term date of the year of the fire plus two weeks. In Alaska where the summer fire season is relatively short the duration of fires, particularly large fires, is related to the time of season the fire started. Fire starts in mid June typically have a longer duration then fires in late July. Therefore the start date became a factor in the potential fire duration. Potential fire duration analysis was completed for two week "bins" (Bin = 2 week period) starting at the beginning of the fire season to the end of the fire season. Maximum and average fire duration for each bin was calculated based on fire history records. However, the potential fire duration should not be based on when the fire starts and the fire historical records alone. Other factors to consider, but not limited to, include: Drought Code, state of greenness, observed fire behavior is inconsistent with indices, barriers to fire growth, and/or regional weather patterns conducive to fire persistence.

2. Relative Risk – *No Denali National Park & Preserve Specific Guidance.*

3. Fire Activity – *No Denali National Park & Preserve Specific Guidance.*

Guidelines for Fire Use Manager Decision Chart

1. Potential Fire Duration

   Reference "Guidelines for Planning Needs Assessment Chart" Section 1 above.

2. Relative Risk – *No Denali National Park & Preserve Specific Guidance.*

3. Fire Activity – *No Denali National Park & Preserve Specific Guidance.*

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APPENDIX I. - DELEGATION OF AUTHORITY AND AGREEMENTS

The following documents are on file in the Fire Management Officer's office at Denali NP/P

1. Delegation of Authority for Fire Management Officer, Denali NP/P

2. Inter-park Agreement Between: National Park Service Alaska Western Area Wildland Fire Management and Denali National Park & Preserve, Lake Clark National Park & Preserve, Bering Land Bridge National Preserve and Western Arctic Parklands

3. 2010 Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement and the 2010 Alaska Statewide Annual Operating Plan.

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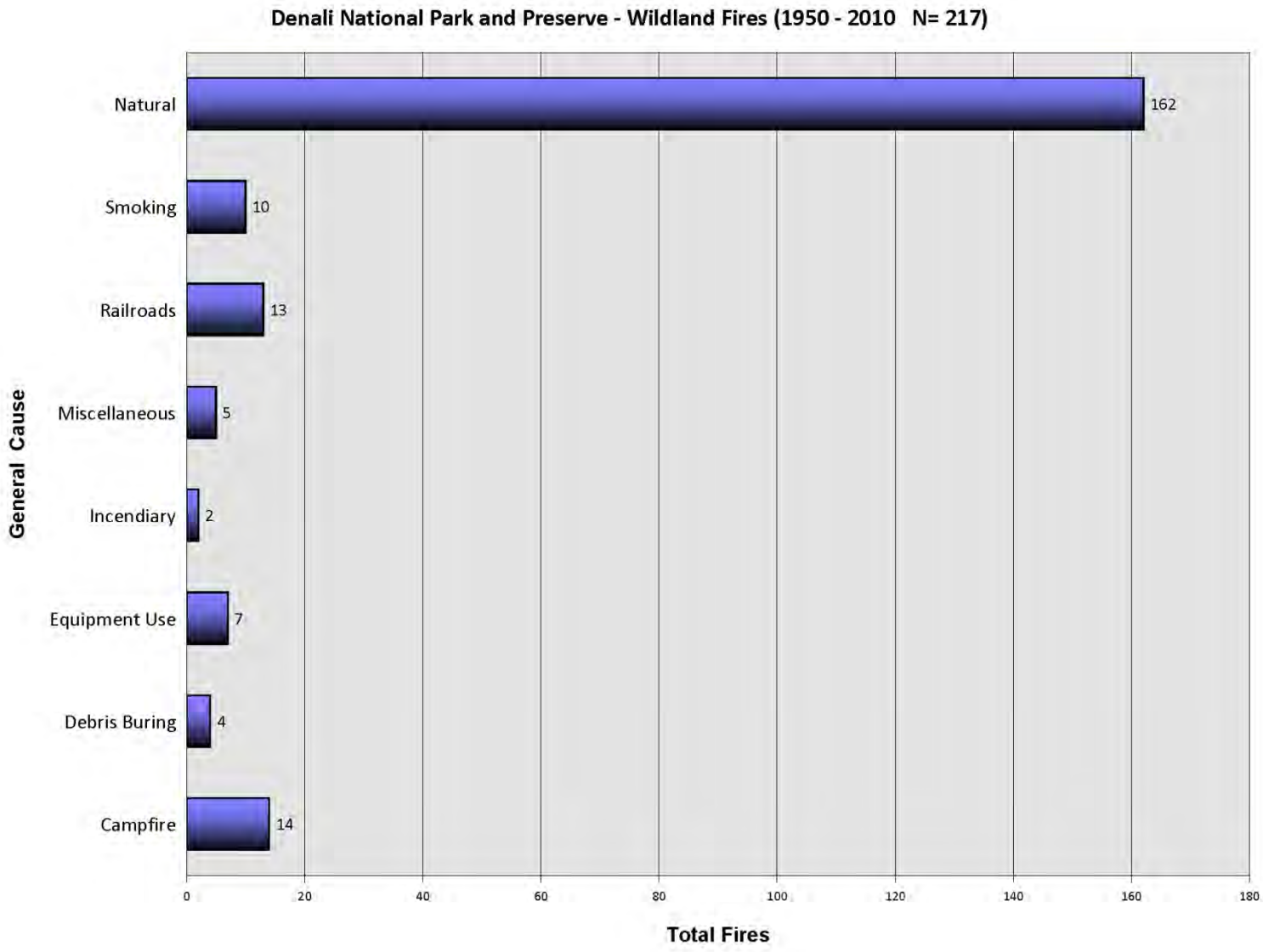
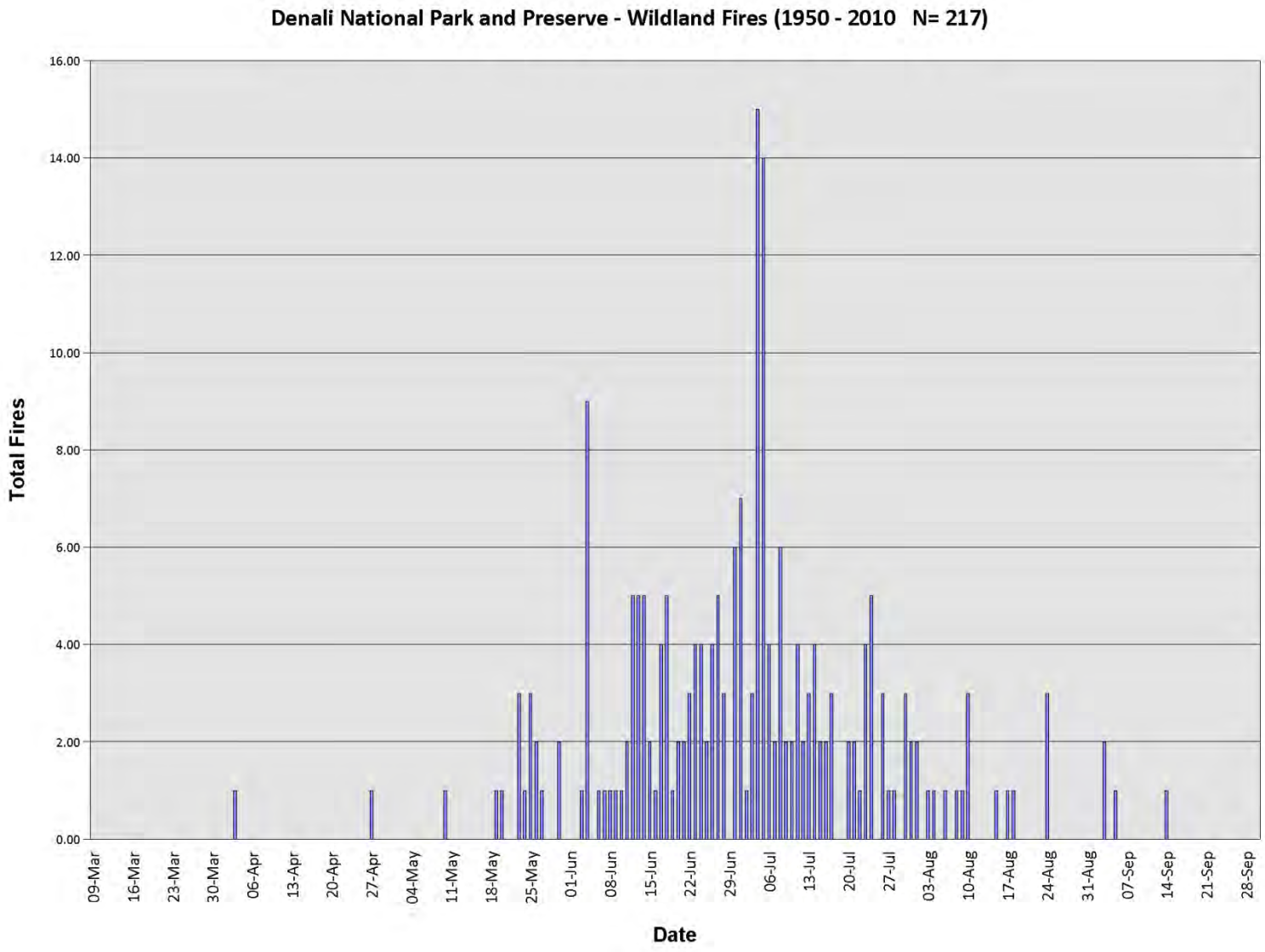
APPENDIX J. – FIRE STATISTICS & GRAPHS

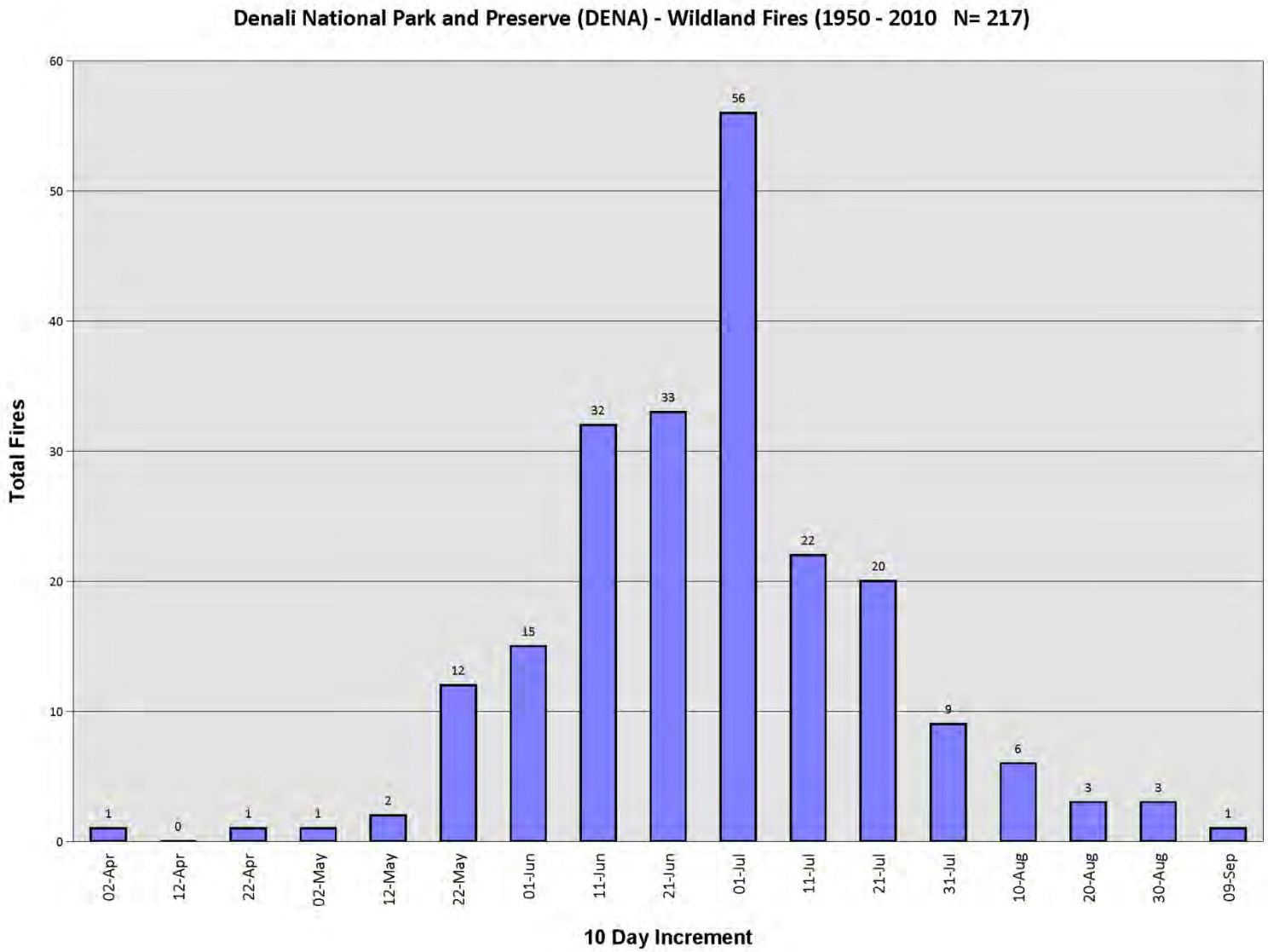
Fire Statistics and Graph 1: General Cause of Fires



Fire Statistics and Graph 2: Wildland Fire Occurrence by Start Date

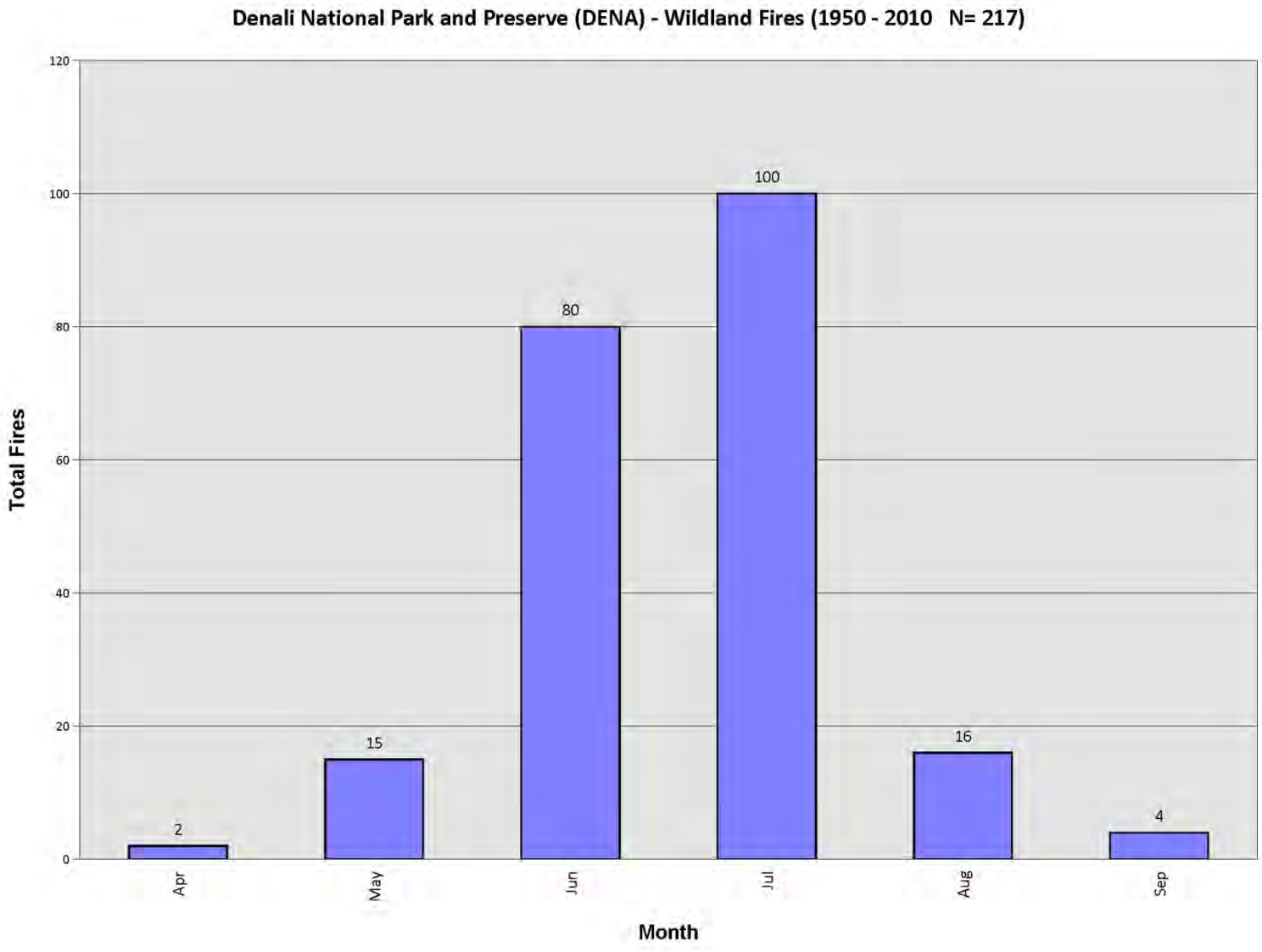


Fire Statistics and Graph 3: Wildland Fire Occurrence (10 Day Increment)

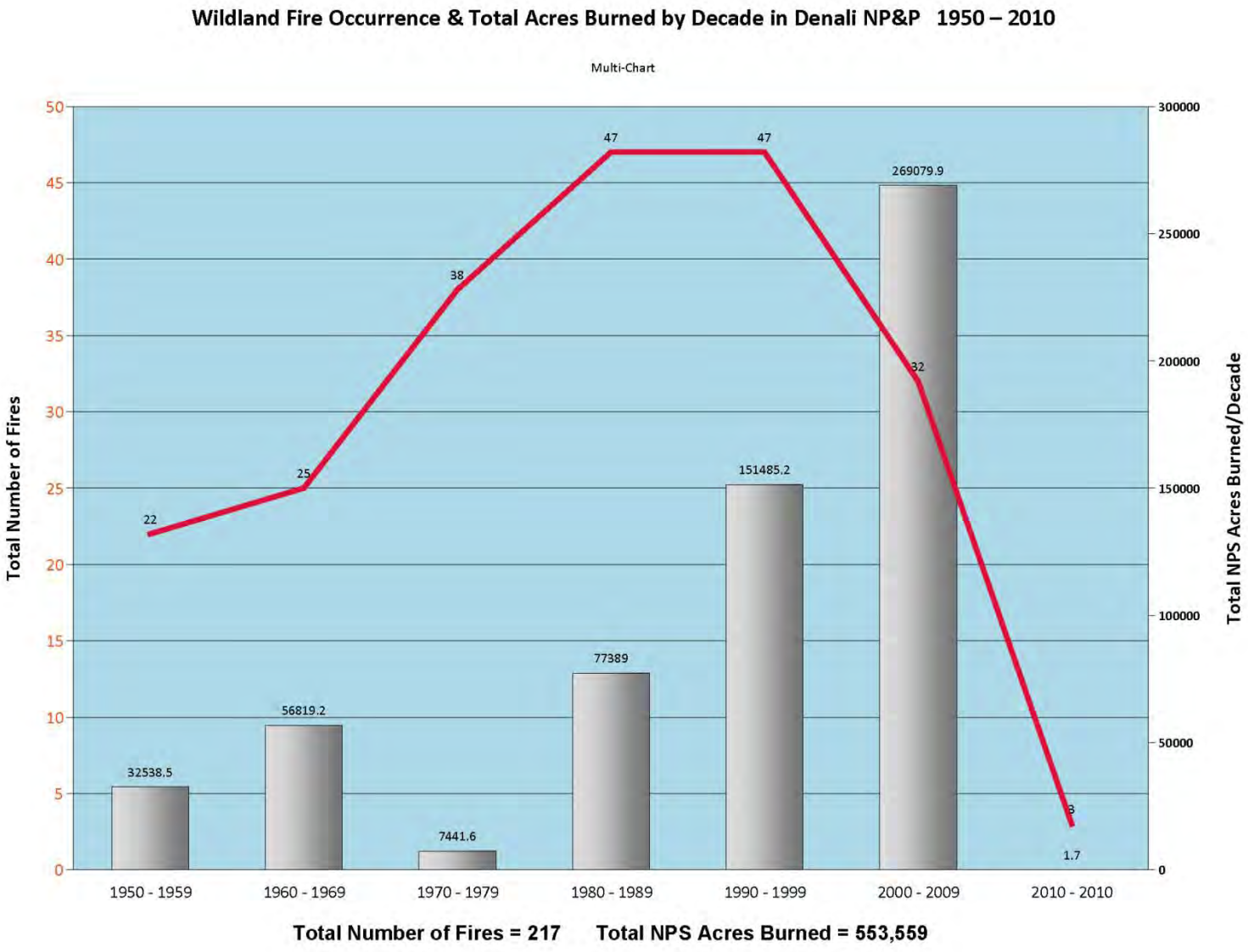


Fire

Statistics and Graph 4: Wildland Fire Occurrence by Month

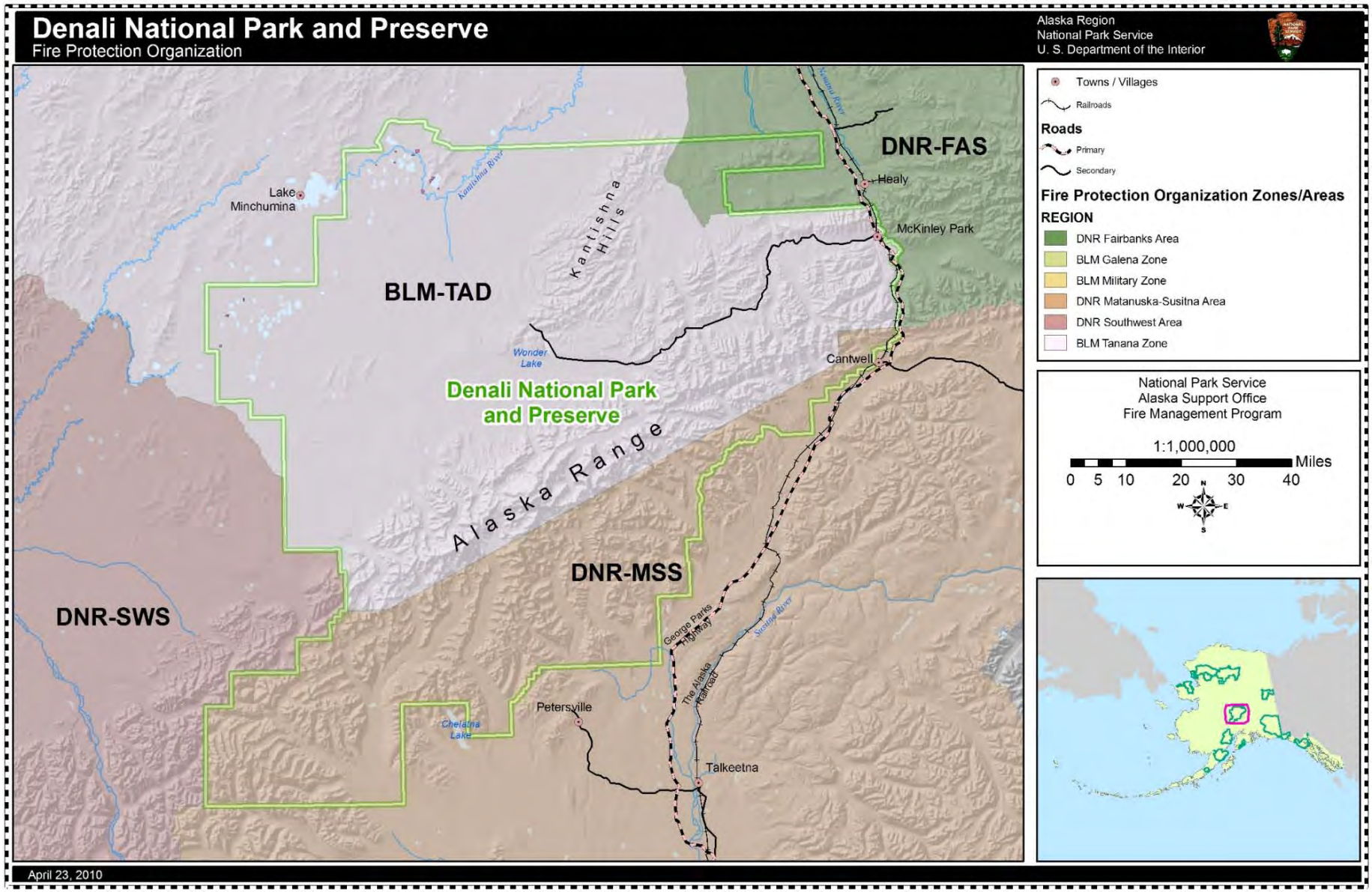


Fire Statistics and Graph 5: Wildland Fire Occurrence & Total Acres Burned by Decade

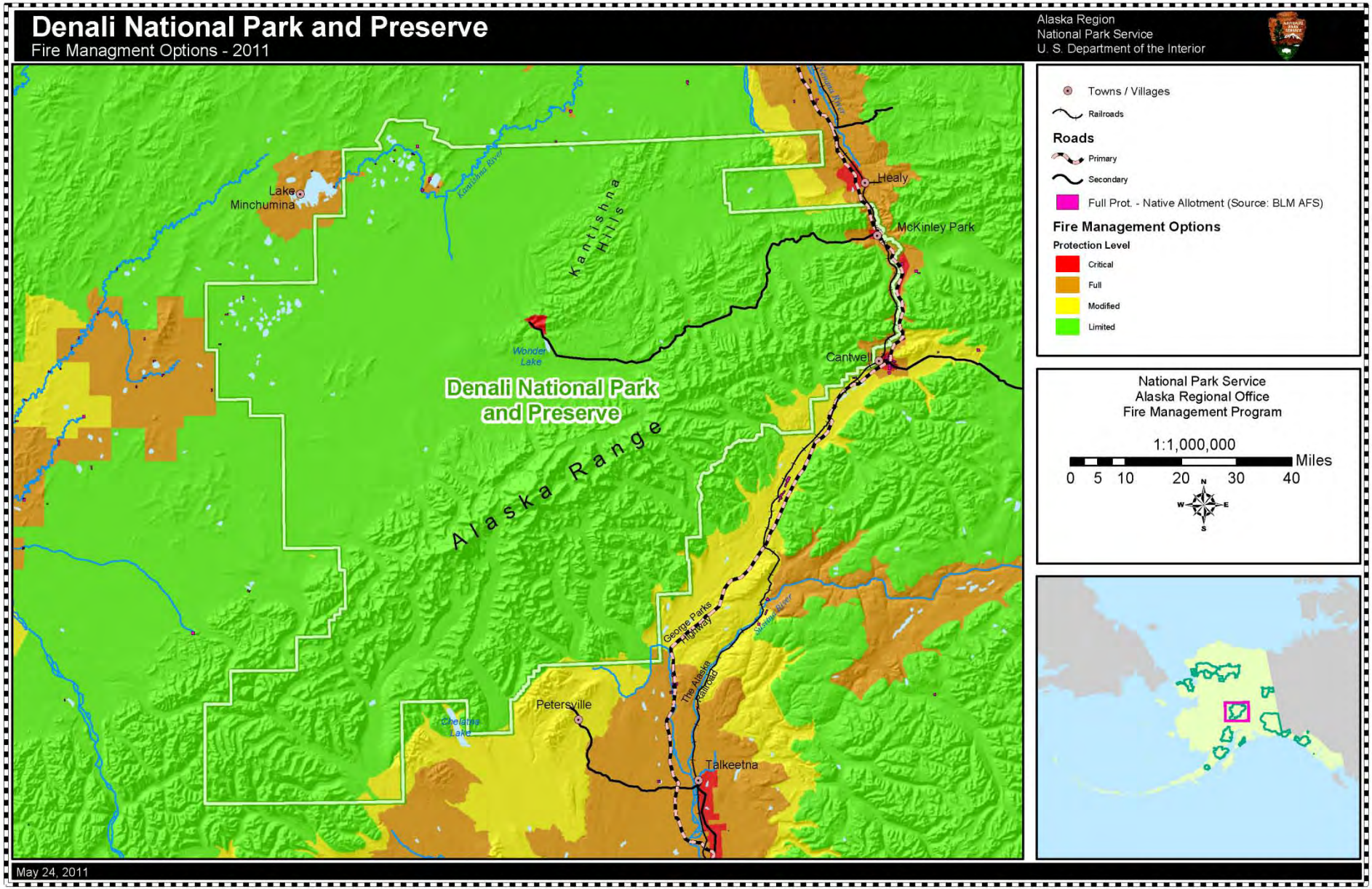


APPENDIX K. - MAPS

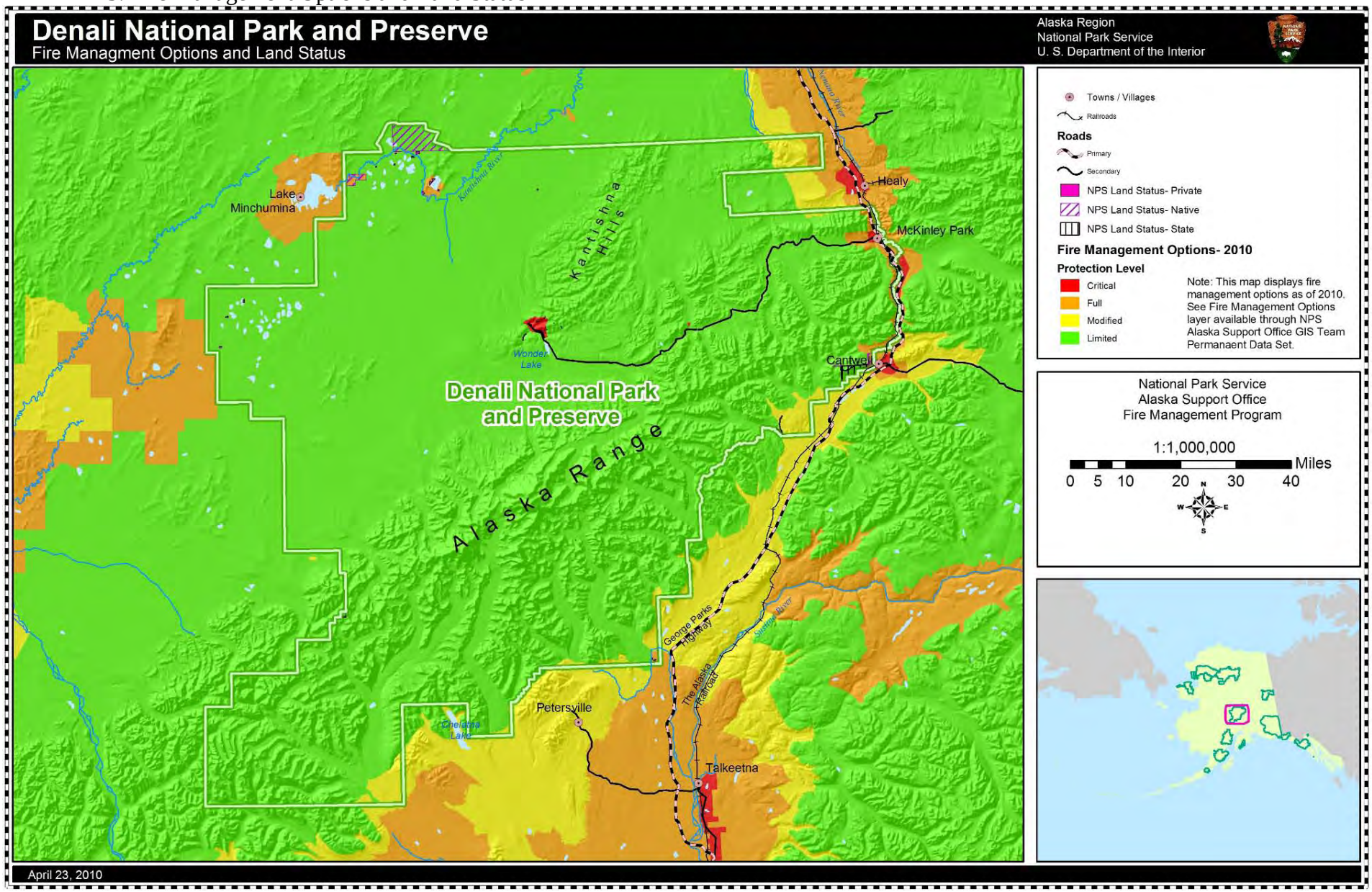
MAP 1: Suppression Organizational Boundaries



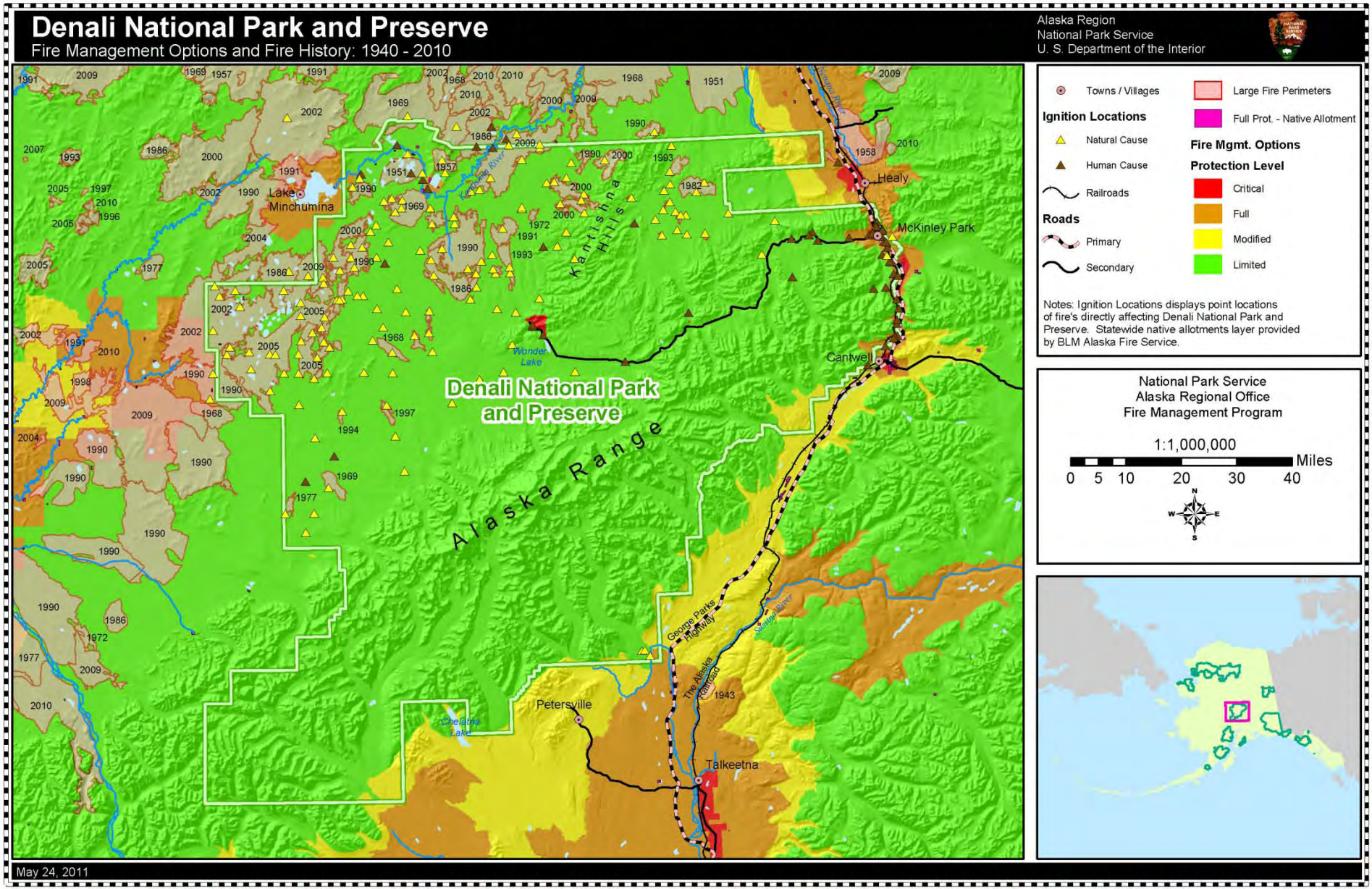
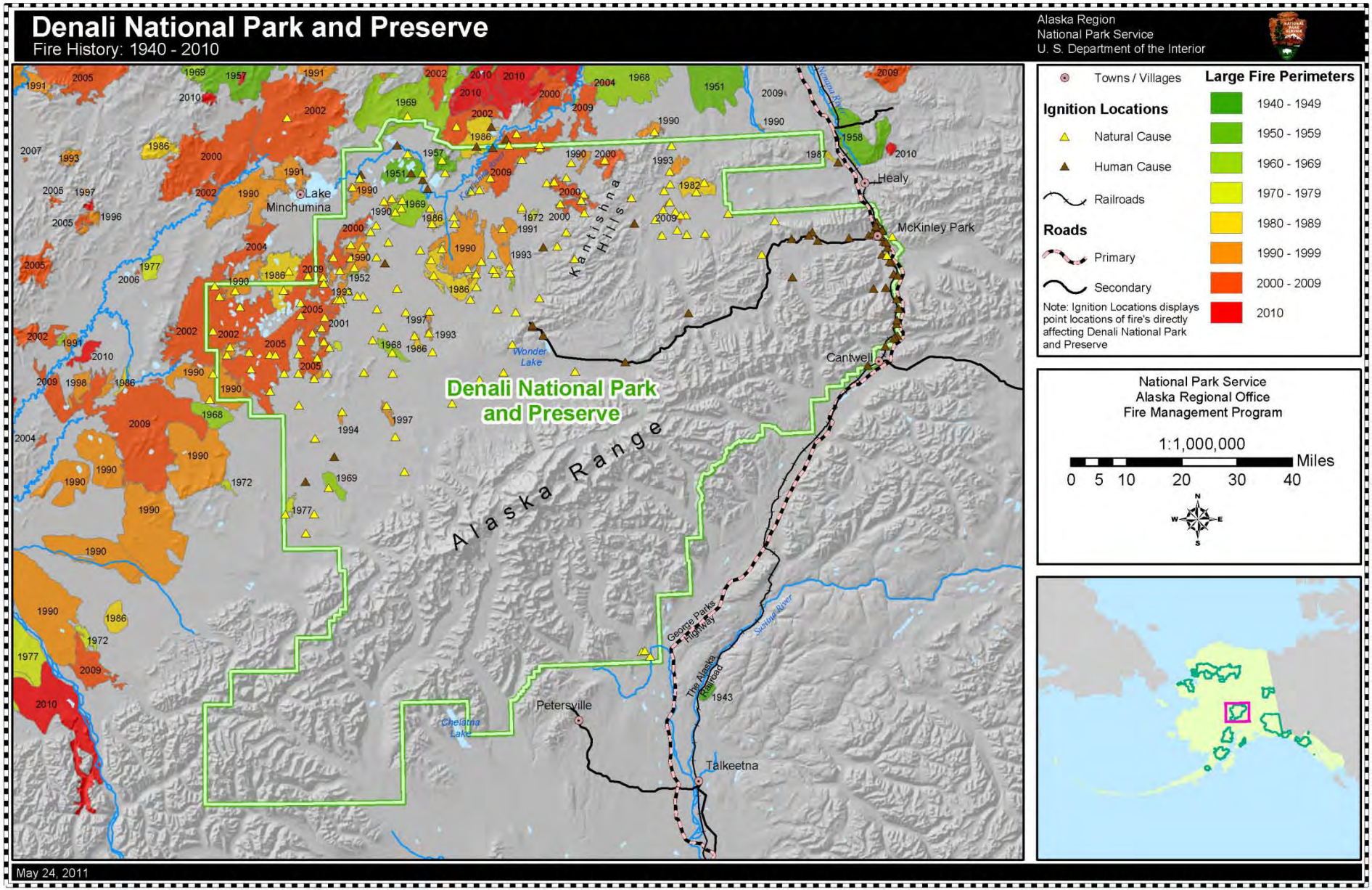
MAP 2: Fire Management Units



MAP 3: Fire Management Options and Land Status



MAP 4: Fire Management Options and Fire History



MAP 5: Fire History by Decade