Alaska Interagency Fire Management Plan

Tanana / Michumina Planning Area

March 1982

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ALASKA INTERAGENCY FIRE MANAGEMENT PLAN
TANANA/MINCHUMINA PLANNING AREA
AND
ENVIRONMENTAL ANALYSIS

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TANANA/MINCHUMINA PLANNING AREA

ENVIRONMENTAL ASSESSMENT COVER SHEET
-FINAL-

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SUMMARY

The U.S. Fish and Wildlife Service, National Park Service, Bureau of Indian Affairs and Bureau of Land Management propose to implement the Tanana/Minchumina Interagency Fire Management Plan. The fire plan applies to approximately 31,000,000 acres of Federal, State, Native Corporation and other private lands in central interior Alaska. The plan contains four fire management alternatives or options that range from immediate and aggressive suppression to no initial attack. Implementation of the plan, which is the preferred alternative, allows for the use of cost effective strategies to reduce fire suppression expenditures, and to assure responsiveness to land manager/owner objectives.

DECISION RECORD

Adopt preferred alternative(s) as shown on Appendix E and implement special considerations (Table 9). This decision is in conformance with existing land-use plans where applicable. No significant negative impacts will occur; therefore, an environmental statement is not required.

ALASKA INTERAGENCY FIRE MANAGEMENT PLAN
TANANA/MINCHUMINA AREA
AND
ENVIRONMENTAL ANALYSIS

I. INTRODUCTION

A. AUTHORITY AND PLANNING TEAM COMPOSITION

This plan is being prepared with the approval and support of the Alaska Land Use Council (ALUC). The ALUC was formed in 1980 by a provision of the Alaska National Interest Lands Conservation Act (ANILCA).

The ALUC designated a Fire Management Project Group to organize and coordinate interagency fire management. The group is composed of representatives from Doyon, Limited (for Alaska Federation of Natives); Alaska Department of Fish and Game; Alaska Department of Natural Resources; National Park Service; U.S. Fish and Wildlife Service; Bureau of Land Management; Bureau of Indian Affairs; U.S. Forest Service Region 10; and U.S.F.S. Institute of Northern Forestry.

The Tanana/Minchumina Fire Planning Team is a working group under the Fire Management Project Group. It is composed of representatives from:

- Tanana Chiefs Conference, Inc.
- Doyon, Limited
- State of Alaska
  - Department of Natural Resources
  - Department of Fish and Game
- U.S.Department of the Interior
  - Fish and Wildlife Service
  - National Park Service
  - Bureau of Indian Affairs
  - Bureau of Land Management
- U.S.Department of Agriculture
  - Forest Service, Institute of Northern Forestry

B. GOALS AND OBJECTIVES

The purpose of this plan is to provide an opportunity for land managers within the planning area to accomplish their land use objectives through cooperative fire management. We recognize that the management options developed in this plan should be ecologically sound, operationally feasible, and flexible enough to change as new objectives, information, and technology become available.

The objectives of this plan are to ensure:

1. The coordination and consolidation of fire prevention activities, including education, regulation, enforcement, and burning restrictions.

2. Aggressive and continued suppression action on fires which threaten human life, identified private property, and physical developments.

3. A regular review to facilitate modification by individual parties or between parties with shared boundaries and/or concerns.

4. Maintenance of total control by affected land managers/owners in selecting the fire management options in the lands that they administer.

5. Identification, promotion, and (where possible) prioritization of needed research related to fire management and fire's role within the planning unit.

6. Selection of fire management options to help realize current resource management objectives in a manner which maximizes the effectiveness of each dollar spent.

7. That the treatment of options other than total and immediate suppression is as comprehensive in planning, design, and operational guidelines as the treatment if total and immediate suppression is planned.

C. GENERAL GUIDELINES

The plan was prepared within these general guidelines:

1. The boreal forest is a fire-dependent ecosystem, which has evolved in association with fire, and will lose its character, vigor, and faunal and floral diversity if fire is totally excluded.

2. The plan will be formulated under existing land ownership and land use plans. This recognizes that land ownership will change continually for several years, and that land use plans are in various stages of completion. Yearly reviews, modifications, and updates of the plan will be made accordingly. (See Section H.)

3. This plan will be implemented during the 1982 fire season.

4. The plan will replace the current policy of total suppression with a comprehensive fire management program for the planning area.

5. This plan will establish fire management options which each land manager can apply according to his own land use objectives and constraints. Each land manager is expected to incorporate changes in land use objectives into the plan each year. Selection of a fire management option does not preclude the development of prescribed burning programs by any land manager/owner.

6. The functions of allocation of forces, detection, and prevention will be considered and addressed as needed to accomplish objectives of the plan.

7. Cost effective strategies will be explored to reduce fire suppression costs, promote resource management, and assure responsiveness to all land managers' objectives.

D. RELATIONSHIP TO LAND USE PLANNING

This plan is not a land use plan. Rather, it is a guide to coordinate use of fire suppression forces among a wide variety of land managers and to promote a comprehensive fire management program. It does not develop land use objectives; it implements these objectives relative to fire management.

Unfortunately, land use planning has only been completed within very small portions of the planning area. Thus, specific objectives have not been developed for most of the planning area. Nevertheless, land managers are guided by basic policies and objectives which can be stated without land use planning (e.g., protection of human life). These policies and objectives provide a solid foundation for this planning effort. As more specific objectives are developed by various land managers, they will be incorporated into this plan.

The status of land use planning for individual agencies is reviewed below.

Native Corporation - Planning is in preliminary stages of collecting information. No specific planning is underway although the need is recognized to promote effective use of resources.

State of Alaska - The State has completed land use allocations in most of the area. General land use planning for the eastern part of the area has begun, ant is scheduled for completion in mid-1982.

National Park Service - Comprehensive land use planning has begun for Denali National Park and Preserve.

Fish and Wildlife Service - The Nowitna Refuge was added to the Fish and Wildlife Refuge system by P.L. 96487. No specific land use planning has been done.

Bureau of Land Management - The Utility Corridor Land Use Plan, covering a 6 to 24 mile wide strip along the Trans-Alaska Pipeline was approved on September 29, 1979. The Anchorage District completed a plan for the southwestern part of the area in 1981. The balance of BLM land is not covered by a land use plan.

E. CURRENT FIRE MANAGEMENT POLICY

All participating agencies subscribe to a policy of immediate and aggressive initial attack, followed by aggressive, sustained attack until the fire is suppressed. This policy can only be modified when mandated by safety consideratlons or lack of men/equipment, or when an approved fire management plan is in effect. The Tanana/Minchumina Fire Management Plan constitutes such a plan.

The USDI, Bureau of Land Management and the State of Alaska currently provide all fire suppression forces in the planning area. The State protects the northeastern corner of the area, including State, Federal, and private lands. The BLM protects the remainder of the planning area, including State, Federal, and private lands.

While the State and BLM still provide all suppression forces, the policies and objectives under which fire is managed are changing radically. The National Environmental Protection Act, Federal Land Policy and Management Act, Endangered Species Act, and other laws have stimulated the change in policy from fire suppression to fire management. In addition, lands have been transferred from the BLM to the State of Alaska, the U. S. National Park Service, and the U. S. Fish and Wildlife Service, according to the provisions of the Alaska Statehood Act (1958), and the Alaska National Interest Lands Conservation Act (1980). The Alaska Native Claims Settlement Act (1971) gave about 44 million acres to village and regional Native corporations. Each village corporation was allowed to select from three to seven townships, while regional corporations selected varying amounts of land, according to the Native population in the region. The Act specifies that the Federal government has fire suppression responsibility on Native lands, even though these lands are in private ownership.

The fire suppression organizations are moving from a time when they had a relatively simple mandate (suppress all fires), into an era when they must respond as service organizations to the complex demands and objectives of many new and old land managers. This is the essence of the Tanana/Minchumina Plan--to provide a formal and organized transition from simple fire suppression to complex fire management.

F. PUBLIC MEETINGS

In May 1981, public meetings were held in all towns and villages located within or near the fire planning area. The objectives were to make the public aware of the plan, and to answer any questions regarding the plan content, procedures, or potential impacts.
Members of the fire planning team were divided into two groups, one to visit the northern part of the area and one to visit the south. Team members represented three to five Federal, State, or private agencies, and always included a representative from BLM Fire Management and the Alaska Department of Fish and Game. Meetings were held in Fairbanks, Ruby, Tanana, Rampart, Minto, Manley, Nenana/Anderson, Healy, McGrath, Minchumina, Telida, Nikolai, Takotna, and Medfra.

Before each meeting, team members sent announcements and/or made phone calls to the community indicating dates when the meeting would be held. At each meeting, an overview of the proposed fire management options established by the plan was given, and the opinions of local residents sought. All comments regarding the fire plan were recorded, and questions answered. Residents were encouraged to send any additional suggestions or comments to the Fairbanks or Anchorage BLM District offices.

Appendix A contains a summary of the questions which the public asked, and the planning team's response.

G. ROLE OF FIRE IN THE ALASKAN ENVIRONMENT

Fire has been a natural force in the Alaska interior for thousands of years. It is a key environmental factor in these cold-dominated ecosystems. 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. Even some of the plant and animal species normally associated with later successional stages will find the environment unsuitable.

Fire rejuvenates these ecosystems. It removes some of the insulating organic matter and results in a warming of the soil. Nutrients are added both by ash from the fire, and by increased decomposition rates. Vegetative regrowth quickly occurs, and the cycle begins again.

An occasional fire may be critical for maintaining the viability of northern ecosystems, yet fire can also be a threat to human life, property, and valued resources. The realization that fire plays an essential ecological role, but also has a destructive potential in relation to human life and values can make the fire management decision process very difficult.

H. REVISION

This plan will be reviewed for revision yearly by a committee of land managers/owners. This meeting should take place prior to April 1 to allow fire suppression organizations to implement any changes. It will be the responsibility of the Bureau of Land Management Alaska Fire Service to manage the review process.

A land manager/owner may change the management option on any part of his land at any time between September 30 and April 1. Alterations or changes will be processed in the same manner as modifications in Cooperative Agreements. It will be the responsibility of the land manager/owner to notify adjacent land manager(s)/owner(s) of any change in the management option.

Information on land status changes, critical sites, and special concerns (such as historic and cultural sites) may be used to update the plan at any time during the year. This will be handled at the local operational level.

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II. PLANNING AREA

A. GENERAL

1. Location and Size

The Tanana/Minchumina Planning Area encompasses approximately 31,000,000 acres (48,000 square miles), about 1,500 square miles smaller than the State of New York. It is located in central interior Alaska (Figure 1) and is bounded on the.east by the George Parks Highway, on the south by the crest of the Alaska Range, on the west by the Big River, Innoko River, and Placerville Road, and on the north by the northern crest of the Melozitna River watershed, the Ray Mountains, and the Dalton Highway (Alaska Pipeline haul road).

The planning area is centrally bisected by the Kuskokwim River and the Yukon River, the two largest rivers in Alaska. Most of the inhabitants live along these rivers and the Tanana-River which flows into the Yukon at the village of Tanana

2. Land Ownership

Major shifts in land ownership are occurring and will continue for several years as a result of the Alaska Native Claims Settlement Act (ANCSA), Alaska Statehood Act, and Alaska National Interest Lands Conservation Act. The area includes 10 recognized Native villages and two Native groups awaiting approval. (Current land status is shown in Appendix D in map pocket1.) Corporate Native lands include patented, interim-conveyed, and selected designations for both village and regional corporations as well as cemetery and historical site selections. Most of the acreage is in the selected category with continual changes to interim-conveyed as the ANCSA conveyance process continues.

BLM is the interim manager for unconveyed Native selections, except for the Ruby selection inside the Nowitna Wildlife Refuge for which the Fish and Wildlife Service is the interim manager. This means that the respective agencies, acting for the Secretary of the Interior, have the final decision authority for fire protection on the Native lands.

State land is in a category similar to Native lands: that is, patented, tentatively approved, or selected. Patented and tentatively approved lands are concentrated in the Fairbanks locale northwesterly to Livengood, along the Parks Highway, in the Kokrines Hills, and in the Poorman area. Elsewhere, the State lands are chiefly in the selected category. BLM is the interim manager for State selected lands.

Lands in Denali National Park and Preserve are under the jurisdiction of the National Park Service. The Nowitna Wildlife Refuge, created in March 1980, is administered by the Fish and Wildlife Service. This agency is also the interim manager for Native selections lying within the Refuge boundaries.

1. Base map obtained from Arctic Environmental Information and Data Center, 707 A Street, Anchorage, Alaska.

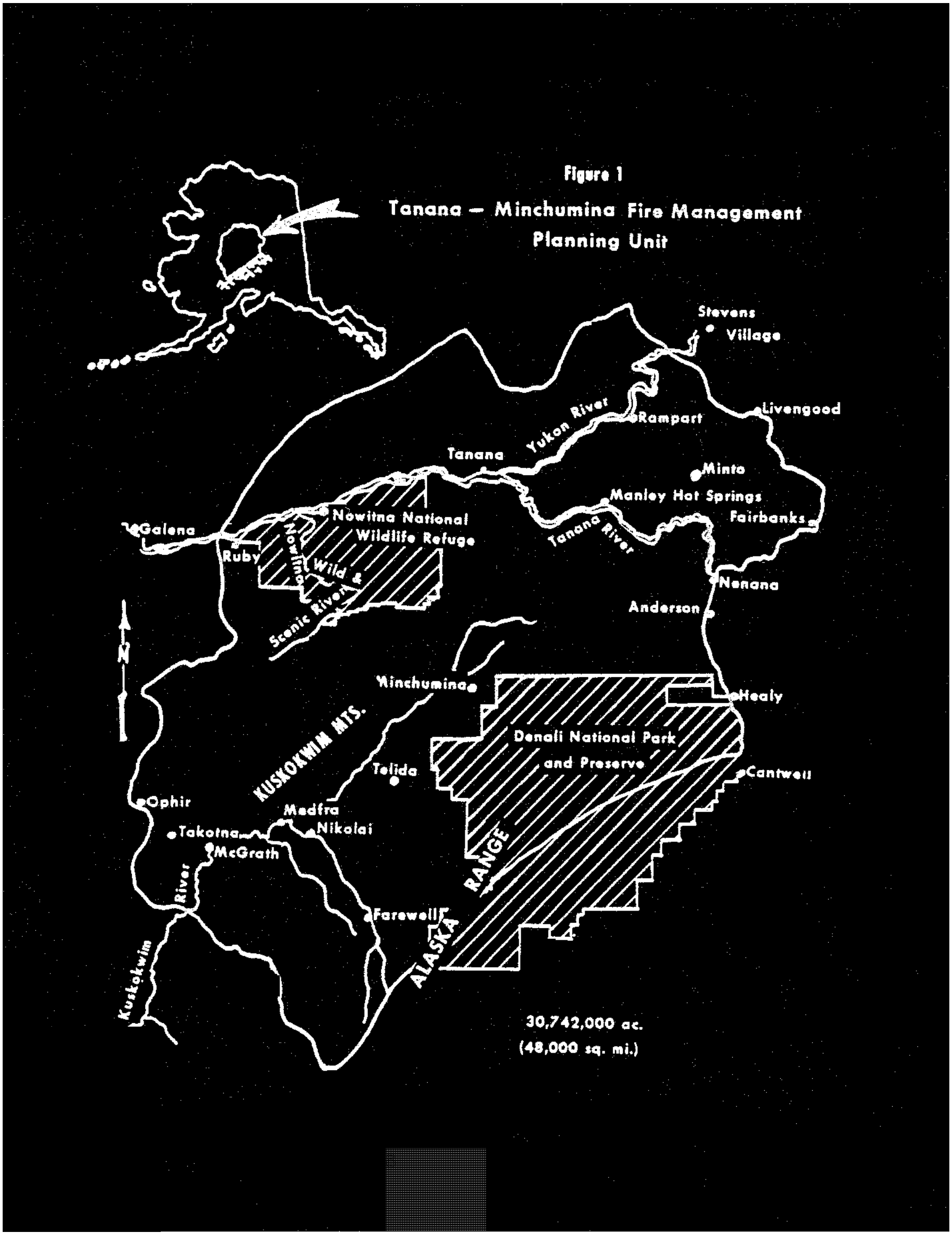

Figure 1
Tanana – Minchumina Fire Management Planning Unit
Stevens Village
Livengood
Yukon River
Rampart
Tanana
Minto
Manley Hot Springs
Fairbanks
Galena
Nowitna National Wildlife Refuge
Ruby
Nowitna Wild & Scenic River
Tanana River
Nenana
Anderson
N
Minchumina
Healy
KUSKOKWIM MTS.
Denali National Park and Preserve
Telida
Cantwell
Ophir
Medfra
Takotna
Nikolai
McGrath
RANGE
River
Farewell
ALASKA
Kuskokwim
30,742,000 ac.
(48,000 sq. mi.)

The BLM manages the remaining Federal lands outside the Park and Refuge, except for small military parcels at Clear and Takotna, and several small air navigation sites administered by the Federal Aviation Administration (FAA).

More than 300 Native allotments and about 75 other settlement claims are found across the area. Additionally, there are parcels of privately patented land. The claimants for Native allotments, Trade and Manufacture (T&M) sites, headquarters sites, and patented mining claims have possessory interests which place the claims in the same category as private land.

3. Population and Facilities

Most of the people in the planning unit live in the Fairbanks area, with a local population of about 36,000. The rest of region is sparsely populated. Twelve villages, located mainly along rivers and highways, have a total population of about 2400. A few people live outside of villages on mining claims or near areas which meet their subsistence needs.

The road net within and adjacent to the planning area is very limited. The George Parks Highway extends from near Anchorage to Fairbanks, forming the eastern boundary of the planning area from Cantwell to Fairbanks. The Elliott Highway forms part of the northeast planning unit boundary, from Fairbanks north to Livengood, and then extends southwest into the planning area to Manley Hot Springs. The Dalton Highway extends from Livengood northwest to the Ray Mountains, along the remainder of the northeastern boundary of the planning unit.

Most major facilities are located near population centers or along the road network. A variety of remote communication sites are scattered throughout the area, but they are generally located on rocky unburnable ridge tops where they are not threatened by wildfires.

B. PHYSICAL ENVIRONMENT

1. Climate

The climate is continental, characterized by long cold winters and short warm summers. Winter temperatures of -60 EF or lower are not uncommon and can be expected for extended periods of time. Summertime temperatures are relatively mild, but have reached as high as 90EF. Freezing conditions have occurred in every month of the year within the planning unit. Because sunlight approaches 22 hours/day in the northern portion in mid-June and slightly less in the southern portion, there is no pronounced variation in burning conditions between day and night during the peak of the fire season.

Annual precipitation is approximately 12 inches for the northern portions and 19 inches in the central and southern portions with 40 to 50 percent of this in the form of snow. Light, general rain occurs frequently during the summer months, although significant amounts are provided by thunderstorms. Thunderstorms are most frequent in the months of June and July (specific information can be found in Appendices B and C). Spring flooding occurs commonly along nearly all major rivers. Floods also can occur following periods of exceptionally heavy rainfall in midsummer.

Prevailing winds are southwesterly and tend to be closely associated with frontal passages. Severe winds often occur near the mouths of the valleys and steep gorges along the north face of the Alaska Range. These winds influence adjacent areas for up to 20 miles. Terrain also plays an important role in determining wind flow patterns in the sheltered Interior.

The basic question relative to predicting the seasonal fire weather picture was addressed to some degree in the climatological study performed for the Bureau of Land Management by the University of Alaska (Searby, 1975). The results of assessing whether or not a weather pattern would remain through a fire season, or if there would be predictable changes as a season progressed, showed wide variations of temperature and precipitation between years and during an individual season. This indicates that any predictions of seasonal or long-range burning conditions would be accompanied by a high degree of risk.

2. Topography

The planning unit is composed of four physiographic regions:

a. Interior Alaska Lowlands - This area includes broad valleys and plains between the Alaska Range and Kuskokwim Mountains, and south of the Yukon River between Ruby and Tanana. Most of these lowlands are nearly level and are interlaced with streams, sloughs, shallow lakes, and marshes. Also included are glacial outwash plains and piedmont slopes, originating in the Alaska Range.

b. Interior Alaska Highlands - The Kokrines Hills, north of the Yukon River, and the Ray mountains, north of the Tanana River, consist mostly of rounded hills and ridges but include some mountains higher than 4,000 feet. Parts of the area adjacent to major river valleys are as low as 300 feet.

c. Alaska Range - This long narrow mountain chain forms the southern boundary of the fire plan area. Steep talus and scree slopes, razorback ridges and deep valleys predominate, with many peaks higher than 10,000 feet. Huge glaciers are the source of many of the major rivers and streams which eventually become part of the Tanana, Kuskokwim and Yukon Rivers.

d. Kuskokwim Highlands - These uplands, in the west central part of the planning unit, include hills and low mountains. The primary portion consists of a series of rounded ridges 1,500 to 2,000 feet in elevation, separated by deep narrow valleys. A few peaks stand above the general level of the hills.

3. Soils-Watershed

A description of soils in the planning area can be found in the Exploratory Soil Survey of Alaska (Rieger et al, 1979). In general, the soils on raised areas along moraines and hills, or along major drainages, are well-drained, sandy or gravelly loams. These are the warmest, most productive, and frequently the driest sites. Severe fire can damage soils on these sites if the organic mat is thin. However, these sites usually support deciduous plant or white spruce/moss communities, which are relatively fire-resistant.

In lowlands, extensive areas are underlain by cold wet soils, usually with a thick organic mat and often with permafrost. Fire effects on these sites can vary widely with the severity of fire and the nature of the permafrost.

Permafrost is a condition in which ground temperature remains below freezing for two or more years. Above the permanently frozen soil is an "active layer" which thaws and freezes each year. Thawing is retarded by the insulating effect of a thick organic layer. The active layer found in the Tanana/Minchumina area ranges from 10 to greater than 60 inches in depth.

Fine-grained permafrost soils may contain up to 50 percent water. They are extremely unstable and easily eroded when the insulating cover of vegetation is removed because water released by the melting ice can cause runoff even on very gentle slopes. Sandy soils can have a fairly high ice content but resist erosion because of their large particle size. Coarse-grained gravelly soils tend to be very stable because they are generally well drained.

Many of the soils and substrates in the planning unit are composed of fine grained materials. North-facing slopes, south-facing toe slopes, valley bottoms, and areas shaded by heavy tree cover are completely underlain by ice-rich permafrost. Complete removal of the shading or insulating vegetation mat results in rapid melting of the ice-rich, fine grained soils and substrates. Rain may greatly accelerate melting. If the vegetation mat is removed to the edge of a water body, silt and organic material may wash into the water. Significant erosion rarely occurs after wildfires in interior Alaska because fires rarely consume the entire organic mat, although slumping and landslides occasionally occur on steep slopes after severe fires.

While wildfires have little effect on watershed values, major erosion frequently results from the use of mechanized fire equipment on ice-rich, fine grained, permafrost soils. Complete removal of all of the vegetation and organic material during fireline construction causes much deeper permafrost melting than occurs in adjacent burned areas. Runoff channels and deep gulleys frequently form, and stream siltation can result.

C. VEGETATION

1. Major Plant Communities

The flora of the Tanana/Minchumina planning area is typical of interior Alaska. The immense area includes nearly all plant communities found in the Interior, ranging from conifer and hardwood forests to alpine tundra. The predominant forest cover types include black spruce, white spruce, hardwood, and mixed deciduous-conifer.

a. Black Spruce Woodland - Black spruce forests with a canopy closure of less than 25 percent, but greater than 10 percent, typically occur on poorly-drained permafrost sites. The understory is dominated by sphagnum moss on wetter sites and feathermoss/lichens on drier sites. Ericaceous shrubs (2), dwarf arctic birch, and cottongrass are also important. The trees are often very stunted due to the harshness of the site. These black spruce communities often have a thick organic mat, which surface wets ant dries out quickly in response to changes in relative humidity. This, along with the continuity of fuel over larger areas, allows this vegetation type to burn readily when ignited during dry periods of time, usually with a crown fire. The site will be ready to burn again in 30-40 years, once a moss/lichen layer has developed ln the new black spruce stand.

b. Open/Closed Black Spruce Forest - Black spruce stands with canopy cover greater than 25 percent occur throughout the planning area. Paper birch and tamarack are occasional components. These stands are usually located on slightly drier sites than are woodland black spruce communities, and the trees are often taller. The understory is usually dominated by feathermosses, although lichens may form a nearly continuous mat in some stands. Ericaceous shrubs, dwarf arctic birch, and low willows make up most of the shrub layer. Open/closed black spruce forests burn with a frequency similar to that of black spruce woodlands.

c. Open/Closed White Spruce Forest - White spruce forests with canopy closure greater than 25 percent form large, productive stands on warm well-drained sites, especially along major rivers. White spruce also commonly form "stringers" along smaller streams and around lakes. Paper birch and balsam poplar often comprise a significant part of the tree canopy in these stands.

In open stands, a wide variety of shrubs and herbs dominate the understory, along with feathermoss. Alder, tall willow, prickly rose, buffaloberry, bunchberry, twinflower, and ericaceous shrubs are common. Fire occurs much less frequently in these forests than in the black spruce types. When they occur they tend to have lower intensities, although, occasionally, fires kill white spruce, particularly in older stands.

d. Open/Closed Deciduous Forest - Pure stands of birch, aspen, or mixtures of the two species are common on upland sites in the Interior. Aspen are most common on warm, well-drained sites, and grade into birch on colder, wetter sites. Aspen is an intermediate stage leading to white spruce, while paper birch sites may later be dominated by white or black spruce. A well developed understory of alder, willow, highbush cranberry, and low shrubs is usually present, as well as herbaceous vegetation, mosses and lichens. Fires are infrequent in deciduous forests and generally are low intensity when they do occur. However, these fires often kill the thin-barked overstory, after which a new hardwood stand will quickly reestablish.

e. Tall Shrubland - Tall willow, alder, and shrub birch form dense stands between treeline and alpine communities, and in some riparian zones. The understory varies considerably, consisting of dense grasses and herbs, or mosses and lichens. Fires tend to burn very slowly and with very low intensity on the rare occasions when they occur in this vegetation type.

(2) Ericaceous shrubs include blueberry, cranberry, Labrador tea, and other shrubs belonging to the taxonomic family Ericaceae.

f. Low Elevation Shrublands - Tall willows form extensive communities in low areas, particularly near the foothills of the Alaska Range. On moist sites the understory consists of a dense feathermoss/ericaceous shrub mat, while on dry sites there may be nearly continuous cover of lichens. The meager fuels and typically moist conditions seldom support fires of any notable size.

g. Shrub Bogs and Bogs - Vast shrub bog communities, dominated by ericaceous shrubs, are found over much of the area. Stunted black spruce and dwarf arctic birch are often scattered throughout. Shrub bogs occur on wet cold sites, generally underlain by permafrost, and have a thick organic mat. This community grades almost imperceptibly into black spruce woodland and low shrublands. On very wet sites, all shrubs disappear and a bog characterized by sphagnum dominates. These areas are often left unburned when large fires burn surrounding, drier areas.

h. Grasslands - Grassy meadows are scattered throughout the area on old lacustrine and glacial deposits. They are generally dominated by bluejoint grass and provide vital habitat for several wildlife species.

i. Tussock Tundra - Tussock tundra, dominated by cottongrass, is found on gentle slopes underlain by permafrost in mountain valleys in the northwest part of the planning unit. Other important species include ericaceous shrubs, mosses, and lichens, and frequently other sedges, shrub birch, and cloudberry. Fires in tussock tundra can burn with high intensity at any time of the summer because of the large amount of dead material. Fires can burn very deeply into the organic mat after a long dry period, but more characteristically consume only the surface organic layer.

j. Other Tundra Communities - Other tundra communities are also found within the planning area, but do not readily burn. Shrub tundra, dominated by dwarf birch, blueberry, labrador tea, and dwarf willow, is fairly common at higher elevations, above the shrub bog communities with their stunted black spruce. Fires which burn into these communities from lower elevations frequently go out because of the moist conditions and sparse fuel. Fires which do burn have very slow rates of spread and low intensity.

The following communities are probably found within the planning unit at higher elevations, although their extent is unknown. Herbaceous tundra, meadow communities dominated by grasses and other herbaceous plants, are found on adequately drained, protected sites. Fires would be infrequent and of low intensity, because of low fuel loading, and summer-green conditions. Sedge-grass tundra is usually too wet to burn, and also has a very low quantity of fuels.

Mat-and-cushion tundra communities are located where harsh environmental conditions limit the development of vegetative cover. Discontinuous low growing mats of vegetation, primarily of dryas species and prostrate willow are found, along with ericaceous shrubs, other fortes, sedges, and sometimes lichens. Fire occurrence is very low because fuels are sparse and discontinuous, and any fire would be quite small.

2. Fire Effects on Vegetation

Fire may be the chief factor maintaining vegetative productivity in cold Alaska soils, in which the lack of nutrients is a major factor limiting plant growth. Most nutrients are tied up in the vegetative overstory and in the thick moss and organic layers, and are unavailable to plants. The insulating effect of the organic mat limits summer warming of soil, and keeps the level of permafrost close to the surface.

Burning organic material changes nutrients from complex forms unavailable for plant growth, to more simple and readily available forms in ash. The soil becomes warmer because the overstory and moss layer have been removed, the organic layer is thinned, and the darkened soil surface absorbs more of the sun's heat. The active layer becomes much deeper, increasing the volume of soil from which plants can extract nutrients. The soil nutrient regime is greatly improved by the increased activity of decomposing and nitrogen fixing organisms. The degree to which these changes occur is closely related to the amount of organic matter removed by the fire, a factor which can vary considerably for different fires and for different areas of a single fire.

The amount of organic layer consumption is the result of an interaction between the organic layer moisture content and the amount of heat released by burning fuel. The depth of burning, fire severity, is much greater if the organic layer has been dried by a long period of sunny weather, than if the fire occurs after only a few drying days. The type and amount of initial revegetation of the burned area will be closely related to the severity of the fire.

The three major means of plant regeneration after burning are: resprouting from the stumps of plants killed by fire, resprouting from lateral roots and rhizomes (buried stems), and plant development from buried or wind carried seeds. The depth of organic material remaining as a mat on the mineral soil will determine which of these means of revegetation will be the most important.

In Alaska forests with deep organic layers, most of the below ground plant parts are found in the organic mat, rather than in the soil. Roots and rhizomes of plants such as blueberry, mountain cranberry, and twin-flower are located in the upper portions of the organic layer, while rhizomes of other species, such as rose, raspberry, and fireweed tend to be more deeply buried. Many of the roots of willow and some of the lateral roots of aspen also grow in the organic mat. Because these plant parts are the source of new sprouts after fire kills above-ground stems, the depth of burn has a great effect on the amount of postfire sprouting, and the species likely to dominate the postfire community. If fire just scorches or burns the surface of the organic mat, killing, for the most part, Just the above-ground stems, rapid and often prolific sprouting occurs from roots and rhizomes of those species found in the surface organic layers. If fire heat penetrates into the organic mat, killing plant parts to some depth but not consuming all organic matter, sprouts may originate from more deeply buried plant parts, and the sprouts may take longer to grow to the surface. Species with more deeply buried rhizomes and roots will be favored over those species which root primarily in the upper organic layer.

Complete consumption of the organic layer removes many or all of these potential sprouting sites, truly killing most plants on the site. A fire which burns away most or all of the organic layer will greatly limit the amount of vegetative reproduction which can occur after fire, but will favor development of new plants from weeds by creating good seedbed conditions.

Most plants of interior Alaskan forests require bare or nearly bare mineral soil as a prerequisite for successful seed establishment. When a seed falls on a blackened, but deep organic layer, it will germinate when there is plenty of moisture, such as after snowmelt or spring rains. However, the seedling will frequently die in a warm summer, because it is rooted in the organic layer which dries out. Because mineral soil retains moisture much longer than organic material, a seed landing on a mineral soil seedbed is much more likely to develop into a mature plant. Also, because postfire sprouting is limited on deeply burned sites, the amount of competition from other plants will be greatly reduced for several years.

A mosaic of fuel, organic layer and soil moisture conditions on a site can lead to a variable pattern of burn severity, and thus favors the development of a vegetation mosaic after the fire. Sprouts, seedlings, and vegetation which survived the fire may all be found. Successful reestablishment of seedlings, however, depends on more than the presence of a suitable seedbed. Other factors are also critical, such as the type and age of prefire vegetation, the time of year when the fire burned, the distance to the nearest seed source, the amount of seed consumed by rodents and birds, and the periodicity of seed crops. White spruce, for example, is physiologically capable of producing good cone crops every two or three years, but the lack of favorable weather for cone formation can greatly increase the interval. A ten year period between large cone crops is not unusual.

3. Postfire Vegetative Recovery

a. White Spruce - Although the amount and rate of postfire revegetation will vary, general successional sequences for interior Alaska forests have been developed. Foote (1980) describes six postfire stages for upland white spruce/feathermoss communities:

1) Newly burned stage - lasts for a few weeks to a year. The forest floor is covered with a layer of charred organic material and ash. Suckers of rose, highbush cranberry, willow and aspen appear first; then seedlings of fireweed, aspen, paper birch, and rarely, white spruce. Red raspberry, and other herbaceous species will be present in lesser amounts.

2) Herb-seedling stage - (1-5 years postfire). This stage is dominated by shrubs, aspen, and herbaceous plants, particularly fireweed, and Ceratadon and Polytrichum mosses and the liverwort Marchantia, which colonize bare mineral soil. Vegetative cover increases, litter accumulated and a thin organic layer begins to form.

3) Tall shrub-sapling stage - (6-25 years postfire). The overstory is dominated by one to two meter tall willows, prickly rose, highbush cranberry, and aspen, with an understory of herbs, tree seedlings, and litter. The organic layer thickens to about 8 cm.

4) Dense hardwood stage - (26-45 years postfire). Hardwoods form a dense canopy and shade out the shrub understory. As the stage progresses, hardwoods begin to thin, and an understory of small spruce develops. Cladonia lichens are more abundant in this than any other stage, although they are not a significant part of the ground cover. Organic layer depth does not increase.

5) Mature hardwood stage - (46-150 years postfire). These stands are characterized by well developed aspen and/or paper birch, or mixtures of hardwoods and white spruce. Because paper birch trees tend to outlive the aspen by 30 to 50 years, older stands usually contain paper birch or birch/spruce mixtures. Highbush cranberry, prickly rose, twin-flower, and horsetails dominate the understory; leaf litter covers the forest floor; willows, mosses and lichens are not important. The organic layer depth averages 11 cm.

6) Spruce stage - (150 to 300+ years postfire). Mature white spruce dominates, with a few remaining hardwoods in younger stands. Prickly rose and highbush cranberry are the mayor understory species, but may be replaced by green alder in older stands. Twin-flower and horsetails are common. Feathermosses cover the forest floor, over a 12 cm organic layer.

It has been suggested that without fire, some old upland white spruce sites would eventually be replaced by black spruce and bog, or a treeless moss/ lichen association, although others believe that white spruce stands are the final vegetation stage. Substantial evidence indicates that older white spruce stands on floodplains are replaced by black spruce as permafrost develops under accumulating moss and lichen layers.

b. Black Spruce - Postfire revegetation of black spruce/feathermoss sites follows a sequence similar to that for white spruce sites, but the duration and dominant species of later stages differs. Permafrost is close to the surface on most black spruce sites. Fire's consumption of some of the organic layer, and the blackened surface will result in a warming of the soil profile. Depth of the active layer will increase and soil and vegetative productivity will markedly improve. The following sequence of postfire vegetative changes have been detailed by Foote (1980).

1) Newly burned stage - (0-1 year after fire). Within a few days of the fire, sprouts of willow, prickly rose, bog blueberry, bluejoint, labrador tea, cloudberry, and Polytrichum moss appear. Charred materials cover most of the.forest floor throughout this stage.

2) Moss-herb stage - (1 to 5 years postfire). Other species also become important, including black spruce, aspen, paper birch, additional species of willows, resin birch, mountain cranberry, Ceratodon moss and Marchantia, as well as bluejoint, cloudberry and horsetail. The active thaw zone increases greatly during this stage.

3) Tall shrub-sapling stage - (5 to 30 years postfire). Tall shrubs and/or saplings dominate the overstory, especially willow and aspen. black spruce and hardwood seedlings are abundant. Ceratodon moss, fireweed, bluejoint, blueberry, labrador tea and mountain cranberry dominate the low growing vegetation. The active layer reaches its maximum depth, averaging 82 cm.

4) Dense tree stage- (30 to 55 years postfire). An overstory of numerous young birch and/or aspen trees is present, with extensive patches of low shrubs, feathermosses and Cladonia and Cladina lichens. Cover of herbaceous plants and willow has greatly decreased, while resin birch, prickly rose and green alder are still common. The trees begin to self-thin during this period. These stands are highly flammable and frequently burn.

5) Mixed hardwood-spruce stage - (56 to 90 years postfire). A mixed overstory of black spruce, aspen, and/or paper birch dominates. Hardwoods are mature and begin to stagnate and die out. Prickly rose, mountain cranberry, blueberry, bluejoint, bunchberry and feathermosses are the major understory species. The permafrost table begins to advance, averaging 57 cm. below the surface. Many stands burn during this successional stage.

6) Spruce stage - (91 to 200+ years postfire). This final stage has an overstory of black spruce and perhaps a few relict aspen and paper birch. A mid-vegetation layer of green alder, smaller black spruce and sometimes prickly rose overtops the forest floor layer of feathermosses, Sphagnum moss, mountain cranberry, blueberry, and a few herbs. A few Cladina and Cetraria lichens are present. With increasing stand age, sphagnum mounds increase in size, the moss layer thickens, the depth to permafrost decreases, and vegetative growth stagnated, because of cold soils and unavailability of nutrients.

Without fire, wet boggy conditions and a fairly open stand of stunted black spruce will develop on colder and wetter sites. On mesic black spruce sites, stands may increase in density, maintaining themselves by layering and rooting of lower branches, or may decrease in density, with many dead and dying trees and little reproduction. Fire is the only way to restore upland black spruce sites to a productive state.

c. Tussock Tundra - Fires in tussock tundra remove varying amounts of cottongrass, shrubs rooted in the cottongrass tussocks, tussock mounds, and adjacent mosses, lichens and organic matter. Vegetative recovery after most fires will begin within a few weeks, with sprouting of cottongrass, other sedges, shrub birch, ericaceous shrubs, and cloudberry. Because flowering and seed production of cottongrass increase manyfold, seedling establishment occurs on favorable seedbeds. Lightly burned lichens may regenerate from unburned basal parts. After 7 or 8 years, little direct evidence of fire may be visible.

Revegetation on severely burned sites will proceed more slowly. Many cottongrass tussocks will be partially or completely consumed by fire, and less sprouting will occur. Some shallow rooted shrub species, such as mountain cranberry and crowberry, may be temporarily eliminated from the site. Cottongrass reestablishment from seed will be a major means of revegetation. Lichens will initially establish from wind blown lichen fragments which land on moist microsites, but it is not known how many years will be required before lichens regain their prefire abundance.

The tussock growth form is a very important adaptation to these cold sites. Higher than the general ground level, tussocks receive more sunlight, thaw more quickly in the spring, reach maximum summer temperature sooner, average 6-8°C warmer than soils beneath the surface, and have more favorable nutrient regimes because of the warmer temperatures. The tussock growth form ensures much higher productivity for tussock sedges and associated plants (Chapin, Van Cleve, and Chapin, 1979).

Productivity will decline as sphagnum and other mosses fill in the spaces around the tussocks. Tussocks will no longer receive additional sunlight, so their internal temperature will be as cold as soil temperatures, and growth of most vegetation will stagnate. Some tussocks may eventually be completely buried by sphagnum. Because tundra fires cannot be dated with present methods, it is not known how long this process takes. The effect of sphagnum moss accumulation on tussock tundra lichen production is not known, but it may be detrimental, as it is on black spruce sites.

d. Other Non-forested Sites - Postfire revegetation in shrublands and bogs is primarily by resprouting of shrubs, grasses, sedges, and low growing herbaceous plants. Because these vegetation types are fairly wet, fires rarely burn severely enough to burn all roots and rhizomes. After the rare event that a fire burns deeply into the organic layers, seed reproduction will assume greater importance, and recovery of the prefire vegetation will initially be slower.

Fires in grassy meadows can be intense, but are usually beneficial, even in the short term. Sprouting occurs within a few days. Removal of accumulated litter and darkening of the soil surface promotes earlier snowmelt and greenup and therefore, a longer growing season. Seed production is much greater, and grass production will increase for several years, only declining as litter accumulates to prefire levels. Fire will also benefit meadows by removing or killing back encroaching trees and shrubs.

Postfire revegetation of sedge-grass, and mat-and-cushion tundra has not been studied in Alaska. It is likely that plant recovery will be by sprouting if perennating plant parts are not destroyed. If sprouting sites are killed, recolonization of the small burned areas will probably be from seed, or from roots and rhizomes which spread into the burned area from adjacent living plants.

D. WILDLIFE

1. Fire Effects on Habitat

Fire is a natural occurrence within Alaskan ecosystems. Generally, the effects of fire on habitat are much more significant than the effects on existing animals. Habitat changes determine the suitability of the environment for future generations of animals. Fires may have a short-term negative impact on existing animals by displacing or sometimes killing them or by disrupting critical reproductive activities. However, these animal populations recover quickly if suitable habitat is provided. Generally, fire improves the habitat for a wide variety of species. The adverse effects that the immediate generation of wildlife may experience are usually greatly offset by the benefits accrued to future generations.

Most of the planning area is covered with a mosaic of forest and bog habitat types that have been collectively termed the northern boreal forest. Fire is the primary agent of change in the boreal forest and is responsible for maintaining habitat heterogeneity. Wildlife have evolved in the presence of fire and have adapted to its presence. Indeed, the continued wellbeing of most species of wildlife depends on periodic disturbance of the habitat by fire. Even those species normally associated with mature stages of vegetation are able to accommodate and benefit from some level of disturbance by fire.

The grasses and herbaceous plants that quickly reestablish on burned areas provide an ideal environment for many species of small mammals and birds. A rapid increase in microtine population usually occurs following a fire. This abundance of small prey animals in turn makes the recently burned area an important foraging area for predatory animals and birds. However, the size of the fire and the subsequent proximity to cover, and denning or nesting sites affects the degree of use by these larger animals.

Fire severity and frequency greatly influence the length of time that this grass and herbaceous plant stage will persist. Severe burning delays the reestablishment of shrubs, a benefit to grazing animals and seed-eating birds. Frequent reburning of a site further retards generation of shrubs and seedlings and prolongs the grassland environment.

For some species of wildlife, such as bison, this perpetuation of a grassland environment is beneficial. Where bison are present, a management program that entails periodic burning to preclude invasion by shrubs and trees can supplement the rangeland that is naturally available along the braided river courses.

Browsers such as moose, ptarmigan and hares can benefit from the fire as soon as shrubs and tree seedlings begin to reestablish. If a fire leaves most of the shrub root and rhizome systems intact, sprouting will occur very soon after burning. In the case of early season fires, some forage may be available by the end of the growing season and limited use by browsing animals may occur. Forage quality is much improved, with higher digestibility, protein, and mineral content for some years after fire. As tall shrubs and tree saplings begin to dominate, the site becomes increasingly able to provide shelter and forage for a greater variety of wildlife. Although the rate of regrowth varies among burned areas and is dependent on many factors discussed earlier, this productive stage can persist for as long as 30 years after fire.

The greatest variety of wildlife will be found during the tall shrub-sapling stage. Many species, which up to that point have frequented the burned area only to hunt or forage, begin to find that it provides shelter and denning or nesting sites as well. This abundance and diversity of wildlife, in turn, makes these burned areas extremely important to people, whether it be to hunt and trap or to view and photograph.

On most sites the young trees outgrow the shrubs and begin to dominate the canopy after 25-30 years. At this point the shrub component thins out and changes, as more shade-tolerant species replace the willows. Subsequently, use by browsing animals such as moose, hares, and ptarmigan declines. On mesic sites which are developing into black spruce forest, lichens become important during this period and increase in abundance for 50 to 60 years.

As the forest canopy develops and the understory species disappear, a burned site becomes progressively more unproductive. Relatively few animal species can find the requirements necessary for their survival in the mature spruce forest that will eventually develop in the absence of further fire.

Because lichen cover increases in these more mature stages of black spruce stands, these areas are very valuable for lichen foraging animals such as caribou at this stage of development. However, in older stands, lichens are slowly replaced by feather and sphagnum mosses. On valley bottoms where a muskeg bog situation exists, lichen cover also develops but, contrary to the upland sites, lichens may persist as succession advances.

Generally speaking, large, severe fires are not nearly as beneficial to wildlife as are more moderate fires. Lighter fires quickly benefit browsing animals and their predators by opening the canopy, recycling nutrients, and stimulating sprouting of shrubs. In addition, the mature trees which are killed but not consumed by the fire, provide nesting sites for hole nesters such as woodpeckers, flickers, kestrels, and chickadees, as well as some cover for other animals. A severe fire that burns off the aboveground biomass and kills root systems, removes all cover and slows the regeneration of the important browse species, which must now develop from seeds.

Some sites, however, have progressed so far toward a spruce forest community that very little shrub understory exists from which revegetation of the site may occur. Furthermore, many sites are so cold and poorly drained that black spruce have a competitive edge over the less tolerant shrub species. In these situations, a light fire simply results in more spruce. Severe fire, or frequently recurring fires are necessary to kill the seeds in the spruce cones and prepare a suitable seedbed for other species. Then the value of the site to most species of wildlife is enhanced.

2. Wildlife Response to Fire

a. Moose - Moose were formerly much more abundant within virtually all portions of this planning area. Quality of moose browse in much of the area appears to be deteriorating and until fire or other disturbances are permitted to occur, overall carrying capacity for moose will not significantly increase. Fire suppression activities have interrupted the natural fire regime in much of the area to the overall detriment of moose and other species dependent on early forest seral stages.

Moose populations usually increase following fire due to increased production of high quality browse in the burned area. However, if the moose population has declined for reasons other than poor habitat, moose may be slow to utilize new habitat created by burning, and numbers may not increase dramatically. Under these circumstances the remaining moose have little trouble obtaining sufficient browse without utilizing the new burn. Use of a burned area will depend largely on whether it is situated in an area traditionally used by moose or through which they migrate. Dispersal to new areas will be slow. If, however, a fire occurs in an area where the moose population is near carrying capacity of the range, then competition for food and social pressures between individuals will result in more rapid exploitation of new habitat created by a fire. The use of burned areas by moose is also related to the amount of available cover. Fires of moderate size or large fires that contain numerous unburned inclusions create more edge effect than extensive severe fires, resulting in better moose habitat.

b. Caribou- It appears that caribou may not be adversely affected by fire to the degree once believed. The short-term effects of fire on caribou winter range are mostly negative. These include destruction of forage lichens, reduced availability of other preferred species in early postfire succession, and temporary alterations in caribou movements. However, forage quality of vascular plants will be improved by fire.

Long-term effects are generally beneficial. Light fires may rejuvenate stands of lichens with declining production. Fire helps maintain diversity in vegetation type, replacing old forest stands where lichens have been replaced by mosses, thereby initiating the successional cycle which leads to the reestablishment of lichens. Fire creates a mosaic of fuel types and fire conditions that naturally precludes a series of large, extensive fires that may be devastating to caribou habitat. Caribou are nomadic and each herd has historically utilized a range much larger than necessary to meet its short-term food needs. Thus, gradual rotation of the forest system by fire can be accommodated and, as pointed out, may be essential to prevent large severe fires which burn huge portions of a herd's range and result in an immediate lowering of range carrying capacity.

The long-term effects of fire on caribou range may be negative in some cases, however. Fires that recur frequently over a relatively short period of time may result in forests being replaced by grasslands or shrub-dominated communities, although this is not likely to occur over large areas. Also, large severe fires can create monotypes which would lead to irregularity in productivity and abundance of forage lichens.

While historic reasons for the decline in caribou distribution and abundance are not well known, loss of winter range to fire is not a probable cause. Although much of the caribou range occurs in an area of high fire frequency, there is no indication that natural wildfire has occurred more frequently in recent years than in the historic past. In fact, it is likely that less acreage has burned annually in recent times because of improved fire suppression capabilities.

c. Dall sheep - Winter range, lambing areas, and mineral licks are critical elements of Dall sheep habitat. Because the vegetative cover found on sheep range does not carry fire well in most cases, fire normally does not play a significant role in sheep population dynamics. Under some circumstances, fire may enhance sheep range by depressing treeline in areas where the boreal forest has encroached on alpine habitat.

d. Bison - Wildfires are extremely beneficial to bison. The present habitat is maintained primarily by river erosion and flooding; however, fire has the potential for greatly expanding suitable bison habitat away from the floodplain. The grasses and fortes that are the mainstay of their diet quickly reestablish after a fire. Burning serves to stimulate new growth and remove the mat of old material, canoeing earlier green-up. In addition, an extensive severe fire may result in a long lasting grass stage, by killing sprouting trees and shrubs, and tree seeds. Repeated fires can have the same result by killing trees and shrub vegetation before it is mature enough to produce seeds. The August 1977 fire in the Farewell area created new grassy areas which were utilized by bison during the summer, fall, and winter.

e. Black and Grizzly Bears - Black and grizzly bears are both benefitted by fire, responding in much the same way as do their prey species. Both are omnivorous, and fires increase the availability of both plant and animal foods. Blueberries, cranberries, and soapberries increase following fire, particularly in upland areas. Moose calves are important in the diets of both the black and grizzly bears in the springtime. Early stages of plant succession tend to increase moose production, therefore, more calves are available as prey. Small mammals are more readily available and play an important role in bear diets during the snow-free months. The grizzly, in particular, should benefit from increased large rodent populations following fire, although this is speculative and not yet proven. Because black bears make extensive use of lowland marshy areas during spring, fires occurring in such areas should be considered beneficial for this species.

f. Upland Game Birds and Small Game Mammals - Upland game birds and small mammals are also herbivores and as such, generally benefit from the increased forage and diversity created by fires in the boreal forest.

Sharp-tailed grouse prefer the open, shrubby areas created by fire over the dense forest. In the absence of fire sharp-tailed grouse frequent the open muskeg bogs; however, openings created by fire apparently are preferred and are not nearly as limited. Sharp-tailed grouse extensively utilize young burns both for foraging and for essential reproductive activities such as "lekking" (display activity on communal dancing grounds).

Ruffed grouse numbers may be initially depressed by the occurrence of a fire; however, they begin using the burned areas extensively as foraging sites when the sapling stage develops. Most researchers believe that the overall effects of fire upon ruffed grouse are beneficial and that fire may indeed be essential for the maintenance of healthy populations of ruffed grouse in the boreal forest.

Fires in ptarmigan summer habitat are a rare occurrence, since breeding occurs in the alpine areas at higher elevations. However, fires near treeline could increase ptarmigan nesting habitat by removing spruce trees that are encroaching on alpine tundra sites. Because most ptarmigan migrate to lowland areas for the winter months where their primary winter foods are young willow and birch, fires in the boreal forest can improve habitat for ptarmigan.

Spruce grouse appear not to be benefitted by fires because of their preference for mature coniferous forest habitat. Changes in habitat that affect availability and suitability of nesting areas, brood rearing areas, feeding places or roosting sites would greatly impact spruce grouse.

Snowshoe hares normally prefer older stands of black spruce and thick alder tangles during lows in their 10-year cycles. During population highs, however, hares will use even severely burned areas. Hares normally use open areas during summer months when their diet consists largely of herbaceous plants and leaves from low shrubs which are more abundant and nutritious on recently burned sites. Small fires or large fires with numerous unburned inclusions of black spruce or other heavy cover should provide optimal habitat for hares.

g. Aquatic Furbearers and Waterfowl - When fires occur in riparian (streamside) areas and marshes, they can be beneficial to muskrat, beaver, goose, duck, and swan populations. Without fire, ponds will usually be filled in by marsh vegetation. Organic matter accumulation will then favor the establishment of shrubs and trees. Fire rids marshes of dead grass, sedges, and shrubs and thereby tends to open up dense marsh vegetation to a degree that suits feeding waterfowl. Burning also stimulates the growth of new shoots which are of greater forage quality. Fire can have a short term negative impact when it occurs during nesting or molting periods.

Fire also is an important factor in the maintenance of marsh systems. In dry summers, peat marshes can burn down to the point where new bodies of water are created. Burning also alters the insulative effect of old marsh vegetation and allows solar heat to penetrate and alter the marsh subsurface where permafrost or ice lenses are prevalent. Subsequent melt-outs can result in new ponds and altered vegetative cover.

h. Terrestrial Furbearers - The furbearers other than beaver and muskrat are carnivorous and tend to respond to fire in a manner similar to that of their primary prey population. Some predators such as lynx are very specific, concentrating their efforts toward securing snowshoe hares. Others such as the red fox are less specific and are able to thrive on a variety of prey species such as rodents, hares, birds, and even fruits and berries at certain times of the year.

Because of their extremely large home ranges, wolves should not be harmed by fires of small or moderate size and will derive benefits from such fires as habitat conditions develop that favor prey species. Extremely large fires in caribou winter range, however, may cause changes in caribou migration routes and choice of wintering areas. In that case, wolves would also be forced to cease using the area, or switch to alternate prey species.

Fire probably benefits wolverine in most cases because ample food sources are apparently their key habitat requirement.

Red foxes have been characterized as animals of open grasslands and low shrubs, subsisting primarily upon rodents and hares. Therefore, depending upon the numerical response of red-backed and meadow vole populations on a site, the first 10 to 20 years following fire should benefit red foxes.

Lynx appear to prefer the same habitat types as snowshoe hares, their primary prey; therefore, fires which benefit hares by increasing browse production in association with adequate cover will also benefit lynx. Numerous small fires with numerous unburned inclusions should create optimal conditions for hares and lynx.

There is a common assumption that all fires are detrimental to pine marten populations, and intense fires do remove large trees which provide denning habitat. However, at the same time the food base for marten may be expanded. The food preferences are broad and marten are not dependent upon a particular prey species. Mice and voles constitute the main source of food, along with birds, squirrels, and berries. The frequently voiced assumption that martens depend heavily upon red squirrels probably is not valid in Alaska.

Large fires that result in extensive replacement of mature spruce with aspen and birch are decidedly detrimental to marten. Marten usually abandon these burned-over sites. However, the mosaic created by small fires or fires with unburned inclusions of spruce probably benefit marten populations more than they harm them. Cover and denning sites are retained in the unburned portions, while nearby foraging areas (openings created by fire) are improved.

Both the least and short-tailed weasel benefit from the increased prey abundance that usually follows burning.

Coyote populations are benefitted by fires that result in many openings within the boreal forest or which result in replacement of forest with grassland.

i. Small Mammals and Birds - Fires either benefit most small mammals or cause only temporary declines in their populations. Because vegetative recovery enormously increases available biomass on burned areas, population declines are more than compensated for in a short time. Red-backed voles, a species known to inhabit mature black spruce forests, will quickly exploit newly burned areas adjacent to mature stands of black spruce. Meadow voles often will begin using the same burned area in about the third year. Peak rodent densities in one study occurred when environmental conditions could be tolerated by both red-backed and meadow voles 7 to 16 years following fire. The implications of these observations are that predators largely dependent upon rodents will derive maximal overall benefits from a fire during that period of rodent super-abundance.

Although most small mammal species thrive best in very early seral stages of vegetation a few, like the red squirrel and flying squirrel, are adapted to old-age coniferous forests. These squirrels are dependent on white spruce for food and cover, and would be adversely affected by fire.

The habitat requirements for passerine birds varies greatly. Some like the pine grosbeak are specialized seed eaters that prefer spruce forest. However, most species frequent younger seral stages of vegetation and are most abundant in areas of greatest plant diversity. All burned areas will not be the same age nor size in an area with a history of fire, nor will conditions in like-age burns be the same because of differences in prefire vegetation, and fire severity. This presents a diverse vegetative mosaic that will support a wide spectrum of bird life. Extensive stands of black spruce present a rather narrow set of environmental conditions which restricts the number of bird species which can inhabit such areas.

Studies of songbirds in relation to fire in the north are scarce; however, one study (Klein, 1963) graphically demonstrated the changes that can occur following fire in the boreal forest. After burning of a white spruce forest in

Alaska in 1948, only 19 birds of 7 species were seen during 20 hours of observation. By 1957, 9 years later, nearly 200 birds of 19 species were seen, but by 1961, 13 years later, only 16 species were observed. Woodpeckers were well represented because of insects in the fire-killed spruce.

j. Raptors - Hawks, owls, eagles, and falcons generally benefit from fire. Small raptors that feed on mice and voles benefit most rapidly, since the herbaceous vegetation that is preferred by these small rodents returns to a burned site quickly after a fire. Raptors that specialize in preying on hares, grouse and ptarmigan benefit the most when shrubs and sapling trees invade the burned site. Small fires or large fires with many unburned inclusions would generally be best because of the vegetative mosaic that would result. The sharp-shinned hawk is probably the only raptor in Alaska that might be adversely impacted by fire. These hawks forage in the scrubby, open black spruce muskegs and prefer spruce trees for nesting sites. Other raptors are not nearly so restrictive in their foraging and nesting requirements. Golden eagles, great gray owls, great horned owls, boreal owls, goshawks, and hawk owls will nest in conifers, but neither require them nor necessarily prefer them. Kestrels, hawk owls, and boreal owls nest in tree cavities created by nesting woodpeckers. Burning produces standing dead trees that are readily utilized by woodpeckers, flickers, and other hole nesting species. Other raptors such as short-eared owls and harriers forage and nest in grassy meadow situations which are usually created and maintained by fire.

k. Fish - Fire effects which can directly impact fish populations are increased siltation and increased water temperature. Indirectly, any alteration of the nutrient flow which adversely affects aquatic organisms will also in turn affect fish populations.

Very little surface erosion normally occurs on burned sites in interior Alaska (except where heavy equipment is used to suppress the fire); thus, stream siltation is usually negligible. The few studies which have been conducted on fire effects on stream temperature indicate no postfire increases in the temperature of streams within a burned area. Thus, fish species which are adapted to the cold water in Interior streams are not likely to be affected. Burning also does not seem to adversely impact the aquatic fauna in the Interior.

Fire has the potential for initiating other changes in a riverine system. A stream that coursed unimpeded through white spruce before a burn, may become dotted with beaver colonies 10 to 20 years after a fire. Beaver ponds provide excellent rearing waters for salmon fry and can also benefit grayling and pike. On the other hand, beaver dams may restrict fish migrations and could temporarily result in the absence of grayling from the upper reaches of some streams. Probably in most cases the presence of beaver ponds is beneficial to the fish resource of the area and should be viewed as a positive attribute of fire.

E. THREATENED AND ENDANGERED SPECIES

1. Animals

The only listed endangered animal species that has known distribution and occurrence in the planning area is the peregrine falcon (*Falco peregrinus anatum*). Since known nesting sites generally occur in areas where actual burning of vegetation is unlikely (i.e., cliff faces and rock outcrops), the potential for burning of nest sites or mortality to the bird or its young is fairly remote.

Fire has long-term beneficial effects for peregrines because it provides successional vegetational changes and diverse habitat for prey species. Fire improves waterfowl production in wetland habit. Diverse habitats and increased vegetation productivity provide numerous niches for small bird populations which may provide for an improved prey species base for peregrines as well as other raptor species.

The effects of fire suppression and related activities are considered to have more adverse impact on sensitive, threatened, and endangered species than the actual fire. Human activities, such as the construction of fire breaks, crew camps, use of vehicles, retardant drops, ant low flying aircraft, which occur near peregrine falcon eyries, would contribute to disturbance of nesting birds and increase the likelihood for nest abandonment or mortality to young.

2. Plants

Four taxa proposed for threatened or endangered status (Murray, 1980), have been located within the planning unit. Three of these taxa - *Smelowskia borealis var. villosa*, *Smelowskia pyriformis*, and *Taraxacum carneocoloratum* are found on high, dry alpine ridgetops. The low fire potential in these areas minimizes the risk of destruction by fire, and the inaccessibility of the mountain summits precludes their consideration as staging areas for fire equipment or personnel. The fourth taxon, *Oxytropis kokrinensis*, is found in the Ray Mountains at the northern boundary of the management area. The fellfields of the low, rounded hills on which this species occurs provide more suitable fire fighting staging areas and their utilization could entail disturbance to the oxytrope. While the general distribution of the species in the Ray Mountains is not yet known, it is believed to be sufficiently extensive to withstand some disturbance to local populations. For this reason, *Oxytropis kokrinensis* does not warrant specific protection at this time, but the likelihood of its presence should be noted.

F. HUMAN VALUES AND ACTIVITIES

1. Wilderness

Denali National Park contains the only designated wilderness within the planning area. As a natural ecosystem process, fire will increase the suitability of any area for wilderness designation by Congress. The opportunity for primitive recreation and solitude could even be enhanced. Conversely, the use of bulldozed firelines could effectively remove an area from wilderness consideration, making any such activity extremely undesirable.

2. Cultural/Historic Resources

Cultural resources are the prehistoric and historic evidence of human activities. In addition to physical remnants, cultural resources can be found in oral accounts and customs passed down through the generations, and in lifestyles and lifeways that continue to be lived. Because fire suppression is only a very recent activity of humans in Alaska, most cultural values, especially lifeways, have evolved in fire-dependent environments. Some aspects of the cultural heritage in the planning area have been significantly influenced by fire, since fire has played a major role in the vegetation ant wildlife resources that contribute substantially to those lifestyles, customs, and cultural styles.

The planning area contains a variety of known cultural resources, including archeological sites thousands of years old, native cemeteries, former community sites, and travel routes associated with native heritage. Evidence of more recent human settlers includes cabins, roadhouse sites, mines, trails, and tools and equipment associated with European explorers and settlers.

Although some surveys have been done and others are ongoing, only a relatively small portion of the planning area has had extensive investigation for cultural resources. Until surveys can be completed, all cabins and other remains must be considered culturally valuable. The only National Register sites currently listed are all cabins and roadhouses associated with the Iditarod Trail, which is the first National Historic Trail in the United States.

In assessing the impacts of fire and fire suppression activities on cultural resources, it is advisable to draw a distinction between surface and subsurface resources. Surface resources are primarily historic in nature and tend to be constructed of flammable materials, because natural processes of deterioration have not operated long enough to level structures. Subsurface resources are primarily prehistoric and archeological, and tend to consist largely of nonflammable material because natural processes of deterioration have eliminated most organic matter. Furthermore, subsurface resources tend to be much less visible than surface resources, because structures have been leveled and the material covered by vegetation.

a. Effects of Fire - Information concerning the effects of fire and fire suppression activities on cultural resources is scanty. Some information has been gathered concerning fire effects in the lower 48 states, but any attempt to generalize from this data to radically different conditions in Alaska would not be justifiable. Nevertheless, logic and reason would seem to indicate that surface historic structures are subject to severe effects from fire itself. Organic materials used in construction are likely to be completely destroyed or substantially damaged as a result of burning.

Subsurface resources are much less likely to be significantly affected by fire. In a very severe fire, which burns down to mineral soil, organic material such as bone, ivory, and wood that is present in the soil matrix will be destroyed. Intense heat from such a fire is also likely to fracture and otherwise damage non-organic material such as ceramics and chipped stone. Because of well-developed vegetation mats and generally moist soils, fire in this region does not usually burn extensive areas to mineral soil. In this case, severe impacts to subsurface cultural resources are very unlikely. Much of interior Alaska is known to have burned in the past. Evidence of such burning has been observed on several archaeological sites that have been excavated, apparently with no evidence of severe impacts from the fires.

b. Effects of Fire Suppression - The possibility of damage to surface cultural resources from fire suppression activities is relatively slight. This is particularly true of standing historic structures which can be easily observed, even by untrained individuals. Consequently, it is likely that most suppression activities such as fireline and camp construction can be located so as to prevent impacts to surface cultural resources. Surface sites such as lithic scatters will be disturbed by fireline construction and similar ground-disturbing activities.

Subsurface cultural resources are likely to be damaged by suppression activities, particularly firelines. Such resources are difficult to observe, particularly in regions such as the Tanana/Minchumina, where well-developed vegetation mats obscure them, making it likely that such sites will not even be discovered until after they have been disturbed.

3. Visual Resources

The effect of fire on the visual resource is primarily beneficial but can be adverse in areas of high visual sensitivity. In general, areas of high visual sensitivity correspond to major travel corridors and population centers. Major access corridors which may be visually sensitive include the Yukon, Kuskokwim, and Tanana Rivers, roads, major aviation routes, and the Iditarod Trail.

Wildfire is an integral part of the ecological process that maintains or enhances natural visual diversity. In the short-term, a small fire (up to 50,000 acres), blackens an area creating sharp visual contrast and possibly visual interest. Extremely large, severe fires (over 50,000 acres) with few unburned or less severely burned inclusions, create large expanses of blackened landscape which are monotonous and result in reduced visual interest. Extensively burned areas will have a negative visual impact on some users (viewers), although others will view the scene positively, or make no value judgment. Even large burned areas may create a pleasing visual effect once vegetation regrowth has begun.

Fire suppression can cause highly adverse damage to visual resources. Short term impacts are generally acceptable unless viewed from key observation positions such as highways, high use areas, or scenic overlooks. Long-term impacts are unacceptable and are usually a result of bulldozed firelines. Bulldozers disturb the organic mat and expose mineral soil, creating distinct unnatural lines across the landscape, and sharp color contrast that may take decades to disappear.

4. Air Quality

The inevitable fate of vegetation is decomposition and eventual incorporation into soil. During a very short period of time while a fire is burning, processes of oxidation and chemical transformation occur which are similar to those that slowly occur in decomposition, with the concurrent production of some materials that go into the atmosphere and are eventually returned to the vegetation system. There is a great chemical similarity between the products of combustion of forest fuels and the products of decay. A summary of emissions (Figure 2) from forest burning indicates relatively large amounts of carbon dioxide, water, particulates, and carbon monoxide. Lesser amounts of hydrocarbon and nitrogen oxides, and essentially no sulfur oxides are produced from forest fires (Martin, 1976).

There are substances, termed and regarded as "pollutants," which emanate from forest burning and enter the atmosphere. Carbon dioxide (CO_2) and water (H_2O) emissions are not considered pollutants. Carbon monoxide (CO) is toxic and lethal concentrations of CO have been found in the active part of some fires. High CO concentrations at the fire site decrease rapidly in any direction to ambient conditions. The burning of forest fuels contributes only 1/600 of the total CO emitted from other natural sources. Unsaturated hydrocarbons (HC) of low molecular weight are related to Los Angeles-type photochemical smog. Hydrocarbons known to be photochemically reactive are present in wood smoke but, with the exception *of* ethylene, in very small amounts. Hydrocarbons are extremely widespread in the plant world in volatile oils, waxes, and resins. The most prevalent HC in the atmosphere is methane (marsh gas) which originates primarily from the decay of organic material. The relative importance of HC emitted from forest fires, as far as photochemical smog is concerned, appears to be very small. Nitric oxide (NO) is also regarded as an important pollutant because of its involvement in photochemical smog processes which may produce damaging compounds such as ozone (O_3) and peroxyacylnitrates. NO is not a combustion product, but forms when air is heated higher than 2800E F. On a global basis, natural production of NO, mostly by soil organisms, exceeds man's production by 15 to 1. Forest fires are an insignificant source of NO. There is no evidence that the emissions from combustion of forest fuels are a threat to human health (USDA Forest Service, 1976).

The visible column of smoke from a forest fire contains a lot of water, very small aerosols of organic matter, and some unburned carbon in finely divided form. The water condenses on the particulates, forming a cloud of water droplets. The total accumulation of particulates or aerosols from burning wood is very small in comparison with that emanating normally from forests. The principal valid objection to the burning of forest fuels as regards particulate pollution is the temporary interference with visibility. Military, commercial, recreational, and even fire detection and fire suppression aircraft activities can all be adversely affected by smoke. However, data from the Alaskan interior indicate that smoke conditions severe enough to impact aircraft (visibility reductions to 6 miles or less) do not occur to the extent generally assumed (refer to Table 1). Yearly occurrences of heavy smoke range from an average of about 6 days per year at Tanana to about 2 days per year at McGrath. Even when heavy smoke is present, it is rarely (less than 40%) so severe as to exceed the Visual Flight Rule (VFR) weather minimums for aircraft within a control zone airspace and very rarely (less than 15%) exceeds VFR minimums for areas outside of control zone airspaces. The historical occurrence, extent, and duration of heavy smoke in the interior of Alaska indicate the problem is minimal.

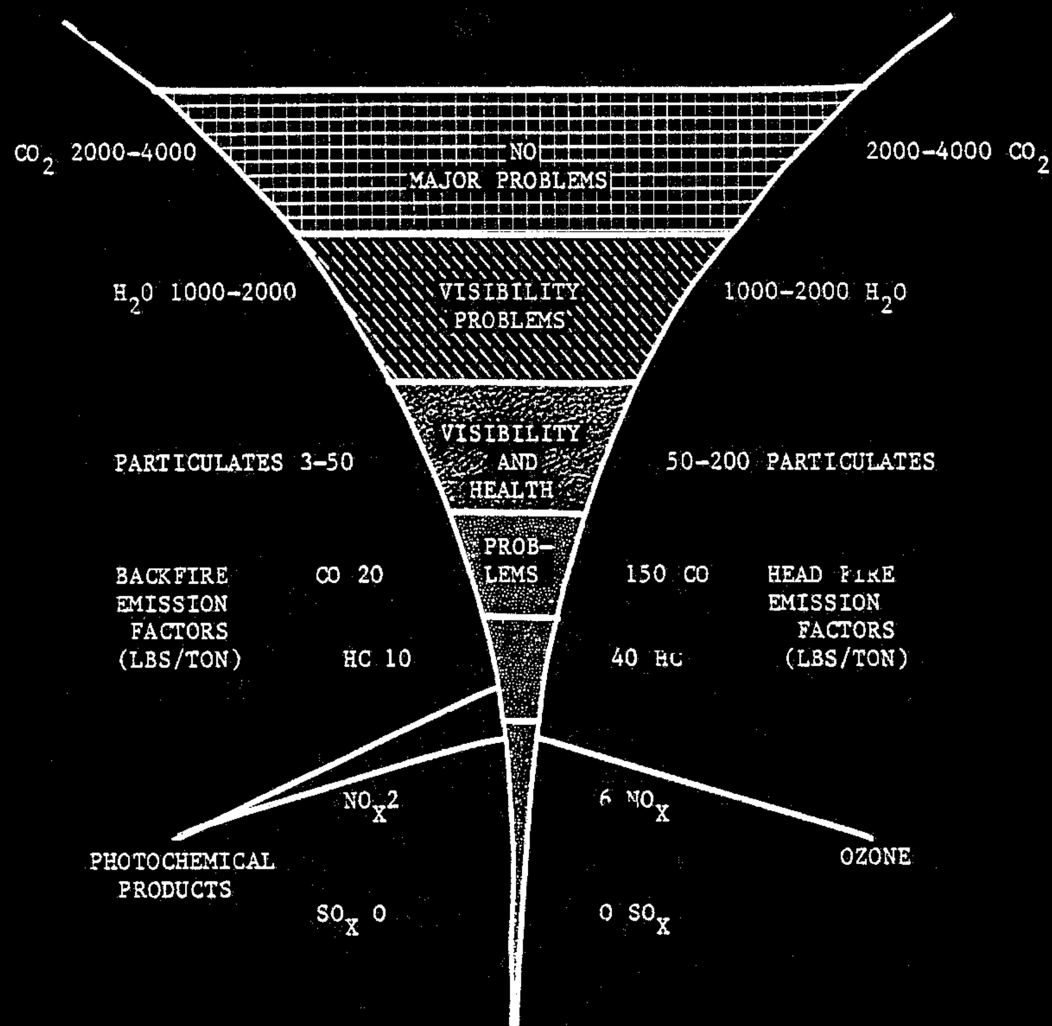

Figure 2. Range of emission factors from forest burning. Because difficulties in sampling and the complexity of the problem, estimated levels of emission factors may vary greatly from these data. (Figure is adapted from that of P. W. Ryan, Southern Forest Fire Laboratory, USDA Forest Service, Macon, Ga. Figures for emissions of carbon dioxide, water, and particulates have been modified.)

Table 1

Occurrence of Heavy Smoke(1) Conditions in Interior Alaska

STATION NAME	NUMBER OF YEARS OF DATA	TOTAL NUMBER OF (2) SMOKE DAYS	YEARLY AV. NUMBER OF (2) SMOKE DAYS	TOTAL NUMBER OF DAYS VISIBILITY WAS LIMITED BY HEAVY SMOKE BY DISTANCE CLASS (MILES) 0-1/8	3/16-3/8	1/2-3/4	1-21/2	3-6
Fairbanks	24	116	4.8	0	2	14	28	72
Farewell	13	30	2.3	0	1	4	10	15
Galena	18	67	3.7	1	7	5	26	28
Indian Mountain	20	69	3.5	1	2	8	12	46
Lake Minchumina	22	46	2.1	0	1	4	9	32
McGrath	20	38	1.9	0	1	5	14	18
Nenana	24	101	4.2	0	2	7	19	73
Tanana	15	85	5.7	0	1	9	20	55
TOTAL NUMBER OF SMOKE-DAYS		552		2	17	56	138	339
% OF TOTAL NUMBER OF SMOKE-DAYS BY DISTANCE CLASS				.4	3.1	10.1	25.0	61.4

(1) Heavy Smoke - Visibility reductions to 6 miles or less.
(2) Smoke-Day - Any day in which smoke, haze, or smoke and haze was reported at any one of eight tri-hourly observations for the given station.

VFR weather minimums for airports within a control zone airspace are a 1,000-foot ceiling and 3-mile visibility.

VFR weather minimums for aircraft operations outside of the control zone airspace are Aclear of clouds@ and A1-mile visibility.@

(Table is a modification from Barney, R.J., and E.R. Berglund. 1974. Wildfire Smoke Conditions: Interior Alaska, USDA for. Serv. Res. Pap. PNW-178, 18p., illus. Pacific NW For. And Range Exp. Stn., Portland, Oregon).

5. Recreation

Types of recreation in the area include hunting, fishing, recreational trapping, camping, hiking, boating, cross-country skiing, scenic travel such as driving, flying, riding the railroad and buses, snowmobiling and ORV driving, dog sledding, berry picking, gold panning, photography, mountain climbing, nature study, and wildlife viewing.

As with other human activities, most recreation is centered around major access routes and population centers. The most intense use is concentrated along roads, particularly the road to Kantishna which passes through Denali National Park. Rivers, lakes, and airstrips concentrate use to a much lesser extent. Very few recreation activities occur away from major access points, with the exception of hunting.

Fire promotes vegetation and wildlife diversity which can enhance recreation opportunities in the long term. The negative effects of fire on recreation generally are short-term and are directly related to fire effects on specific resources used in recreation. Effects on visual and cultural resources, wildlife, and vegetation will have immediate and direct effects on use of these resources for camping, sightseeing, hunting, and other activities. Recreation users are generally more mobile than subsistence users. Thus, if recreation is precluded by fire in one area, they generally can find an alternate area in which a similar recreational activity can be pursued. However, smoke thick enough to limit aircraft flights could cause the cancellation of remote area hunting trips.

One of the most prominent recreational resources in the planning area is the Iditarod Trail, which receives national attention each year as it is traveled by mushers in the longest dog sled race in the world. Approximately 140 miles of the trail lie within the southwest part of the planning area. While small fires are unlikely to affect trail users, large fires, such as the 1977 Bear Creek Fire near Farewell, have resulted in very difficult travel because of exposure to wind, drifting snow, fallen trees, and loss of key landmarks, particularly the opening through tree crowns used to follow the trail.

6. Economy

Fire and fire suppression activities have important effects on the economy of Interior Alaska. The Bureau of Land Management presently hires about 300 seasonal employees, who are fed and housed locally, while the State of Alaska currently hires about 20. Equipment, aircraft, and support services are procured. Aircraft hire can be an important source of income for local air charter companies.

A busy fire season can have an extremely significant impact on village economies, because many Native fire fighting crews are employed, providing a major source of cash income. Fire can affect subsistence hunting and trapping activities by altering wildlife habitat, with increases or decreases in associated species. Specific effects can be inferred from Section II. D., Wildlife, and II. F.8, Subsistence and Lifestyle.

7. Forestry

Despite the vast quantities of timber within the planning area, low volumes per acre and inaccessibility have limited timber harvesting to the road system and areas adjacent to villages. The timber is harvested, processed, and used locally for house logs, saw timber, and fuel wood. Most lands which support local forestry operations have been selected by village or regional Native Corporations, although a large area of potentially commercial timber exists on State land within the boundaries of the Nenana agricultural product.

Commercial timber occurs on warm, well-drained soils along river margins and on south, southeast, and southwest-facing slopes. White spruce is the most valuable species for saw timber, and birch is the most valuable species for fuel wood. Balsam poplar and aspen are also utilized.

Although the various hardwood species have different potential lifespans, they are all managed on a 70-year rotation under natural conditions. After the age of 70 or 80 years, hardwood species are very susceptible to fungal decay, a primary cause of mortality. White spruce stands are managed on a 130-year rotation. Although capable of surviving for over 300 years, few stands reach this age, because overstocked or old white spruce stands tend to develop heavy fuel loadings which make them susceptible to stand-destroying fires.

Fire protection increases the probability that commercial forests will reach their full rotation ages. However, some commercial size stands are so small in area and inaccessible that fire protection is not justified.

Effects of Fire - All commercial forest species in interior Alaska germinate and grow best on mineral soil in open sunlight. Because seedling success is quite low on organic seedbeds or under shaded conditions, fire provides optimum conditions for both hardwood and spruce seedlings.

Aspen and birch are very susceptible to damage from fire because of their thin bark. White spruce and balsam poplar have thicker bark and may survive light surface fires. Most fires will result in prolific sprouting from roots and stem bases of aspen and birch, while balsam poplar sprouts to a lesser degree. All species are generally killed by severe fires which destroy their shallow root systems. However, these fires create the seedbed which permits the reestablishment of hardwood stands from seed, and the replacement of old white spruce stands in a state of decay.

8. Subsistence and Lifestyle

The residents of the Tanana/Mlnchumina fire planning area have lifestyles oriented to the outdoors. Fishing, hunting, and gathering activities provide for much of the food needs of rural residents. However, the degree of dependency upon the natural resources of the area varies considerably, ranging from those who lead a truly subsistence lifestyle to those who supplement their incomes by hunting, trapping, and fishing.

Salmon and whitefish are caught in large numbers in nets and fish wheels and dried for use during the winter. Dried fish are used for human food and dog food and are bartered for other essentials. Local residents also fish commercially. Income from the sale of fish contributes greatly to the cash economy of rural villages. Fishing, whether it be commercial or for subsistence use, is a way of life for many residents of the area. Families frequently travel to summer fish camps that have been in use for several generations.

Moose hunting provides for most of the meat needs of the rural residents, since moose occupy virtually all portions of the planning area. Because moose tend to spend much of their lives along the river systems, moose are frequently found in areas where people are or where access is good. In addition, these moose populations are utilized by many nonlocal Alaskans who hunt there for recreation and to supplement their food supplies.

Historically, people living in this planning area have also relied on caribou to meet many of their domestic needs. People from Tanana and Rampart used to hunt caribou in the Kokrines Hills and Ray Mountains; residents of McGrath and Takotna formerly harvested caribou from the Nixon Fork during winter when overland access was possible; and residents of Minchumina hunted Alaska Range caribou that wintered nearby. Now because of greatly reduced caribou numbers and resultant hunting restrictions or closures, most of these people no longer harvest caribou. Only in Nikolai, and to a lesser extent Telida, are local residents still able to hunt caribou. Most of the caribou in the Alaska Range are accessible only to hunters using aircraft. Consequently, most of the 70-100 caribou harvested from this area annually are taken by non-local residents (mostly from Anchorage) or non-residents hunting with a guide.

Black bear hunting provides food, recreation, and economic value during a time of year when most hunting seasons are closed. Most black bears are hunted in spring and early summer when they are available by boat access on the lowlands. During the fall, bears frequent the good berry producing hillsides and are often taken incidental to other hunting activities. Interior black bears are generally smaller than bears from either coastal or more southern areas; however, there is some guiding interest in portions of the planning area.

Grizzly bears are rarely eaten and most of the harvest is by sport hunters. However, some animals are killed as nuisances or in defense of life and property. The guiding industry brings considerable money into the state's economy by selling guide services in this portion of the Alaska Range. Much of this does not benefit the local residents of the area directly; however, nonresident hunting fees contribute substantially toward the management of other species which local residents do utilize extensively.

Bison are not readily available to most residents of the planning area since the herd occupies a rather remote area accessible only by air. McGrath residents, who have access to aircraft transportation and are relatively close to the herd, have shown considerable interest in hunting bison. Other hunters come primarily from Fairbanks and Anchorage. Bison are equally valued for their meat and as trophy.

Most Dall sheep found within the planning area occupy areas that are relatively inaccessible to local residents. Consequently most are taken by sport hunters and less than 25 percent of the sheep harvest is for local domestic use.

Migrating waterfowl are an important food supplement for residents of interior Alaska. Most waterfowl hunting in this portion of Alaska is for local domestic needs. Only Minto Flats supports sizeable and important recreational hunting of waterfowl and this is largely due to its proximity to a major urban center (Fairbanks). However, waterfowl reared in these areas also provide recreational hunting opportunities for many people throughout the United States and Canada since these are migratory species.

Grouse, ptarmigan, and hares are also extremely important locally as a supplement to other food sources. Usually these species are readily available and easily caught in snares or shot. Most are used to augment food needs; however, sport hunting has become increasingly prevalent in some areas near Fairbanks. Hares are also used as dog food and as bait for traps. Although the hides are fragile they are sometimes used for mittens and blankets, and occasionally the pelts are sold commercially to make felt.

Trapping is a major source of income for many families residing in the planning area. When running traplines, trappers often use some of the numerous cabins scattered throughout the remote portions of the planning area.

Marten, fox, wolverine, lynx, beaver, and muskrat are the furbearers of greatest importance to local residents. Trapping effort depends on both abundance of the furbearers and the prices being received for the various pelts. Many are retained for local domestic uses such as mittens, hats, and garment trim. Carcasses of lynx, beaver, and muskrat are frequently used for human or dog food. All are usable as trap bait.

Marten are the economic mainstay of most trappers in the area. Because of the importance of marten in the local economy, factors that influence marten abundance must be carefully evaluated.

The wolf is a highly valued furbearer. However, wolves are more difficult to trap, require expensive and hard to obtain traps, and occur at lower densities than do other furbearers. Consequently, the harvest remains relatively low.

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III. FIRE MANAGEMENT INFORMATION

A. HISTORICAL FIRE ROLE AND OCCURRENCE

Fire has played a significant role in the interior of Alaska. An average annual burn of 1.5 to 2.5 million acres prior to 1940 has been estimated. With the organization of fire suppression activities, starting with the formation of the Alaska Fire Control Services in 1939, these numbers have been reduced to about 900,000 acres per year (10 year average 1969-1978), but large fires still occur frequently despite increases in suppression efforts.

Essentially, fire suppression has been successful in controlling those fires of low and moderate intensity and severity, fires with distinctly different ecological effects than the large, high intensity fires which have occurred. Fire suppression may therefore have had greater ecological impact than that indicated by the decrease in average annual burned acreage.

Within the Tanana/Minchumina Planning Area, fire activity has followed much the same pattern. During the 25-year period (1957-1981) for which statistics are available, approximately 9 percent of the 31,000,000 acres in the planning area burned. During this period there were 1,716 fires which burned a total of 2,831,554 acres for an annual average of 69 fires and 113,262 acres burned (Table 2). These averages are not truly representative of the fire activity, however, as only 4 percent (64) of the fires burned 94 percent (2,688,784) of the total burned acreage. There were large fires (greater than 5,000 acres) in 1957, 1958, 1959, 1968, 1969, 1971 thru 1977, and 1981 (Figure 3 & 4). The most active years were: 1957 (390,877 acres); 1968 (400,870 acres); 1969 (683,953 acres); 1977 (389,760 acres); and 1981 (313,800). In contrast to these big fire years, there were several seasons (1961, 1965) with very little activity, less than 200 acres burned. The largest individual fires in the planning area were Big Denver #9447 at 314,683 acres in 1969, and Bear Creek #7721 at 345,000 acres in 1977.

Of the 1,716 total fires within the planning area, 820 (47.8%) were man-caused and 896 (52.2%) were caused by lightning (Table 3). In looking at the planning area as whole, however, these figures do not accurately represent the area at large because almost half of the man-caused fires occurred in the Goldstream unit which includes the city of Fairbanks and the surrounding rural areas. The majority of the man-caused fires in this unit were due to debris burning (36% and recreation (23%), strongly biasing the total figures for the planning unit.

There is a definite pattern to the seasonal fire occurrence. The greatest number of fires started in the months of May, June, and July, with 249, 587 and 563 respectively (Table 4). Lightning caused 11 percent of the fires in May, 62 percent in June, and 72 percent in July (Table 5). By September, lightning occurrence dropped off and the majority (92%) of the fires were man-caused. The earliest reported fire was on March 29 and the latest on October 26. Both were man-caused.

Table 2
Total Number of Fires and Acres Burned by Fire Size Class (1957-1981)

Number of Fires*

Size Class* Year:	A	B	C	D	E	F	G	Total
57-59	31	56	37	15	11	16	17	183
60-64	28	47	26	2	1	1	0	105
65-69	97	124	54	17	11	15	29	347
70-74	214	191	64	19	7	2	8	515
75-79	233	161	46	5	5	12	5	457
80-81	26	57	18	2	1	0	5	109
TOTAL	629	636	245	60	36	46	64	1,716

Acres Burned

57-59	0	172	1,396	2,858	6,400	43,500	516,137	570,463
60-64	0	163	883	235	410	1,800	0	3,491
65-69	1	398	1,995	2,785	5,349	32,101	1,191,063	1,233,692
70-74	0	486	1,982	2,845	3,450	25,570	216,024	250,357
75-79	4	388	1,085	790	2,700	2,400	451,760	459,127
80-81	0	142	394	320	0	0	313,800	314,424
TOTAL	5	1,749	7,735	9,833	18,309	105,371	2,688,784	2,831,554

* Does not include false alarms.

** A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres,
E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres

Figure 3: Annual Number of Class G Fires (5,000⁺ Acres): 1957-1981
Tanana/Minchumina Planning Area

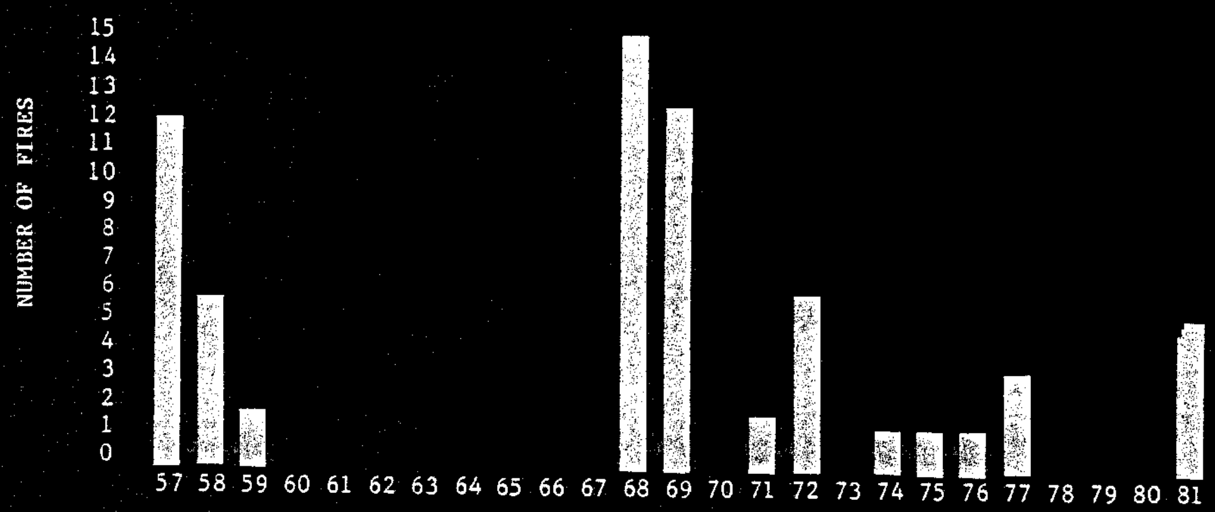

Figure 4: Annual Acreage - Class G Fires (5,000): 1957-1981
Tanana/Minchumina Planning Area

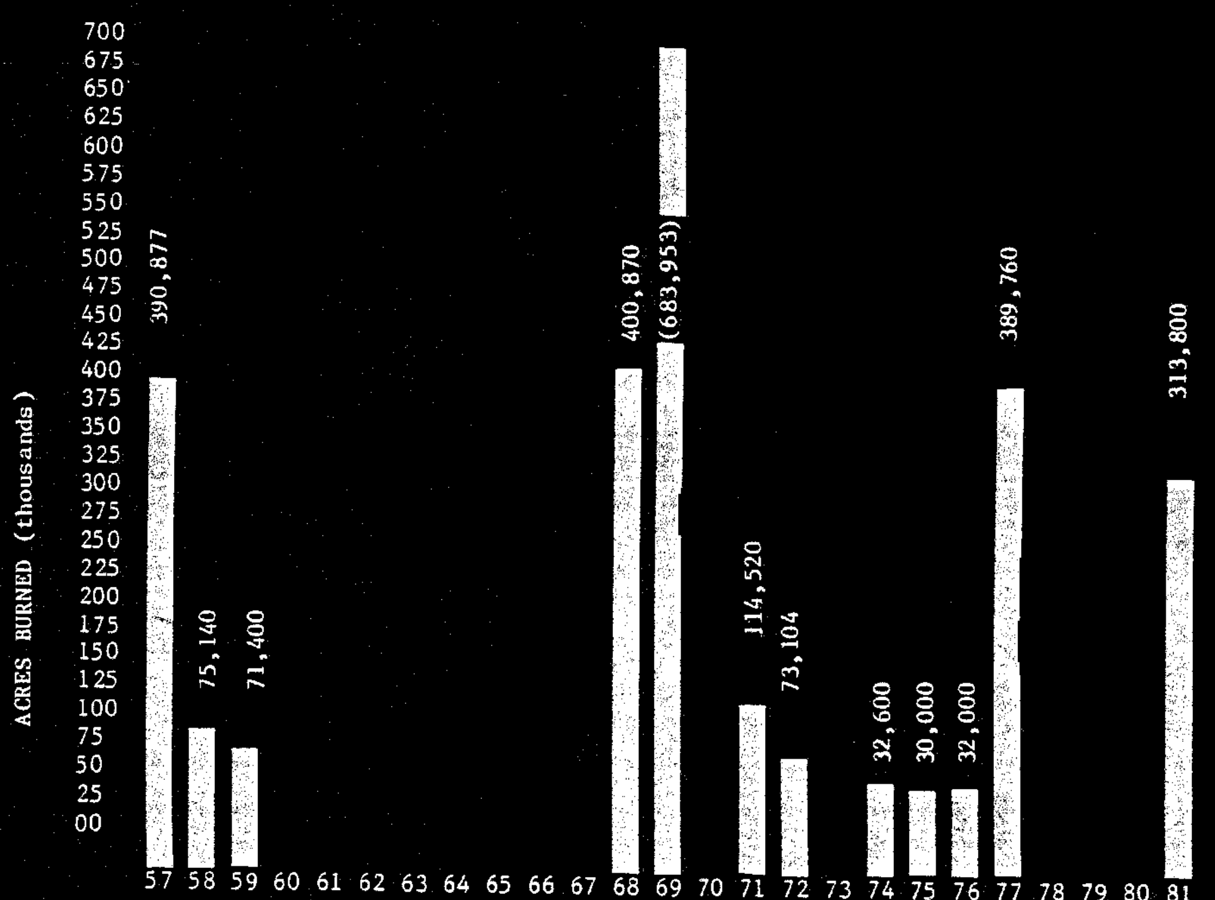

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Table 3

Total Number of Fires and Acres Burned by Cause (1957 to 1981)

Year	Lightning	Man-Caused	Total	Lightning	Man-Caused	Total
57-59	113	70	183	552,619	17,844	570,463
60-64	53	52	105	2,623	868	3,491
65-6	156	191	347	901,40	332,289	1,233,692
70-74	290	225	515	249,196	1,161	250,357
75-79	198	259	457	427,887	31,240	459,127
80-81	86	23	109	314,205	219	314,424
TOTAL	896	820	1,716	2,447,933	383,621	2,831,554

Table 4
Fire Occurrence by Month (1957-1981)

	March	April	May	June	July	Aug.	Sept.	Oct.
57-59	0	1	22	98	37	10	15	0
60-64	1	0	21	30	51	3	0	0
65-69	0	6	49	103	131	30	9	9
70-74	0	3	68	206	158	62	18	0
75-79	0	17	63	85	174	73	43	2
80-81	0	1	26	65	13	3	1	0
TOTALS	1	28	249	587	563	181	96	11

Table 5
Fire Causes by Month (1957-1981)

	March	April	May	June	July	Aug.	Sept.	Oct.	Total
Man	1	27	222	221	158	92	88	11	820
Lightning	0	1	27	366	405	89	8	0	896

B. FUELS AND FIRE BEHAVIOR

The vegetation occurring in the Tanana/Minchumina Planning Area has been previously described in section II.C.1., Major Plant Communities. A 1:250,000 scale fuels overlay has been made through manual interpretation of LANDSAT imagery.

The fuels in the Tanana/Minchumina Planning Area are similar to those throughout the rest of the interior of Alaska and contribute to similar fire behavior and problems. The majority of the fire-prone areas are typified by complexes of fine fuels, both living and dead, which react rapidly to changes in relative humidity. They are capable of rapid drying, even after substantial rainfall. Fuel beds are often continuous, with few breaks. Deep organic mats allow fires to be carried beneath the surface, increasing the probability of hold over fires and the difficulty of mop-up.

Black spruce and white spruce are often associated with these fuel complexes and contribute to additional fire behavior considerations. Spruce trees (especially black spruce) often have branches growing near the ground and retain a large number of dead branches. These dead fuels form a vertical ladder that easily carries a surface fire into the crowns. The problems associated with crown fires are increased when the spruce grow in dense stands with closed canopies, forming a continuous fuel bed above the ground. In addition to crowning, spotting ahead of the main fire is a problem in spruce stands. The embers are lofted as crowns burn, and are carried by the wind to points ahead of the main fire.

Fuels under deciduous stands and tall shrubland communities do not create the same problems, because they are not as dense, usually do not burn as readily, and crown fires are rare. Fires may occur in this fuel type after snowmelt but before greenup in spring, then again after leaf drop in the fall. However, the potential for suppression problems does exist after periods of extensive drying.

A third important and extensive fuel type in the planning area is tussock tundra. From a fuels and fire viewpoint, the tussock tundra is essentially a grassland. Virtually all of the burnable material is small diameter and loosely packed dead grass. 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 situation presents a set of suppression problems unique to the fuel type. Line building may be questionable and is certainly time consuming because of the commonly deep layers of organic material. For the same reasons, mopup is slow and tedious. Because the dead grass fronds are retained on the tussocks, this fuel type is ready to burn any time the area is snow free, and even beyond that under the right circumstances.

Elevations above 3,000 feet form effective barriers to fire spread because they generally do not support enough vegetation to carry fire. Extensive high elevation areas in the Ray Mountains, Kokrines Hills and Alaska Range are unvegetated and form natural firebreaks.

C. SUMMARY OF FIRE OCCURRENCE BY MANAGEMENT UNIT

The Tanana/Minchumina Planning Area has been divided into 17 management units which correspond to entire watersheds or segments of very large watersheds. Unit boundaries are natural barriers to the spread of fire. Management units are mapped in Appendix E3 (in attached map pocket). Thirty-six smaller units had originally been used for a detailed analysis of fire occurrence, fire behavior, fuels, and other related information. This analysis is available from the BLM fire suppression organization.

Summaries of fire information have been made for the 17 management units. Some of the patterns of fire occurrence will be summarized, including units with high levels of lightning activity, units with high risk of man-caused fires, and units with similar weather patterns.

The first grouping of units lies just to the north of, and includes portions of, the Alaska Range. This includes the Big River, Tonzona River, and most of the Upper Kantishna units. Topography typically ranges from lowlands to the west and north, grading up into the mountains of the Alaska Range to the south. The Alaska Range creates a rain shadow which diminishes farther east and north away from the mountains. Historically, this general area does not receive as much lightning activity as the areas to the north. The potential for large fires does exist, however, due to the drying effects of the rain shadow and because of strong persistent winds which funnel down the steep mountain ranges. The Bear Creek Fire, #7721, in 1977, which burned 345,000 acres in the Big River Unit, is a typical example of the type of fires which can occur in these units when drought is combined with high winds. The Toklat Unit also includes mountains of the Alaska Range, but its northern section receives more lightning than the areas to the southwest. Fire behavior can also be extreme in this unit. Fire occurrence in the Alaska Range is quite low, and fires are small because of steep terrain and sparse fuels.

Man-caused fires account for about 81% of all fires in the Goldstream Unit, which includes Fairbanks and its rural residential areas. About 60% of the fires in the Minto Unit to the west, and the section of the Toklat Unit north of Denali Park, are man-caused. Most of the fires start near settlements or along roads. Large numbers of fires associated with land clearing and mining have occurred around Takotna and Takotna Mountain in the southwest part of the planning area (Nixon Fork Unit).

The greatest lightning activity occurs in the center of the planning area, including the following management units: Cosna, northeast part of the Lower Nowitna, most of the Birches Unit, and northern part of the Upper Kantishna Unit. Most of the thunderstorm activity south of the Yukon River is caused by frontal lifting associated with the movement of massive storm systems across the Interior. These systems are commonly widespread and create considerable lightning, but are usually accompanied by measurable precipitation that decreases fire activity. These four units seem to be more fire prone than surrounding areas, possibly because weaker storms moving inland from the west

3 Base map obtained from Arctic Environmental Information ant Data Center, 707 A Street, Anchorage, Alaska

drop their precipitation before reaching them. Therefore, the fuels in these areas are likely to be drier and more likely to sustain a lightning fire. The potential exists for large project fires, since there have been 18 Class G fires (greater than 5,000 acres) since 1957.

The units north of the Yukon River, Melozitna, Tozitna, Ray River, and Rampart, also experience high levels of lightning activity. The lightning is associated with small, localized thunderstorms rather than wide ranging, large storm systems which affect the units to the south and west. Almost all fires are caused by lightning, particularly in the Melozitna and Tozitna drainages, and initial attack is fairly successful. Large fires have occurred in the past, including a 251,500 acre fire near Tanana in 1969, and a 314,700 acre fire around Manley Hot Springs that same year.

The Lower Nowitna, Upper Nowitna, North Fork Kuskokwim, and Northern Innoko units, which lie along the western boundary of the planning area, are affected by wide ranging storm systems accompanied by lightning, similar to the area to the east. The storms generally drop more rain in this area because they have not lost much moisture while moving inland from the west. These units may also be subject to occasional dry lightning storms which cause numerous fires. The Kuskokwim Mountains run through this area, and appear to influence the local weather. Most of the North Fork Kuskokwim unit lies to the east of these mountains and experiences erratic weather conditions without recognizable patterns.

D. SUPPRESSION COSTS

Suppression costs have been extremely variable, ranging from $10,341 in 1965 to $5,172,028 in 1977. Costs have been adjusted to the value of the U.S. dollar in 1967 for comparison purposes (see Table 6). A large percentage of the costs for 1977 can be attributed to the Bear Creek fire, #7721, which burned from August 6, to September 20, covered 345,000 acres and cost $2,408,033 to suppress.

This is similar to the general statewide pattern. It has been determined that 9 percent of the fires (those class E and larger) contributed to 70-80 percent of the total suppression costs resulting in an average suppression cost per fire of $32,000. These high suppression costs are due to multiple concurrent fires, large, inaccessible land areas, and dependence upon expensive air attack and transportation of supplies.

E. SUPPRESSION RESOURCES

At present, the fire protection within the Tanana/Minchumina area is provided by the BLM and the State of Alaska. The BLM maintains initial attack forces, primarily helitack, at Galena, Tanana, Lake Minchumina, McGrath, and Fairbanks. Smokejumpers are stationed at Fairbanks, Galena, and McGrath with temporary standby at other bases within the area when necessary. Retardant bases are located at McGrath, Galena, and Fairbanks, and a secondary base is set up at Tanana. Temporary bases can be moved into areas with adequate airstrips when needed. Retardant aircraft with water scooping capability can be operated out of many of the larger lakes.

Table 6
Suppression Costs Using 1967 as the Base Year*

Year	No. Fires	Cost	Adjusted Cost Factors	Adjusted Cost	Acres Burned
1957	70	429,049	84.3	508,955	401,499
1958	51	392,173	86.6	452,855	85,822
1959	66	250,188	87.3	286,584	80,198
1960	31	29,390	88.7	33,134	128
1961	20	25,170	89.6	28,091	141
1962	21	128,844	90.6	142,211	2,164
1963	31	129,127	91.7	140,814	1,036
1964	31	61,796	92.9	65,518	348
1965	25	10,541	94.5	11,154	79
1966	64	323,490	97.2	332,808	62,169
1967	37	320,478	100.0	320,478	3,535
1968	114	3,453,703	104.2	3,314,494	419,071
1969	110	2,717,982	109.8	2,475,393	748,838
1970	69	209,767	116.3	180,367	486
1971	60	1,858,848	121.3	1,532,438	121,059
1972	212	1,297,314	125.3	1,035,366	88,592
1973	73	145,508	133.1	109,322	365
1974	238	1,321,470	147.7	894,698	39,855
1975	87	530,009	161.2	328,789	30,795
1976	115	989,013	170.5	580,066	33,022
1977	144	5,172,028	181.5	2,849,602	393,832
1978	88	621,180	195.4	317,902	630
1979	53	699,237	217.4	321,636	835
1980	22	750,558	246.8	304,116	624

*Includes false alarms

The State of Alaska has suppression forces centered in Fairbanks, with suppression responsibility for the Fairbanks area and the Parks Highway bordering the eastern edge of the palanning unit.

IV. FIRE MANAGEMENT ALTERNATIVES

A. INTRODUCTION

The Tanana/Minchumina Fire Management Plan establishes four management options: Critical Protection, Full Protection, Modified Action, and Limited Action. Fire suppression alternatives range from immediate and aggressive suppression to no attack. As presented, the alternatives set forth general standards for selection of the appropriate option by the land manager/owner. Further, they provide basic guidance and parameters within which the fire suppression organization and land manager/owner make initial strategies and tactical decisions. Fire management options selected for the lands in the Tanana/Minchumina planning area are shown in Appendix E (in attached map pocket).

It will be incumbent upon the land manager/owner to select a fire management option based upon an evaluation of local conditions in order to provide guidance to the fire suppression organization. In turn, the fire suppression organization is expected to respond to the land manager/owner to the best of its capability. Because of rapidly changing land status, the State of Alaska and Native corporations chose fire management options on lands which they have selected but have not yet been conveyed to them, even though management rests with a Department of the Interior agency.

These options are presented under the basic philosophy that they are not "set in concrete" when applied to a specific land area in this plan. Rather, the application of the options must be flexible and subject to revision as conditions change, such as formulation of specific land use objectives and availability of new data. This places a burden on managers to maintain continued evaluation of all factors, at least annually, to accomplish plan and individual land manager/owner management options. The land manager/owner(s) can change their selection of a fire management option between September 30 and April 1 of any year, but not during the fire season. (Refer to Section I.H., Revision, p. 5.)

B. INTENT OF MANAGEMENT OPTIONS

Critical Protection Management Option - This option was specifically created to differentiate the protection of human life ant inhabited property from natural resource protection. The designation of a site (area) with this option is left to the discretion of the land manager/owner responsible for fire protection for the site. Unquestioned priority over all other fires is automatically given to sites (areas) identified in this option.

Full Protection Management Option - Areas assigned this designation will receive fire protection equivalent to what has been supplied in the past. That is, all fires in these areas will receive aggressive initial attack and aggressive suppression efforts until the fire is declared out. This option was designed for the protection of cultural and historical sites, high resource value areas, and those types of things which require wildland fire protection but do not involve the protection of human life and habitation.

Limited Action Management Option - This category recognizes those areas where a natural fire program is desirable or the values at risk do not warrant the expenditure of suppression funds. Suppression actions need only be to the extent necessary to keep a fire within the management unit or to protect critical sites within the area.

Modified Action Management Option - This option provides a level of protection between "Full" and "Limited". The intent is to provide manager/owners with an alternative for those lands that require a relatively high level of protection during critical burning periods, but a lower level of protection when the risks of large, damaging fires is diminished. Its intent is to reduce suppression costs and increase resource benefits during the entire fire season through its two distinct operational responses to fire.

During the critical portion of the fire season, all fires will receive aggressive initial attack. If a fire escapes initial attack and requires more than a modest commitment to contain it, an Escaped Fire Analysis (Appendix G) will be conducted to determine level of suppression commensurate with the values at risk. The intent is to allow acres burned to be balanced with suppression costs. Lands placed in this category will usually be suited to indirect attack.

On individually predetermined evaluation dates, each Modified Action unit will automatically convert to no initial attack status unless an evaluation of current conditions indicates that the preestablished date is too early. Reevaluations will be conducted every 10 days until conditions (such as recent local fire behavior and weather, State-wide fire load) safely allow for no initial attack status in each Modified Action unit. The intent is to reduce the commitment of suppression forces to these units when risks are low and to achieve some resource management objectives through limited fire activity.

The initial evaluation date for each individual unit will be determined prior to each fire season by the affected land manager/owners based on their assessment of the values at risk and the historical risk of fire (seasonal activity) in the unit. It is not the intent of this planning process to develop prescriptions (which integrate fuels, weather, and topographic variables) to quantity the decisions to cease initial attack in Modified Action areas. Local weather information is available from a very limited number of sites within the planning area. The flammability of the black spruce fuel complex fluctuates rapidly and no reliable method for predicting extended drying conditions exists for Alaska. A traditional "prescription" cannot delineate the end of the critical portion of the fire season in the Alaska interior.

C. GENERAL DESCRIPTION

Critical Protection Sites (Areas)

Policy: This designation is for those areas where fire presents a real and immediate threat to human safety and designated physical developments. Fires burning in these areas (sites) will be immediately and aggressively suppressed.

Objectives:

1. Protect human life and inhabited property.

2. Place highest priority on the allocation of suppression forces to sites (areas) in this option.

3. Limit damage from fire to the minimum achievable.

Operational Considerations:

1. Areas designated by this option are restricted to sites and immediate surrounding areas.

2. Managers are encouraged to exercise restraint in the designation of physical developments, limiting the application of this option to those sites which are currently or routinely occupied as a residence, or of such high economic or cultural value that fire could cause an irretrievable loss.

3. The land manager/owner may elect to designate suppression tools which may not be used entirely or within selected locations. Any such constraints are documented in this plan within VII., Environmental Assessment.

Full Protection Areas

Policy: Fires burning in this area will be controlled through immediate and aggressive action.

Objectives:

1. Regardless of fire weather or behavior, control all fires at the smallest acreage possible.

2. Minimize the disruption by fire on designated, planned, or ongoing human activities in the area.

Operational Considerations:

1. Only fires in the critical protection area receive a higher priority for suppression resources.

2. Constraints on the use of selected suppression tools are at the discretion of the land manager/owner as documented in VII., Environmental Assessment.

Modified Action Areas

Policy: Contain all fires using aggressive initial attack unless otherwise directed by the land manager/owner upon completion of a modified initial attack analysis. (See Appendix F).

Manage fires to consider resource management objectives in a cost effective manner.

Objectives:

1. Reduce suppression costs on escaped fires through minimum force commitments and indirect suppression tactics.

2. Provide opportunities for fire to help achieve land management objectives.

Operational Considerations:

1. When a fire escapes control, the fire will be evaluated by the fire suppression organization and the land manager/owner, using the escaped fire analysis format to determine further fire strategy. (See Appendix G).

2. After the predetermined evaluation date, initial attack action will cease unless the land manager/owner instructs the fire suppression organization to continue suppressing fires occurring on certain lands within this designation.

3. Constraints on the use of selected suppression tools are at the discretion of the land manager/owner as documented in VII., Environmental Assessment.

Limited Action Areas

Policy: Contain fires only to the extent required to prevent undesirable escape from this area.

Objectives:

1. Reduce overall suppression costs.

2. Allow fire to burn unimpeded to the fullest extent possible.

3. Prevent fire activity in this area from violating fire management policies and objectives in adjoining areas.

Operational Considerations:

1. Careful monitoring of fire behavior and fire weather conditions is essential within this area.

2. When escape of a fire from this area appears imminent, the fire management organization and land manager/owner will jointly develop a strategic control plan.

3. Constraints on the use of selected suppression tools are at discretion of the land manager/owner as documented in VII., Environmental Assessment.

V. GENERAL OPERATIONAL POLICY

The operational procedures are discussed in two parts. The first part, V. General Operational Policy, addresses procedures that are applicable to the entire planning area, encompassing all fire management options. The following part, Vl. Operational Procedures for individual Fire Management Options, provides a readily available reference for operations personnel.

Interagency cooperation is essential in all aspects of fire management and suppression. Existing cooperative agreements address many of these concerns. Any operational procedures which change current agreements between agencies apply only to the Tanana/Minchumina Planning Area. Cooperative agreements, as updated each year, will be the principal means of implementing operational aspects of this plan.

A. PRESUPPRESSION

Specific areas of mutual cooperation include, but are not limited to:

1. Prevention - Divergent aims and goals will require special coordination. Cooperative prevention programs will be developed to minimize public confusion, duplication of efforts, and to provide a program that can be mutually implemented. Prevention objectives are offered as guidelines for the development and design of prevention programs (Appendix H).

2. Training - in fire suppression, fire management, and resource management.

3. Fire activity plan development - including prescribed burning programs.

4. Mutual interchange - of information and a preseason briefing describing the capabilities and goals of the land manager/owner and suppression organization. Examples of this information exchange include:

    a. Each affected land manager/owner will provide a roster of contact personnel, listing location and phone numbers, to insure ongoing coordination throughout the fire season.
    b. The fire suppression organization will provide a personnel roster depicting appropriate operational contact personnel.
    c. The land manager/owner will identify for the fire suppression organization:
        1) Specific changes in constraints on the use of selected suppression tools.
        2) Changes in management options which are to be applied to specific parcels of land.

5. An analysis should be made by the land manager/owner to determine if there are areas or zones where prescribed burning or hazard re-

duction would allow the selection of a less stringent fire management option. The fire suppression organization may provide the expertise for these operations at the land manager/owner's request. The land manager/owner and the fire suppression organization should coordinate the funding of these projects. These projects may be of particular value in the management of areas surrounding critical sites.

B. GENERAL OPERATIONAL PROCEDURES

Unless specifically changed by provisions of this plan, existing fire management operational procedures will be followed. Interagency use and allocation of suppression forces, support capability, and expertise is encouraged. The concerns from the involved agency or agencies will be handled in the following manner:

1. An agency Natural Resource Officer normally will be assigned to the fire overhead team to work with the on-fire organization. In addition, each agency is encouraged to provide qualified personnel for use on overhead teams.

2. Selection of overhead for specific fire assignments will be made by the fire suppression organization. Agencies should nominate people on their staff for fire positions prior to April 1, each year. These nominations should include the aging, the individual's name, their NIFQS rating (National Interagency Fire Qualification System), and their availability. These people will be used whenever possible on fires on their own agency's land.

3. During the active fire season, each affected land manager will be expected to:

   a. Provide a weekly roster of operational contact personnel who will be available 24 hours a day.
   b. Make available a representative for periods of multiple fire activity and/or large fire occurrence. Representatives will be expected to have the ability and authority to make decisions,set priorities, and identify strategies.
   c. Provide Natural Resource Officers to the extent possible for fire assignment.

4. If the fire suppression organization cannot contact the agency representative within a reasonable amount of time, they will take the appropriate action using the best information they have available. Such actions will continue until an agency representative can be contacted.

5. Responsible fire suppression organizations will provide logistical support to the fullest extent possible to the land manager(s) or their representatives assigned to the fire. This includes support at fire base field stations to agency employees identified as necessary for performance of this plan.

6. In the event that either the fire suppression organization or a land manager/owner feels that conditions warrant a burning restriction in a particular area or zone, the affected land manager/owner(s) and the fire organization will make the determination. If it is decided to place a burning restriction on an area or zone, the affected land manager/owner(s) will be responsible for public notification and enforcement.

7. Safety dictates that any flights conducted within the vicinity of an active fire action by the land manager/owner or his representative will be coordinated with the appropriate fire suppression dispatch office.

8. Participating agencies are requested to notify the appropriate fire suppression field office when ongoing field work may complement suppression operations. Examples include:

   a. Aircraft flights which may provide detection coverage.
   b. Aircraft which may be used in field support activities.

C. POST FIRE ACTIVITIES

Joint review and critique of suppression actions on individual fires and/or the activity which occurred throughout a season is left to the discretion of the parties involved. Either the suppression organization or a land manager/owner may request a formal critique.

Overhead teams will be required to furnish information required by the affected land manager/owner. Conversely, the land manager/owner(s) will be required to furnish necessary information for the completion of daily and final fire suppression reports.

The responsibility for final report submission rests with the suppression organization, including the submission of a final copy to the lan manager/owner.

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Vl. OPERATIONAL PROCEDURES FOR INDIVIDUAL FIRE MANAGEMENT OPTIONS

A. CRITICAL PROTECTION SITES (AREAS)

Presuppression: Land managers/owners are required to identify the size of the area around each critical site which will receive the highest level of protection.

Operations:

1. Detection - Critical sites (areas) will receive maximum detection coverage.

2. Attack Response - The highest priority for the action is to be given critical sites (areas). Fires will receive immediate and aggressive initial attack with adequate forces to obtain control with the minimum damage possible to the critical site(s).

3. Notification Requirements - As soon as possible, the affected land manager/owner will be notified of the fire situation. Information within the initial status report will include: location, size, fuel type, fire behavior, description of critical site involved, and action taken.

4. Escaped Fires - will be handled as follows:

   a. The critical site will receive priority protection over adjacent lands and resources.
   b. Adjacent lands and resources will be jointly analyzed by the land manager/owner and the fire suppression organization to determine fire suppression strategy after the critical site has been protected.

Figure 5

Operational Decision Chart
for
Critical Protection Sites (Areas)

B. FULL PROTECTION AREAS

Presuppression: Suppression force preparedness and mobilization will be provided to the extent necessary to ensure that all fires receive full suppression, except as modified by the Alaska Interagency Fire Service coordination group during abnormal fire years.

Operations:

1. Detection – Designated lands will receive the maximum detection coverage available.

2. Attack Response – Fires will receive immediate and aggressive initial attack with sufficient forces to obtain control at the smallest acreage possible.

3. Notification Requirements – On fires where initial attack is successful or the fire is otherwise controlled within the first burning period, special agency notification is not required. The fire suppression organization will notify the agency of these fires through normal briefing sessions or by forwarding a copy of the individual fire report to the land manager/owner(s).

4. Escaped Fire – When a fire escapes initial attack and requires continued suppression efforts, the affected land manager/owner will be contacted. The land manager/owner and the fire organization will ascertain if a joint evaluation is necessary to develop further fire strategy.

   Escaped fires will be placed under the management control of an appropriate level fire overhead team.

   The need to place a land manager/owner's representative at the fire suppression organization's headquarters will be at either the discretion of the affected agency or at the request of the suppression organization.

   On-site resource impact assessments will be provided by a Natural Resource Officer assigned to the overhead team organization. It is expected that each agency furnish this capability to the best of its ability.

Figure 6

Operational Decision Chart
for
Full Protection Areas

C. MODIFIED ACTION AREAS

Presuppression: Suppression force preparedness and mobilization will be provided to the extent necessary to ensure that all fires receive aggressive initial attack, except as modified by the Alaska interagency Fire Service coordination group during abnormal fire years.

Operations:

1. Detection - Designated lands will receive the same detection coverage as Full Protection Areas.

2. Attack Response - Once a fire is detected and plotted, and the affected land manager is identified, the operational decision charts will be followed. The chart describes the appropriate procedures and course of action for both the suppression organization and the land manager/owner.

   Aggressive initial attack will cease on the predetermined evaluation date unless: (1) a modified initial attack analysis has been completed (see Appendix F), and (2) the land manager/owner(s) has provided written instructions to continue normal initial attack response within the management unit as a result of the initial attack analysis.

   On non-initial attack fires, alternative action (contingency) plans will be jointly developed by the land manager/owner and the fire suppression organization. Implementation of an alternative action plan will be a joint decision between the affected parties.

   On escaped fires, a strategic action plan will be jointly agreed upon by the land manager/owner and the suppression organization.

3. Notification Requirements - The land manager/owner(s) will be immediately notified of those fires not receiving initial attack. Daily communications will continue until the fire is declared out, or, the land manager/owner wishes to change the notification requirement.

   On fires where initial attack is successful or the fire is otherwise contained within the first burning period, special agency notification is not required. The fire suppression organization will notify the agency of these fires through normal briefing sessions or by forwarding a copy of the individual fire report to the land manager/owner(s).

4. Monitoring - The fire suppression organization will maintain monitoring responsibilities on unmanned fires. Joint monitoring arrangements will be made when situations warrant or the land manager/owner(s) wishes to implement his own monitoring procedures.

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Monitoring will be performed until the fire is manned or declared out. This information will be used to update or revise alternative action plans when necessary. (See Appendix I for specific monitoring procedures.)

a. Field station responsibilities include:

1) obtaining a spot weather forecast each day.

2) obtaining a 3-5 day spot forecast each day.

3) providing a past 10-day weather summary, including precipitation amounts, from the two fire weather station(s) nearest to the fire.

b. Fire site observation responsibilities will include:

1) making a map of the fire and adjacent area depicting the following: fire size and location, topography, fuel types(s), obvious areas of special concern, and natural barrier locations.

2) observing fire behavior, including: estimated rate of forward spread, direction of spread, estimated flame lengths, description of fire (i.e., crowning, ground fire, surface fire), and spotting (including distance).

3) describing smoke behavior, including plume height and direction of movement.

4) observing general weather.

c. Projection of fire perimeter

Information obtained from the field station and the fire site will be used to predict the fire perimeter at the close of the next 24 hour period. This information will be used by the land manager and the fire suppression organization to determine if the implementation of the contingency plan is necessary. Information and analysis will be recorded as a chronological history of the fire.

Figure 7

Operational Decision Chart A
For
Modified Action Areas

Figure 7

Operational Decision Chart B
For
Modified Action Areas

Figure 7

Operational Decision Chart A
For
Modified Action Areas

Figure 7

Operational Decision Chart D
For
Modified Action Areas

D. LIMITED ACTION AREAS

Presuppression: The suppression organization will review all boundaries to assure that they are adequate as possible control points. Recommendations for relocating or reinforcing boundaries will be made by the suppression organization. Presuppression action plans will be developed where known reinforcement work will be required where a fire threatens to cross the boundary. Any necessary alterations will be agreed upon between the suppression organization and affected parties.

Operations:

1. Detection - Designated lands will receive routine detection effort. Additional flights will be provided when requested by individual agencies.

2. Attack Response - Once a fire is detected, plotted, and the affected land manager/owner is identified, the operations decision chart will be followed. Its use describes the appropriate procedures and course of action for both the suppression organization and the land manager/owner.

   Land managers/owners or the suppression organization may request, in writing, that all fires within a designated area receive initial attack response. Those fires escaping initial attack will be handled as any other fire burning in a Limited Action area. - Those fires which currently exist will not receive special suppression consideration.

3. Notification Requirements - The land manager/owner will be immediately notified of all fires detected. Daily communications will continue until the fire(s) is declared out or the land manager/owner wishes to change the notification requirement.

4. Monitoring - The fire suppression organization will maintain the monitoring responsibilities on fires while they are burning. Joint monitoring arrangements will be conducted when situations warrant or the land manager/owner wishes to implement his own monitoring procedures.

   Monitoring will be performed until the fire is manned or declared out. This information will be used to update or revise alternative action plans when necessary. (See Appendix I for specific monitoring procedures.)

   a. Field station responsibilities include:

      1) obtaining a spot weather forecast each day.
      2) obtaining a 3-5 day spot weather forecast each day.
      3) providing a past 10-day weather summary, including precipitation amounts from the two fire weather station(s) nearest to the fire.

b. Fire site responsibilities will include:

1) making a map of the fire and adjacent area depicting the following: fire size and location, topography, fuel type(s), obvious areas of special concern, and natural barrier locations.

2) observing fire behavior, including: estimated rate of forward spread, direction of spread, estimated flame length, description of fire (i.e., crowning, ground fire, surface fire), and spotting (including distance).

3) describing smoke behavior including plume height and direction of movement.

4) observing general weather.

c. Projection of fire perimeter

Information obtained from the field station and the fire site will be used to predict the fire perimeter at the close of the next 24 hour period. This information will be used by the land manager and the fire suppression organization to determine if the implementation of the contingency plan is necessary. Information and analysis will be recorded as a chronological history of the fire.

Figure 8

Operational Decision Chart E
for
Limited Action Areas

Figure 8

Operational Decision Chart F
For
Modified Action Areas

Figure 8

Operational Decision Chart G
for
Limited Action Areas

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VII. ENVIRONMENTAL ASSESSMENT

A. PURPOSE AND NEED

Refer to Section I, Introduction, subparts A, B, and C, and Section II, Planning Area, subpart A, of this document.

The fire management planning area was divided into 17 management units (see Appendix E). The unit boundaries were established by evaluating topography, land status, fuels, and presence of barriers to fire spread. These management units are the basic land unit used for the purpose of analyzing and applying fire management alternatives to the planning area.

B. ALTERNATIVES AND PREFERRED ALTERNATIVES

1. Alternatives

The proposed action for this assessment is to implement the Tanana/Minchumina Interagency Fire Management Plan. Within this proposal, four fire management alternatives are available to the land manager/owner(s) for their respective lands. These fire management alternatives are presented in detail in Section IV of this document. Additionally, operational procedures for each fire management alternative are discussed in Section VI of this document.

The No Action alternative consists of continuing implementation of the current fire management policy. Current fire management policy is summarized in Section I, subpart E, of this document.

2. Preferred Alternative

The preferred alternative of the fire management plan is to implement the combination of alternatives as illustrated by Appendix E.

C. AFFECTED ENVIRONMENT

Refer to Section II, Planning Area, for a description of the environment that would be affected by the proposed action.

D. ENVIRONMENTAL CONSEQUENCES

1. Effects of Fire and Suppression Activities

The general effects of fire and_suppression are presented in Table 7 (pg. 76). These general effects represent the anticipated effects in an average year.

The general effects of the alternatives on the environment, including the no action alternative, are presented in Table 8 (pg. 79). These general effects represent the anticipated effects of a particular alternative if it were applied to the entire planning unit in an average year. Additionally, it should be noted that the effects of the Modified Action alternative will vary depending on whether a fire occurs before or after the modified initial attack analysis has been conducted. If the fire occurs before the analysis, the anticipated effects will be essentially the same as the Full Protection alternative. However, if the analysis has been conducted, the anticipated effects will range between those of the Full Protection and Limited Action alternatives.

2. Effects of Preferred Alternative(s)

The anticipated effects of the preferred alternative(s) are presented in Table 9 (pg. 81). The information is presented for each management unit which contains Federal lands, and represents the summary of an analysis based on the following factors:

- Land status
- Critical sites
- Fire considerations
  - Fire history
  - Number per size class, suppression action
  - Initial attack success
- Fire behavior
  - Fuels
  - Natural barriers/topography
- Public issues and concerns
  - Local
  - Regional
- Resource considerations of land manager
  - Resource management objectives and land uses
- Preliminary selection of alternative(s)
- Effects of preliminary alternatives(s)
- Development of mitigating measures
  - Special considerations
- Adjacent land manager/owner coordination
- Reevaluation of preliminary alternative(s)
- Effects of final alternative(s)

Lands in the Goldstream, Innoko, and Nixon Fork units are State of Alaska, Native corporation, or privately owned. The effects of the preferred alternative on these lands have not been recorded in this Environmental Assessment.

E. PARTICIPANTS

Members of the Tanana/Minchumina Interagency Fire Planning Team, and other persons from their respective organizations, participated in the preparation of this Environmental Assessment. Members of the team at the time of signing included:

Norman "Frenchie" Malotte/BLM, Anchorage

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Kay Johnson/BLM, Anchorage

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Table 7
General Effects of Fire and Fire Suppression

Environmental Component	Fire	Suppression Activities
Soils	(H+)* Increased temperature and active layer thickness enhances nutrient availability and turnover.	(M-) May cause severe erosion where firelines are buldozed and access roads are built.
	(L-) Slight potential for permafrost degradation on steep slopes through soil slumping and subsidence.	
Air	(M-) Short term interference with visibility due to smoke.	(L-) Use of large burn-out operations may increase smoke.
Water	(L-) Potential siltation due to fire burning shoreline vegetation.	(M-) Increased silt load due to erosion of bulldozed firelines.
Cultural		
Surface	(H-) Potential for complete destruction of historic structures.	(L-) Fire camps, heliports, and other activities may damage both surface and subsurface resources by compaction, disturbance, or removal of artifacts.
Subsurface	(L-) Extremely severe fire may damage historic and prehistoric artifacts.	
Visual	(M+) Long term effect by adding vegetation diversity to a scene.	(H-) Long term residual effect from fire breaks, Cat lines, etc., caused by straight and harsh contrast lines in the landscape.
	(M-) Large fires may have short term effect by imposing a blackened, disrupted, unpleasing scene.	

* 0 = no impact; L = low impact; M = moderate impact; H = high impact
+ = positive; - = negative

able 7 (Continued)

Environmental Component	Fire	Suppression Activities
<u>Wildlife</u>		
Terrestrial	(H+) Long term effect by increasing habitat diversity and forage quality.	(L+) Long term effect by by creating edge effects and diversity along firelines.
	(H-) Short term effect by loss of habitat with large fires.	(M-) Short term disruption of animals during Suppression period.
	(M+) Snags are created and are habitat for cavity nesting birds.	
Aquatic	(M+) Fire killed trees may fall into streams to create cover for some species.	(H-) Direct drops of fire retardant into streams Can cause very localized fish kill.
	(L+) Increased nutrient enrichment of water from fire ash.	(M-) Siltation increases due to construction and Erosion of fire lines.
<u>Threatened and Endangered Species</u>		
Plants	(H+) Fire sets back stages of plant succession. Over long term, this benefits plants which thrive in early stages of succession.	(H-) Localized plants may be destroyed by construction of fire lines, compaction in camp areas,etc.
	(L-) Possible removal of localized plants.	(H-) Fire retardant may harm plants in localized areas.
Animals	(H+) Fire enhances prey species habitat. (L-) Unlikely event of fire causing nest abandonment or death.	(M-) Short term disruption by human activities may have long term effects if breeding failure or mortality of young occurs.
<u>Wilderness</u>	(H+) Fire is a natural component of the ecosystem.	(H-) Long term effect by construction of fire lines, access roads, etc.

Table 7 (Continued)

Environmental Component	Fire	Suppression Activities
Vegetation	(H+) Long term effect by increasing diversity and vigor. (L-) Short term effect by loss of vegetation.	(L-) Fire line construction causes loss of vegetation in localized areas.
Socio-Economic	(L+) Long term effect on trapping and hunting through improved wildlife habitat.	(M+) Hiring of local residents for suppression Activities enhances economy.
	(H-) Possible short term loss of marketable forest resources.	(L-) Social disruption due to influx of crews in small communities.
	(H-) Private property such as cabins may be lost. (H-) Possible disruption if a home or community were evacuated. (M-) Short term elimination of trapping and hunting in areas of a large burn.	(M+) Regional economy is Enhanced because of contract services related to fire management operations. (H-) Current cost of existing fire management practices is extremely high.

Table 8
General Effects of Alternatives

Environmental Component	Critical, Full Protection, and No Action (Present Policy)	Limited Action
Soil	(H-) May cause severe erosion where firelines are bulldozed and access roads are built.	(H+) Increased temperature and active layer thickness enhance nutrient availability and turnover. (L-) Minimal fireline construction.
Air	(O to L-) Short term interference with visibility due to smoke.	(M-) Short term interference with visibility due to Smoke.
Water	(H-) Increased siltation due to fire breaks, line and road construction.	(O to L-) Severe fires may cause siltation on short Term.
Cultural		
Surface	(O) Historical sites and surrounding areas will receive protection.	(H-) Potential loss of site may occur if not pre-identified to implement protective measures.
Subsurface	(L-) Fire suppression activities may cause compaction, disturbance, or removal of artifacts.	(L-) Fire suppression activities may cause compaction, disturbance, or artifact removal.
Visual	(H-) Long term residual effect from suppression by adDing straight and harsh contrast lines to landscape.	(L-) Suppression effect if no bulldozers. (H+) Scene enhanced by diversity. (L-) Short term effect by blackened scene.
Wildlife		
Terrestrial	(H-) Minimal habitat diversity, poor forage quality and availability.	(H+) Long term effect by increasing habitat diversity and forage quality. (L-) Short term effect of large fires by habitat loss.
Aquatic	(M-) Siltation due to construction and erosion of Firelines and breaks.	(L+) Habitat improved by fallen trees. (O) Minimal siltation if no bulldozers.

* O = no impact; L = low impact; M = moderate impact; H = high impact;
+ = positive; - = negative

Table 8 (Continued)
General Effects of Alternatives

Environmental	Critical, Full Protection, and No Action (Present Policy)	Limited Action
Threatened and Endangered Species	(H-) Minimal habitat diversity, no early successional stages.	(H+) Fire maximizes habitat diversity and enHances prey habitat.
	(H-) Localized species may be disrupted or destroyed by suppression activities.	(L-) Potential disruption by suppression in localized area.
Wilderness	(H-) Long term effect by construction of firelines,	(H+) Fire is a natural component.
		(H+) Minimum effect by suppression actions if no bulldozers.
Vegetation	(H-) Negative effect on diversity and vigor.	(H+) Long term effect by increasing diversity and vigor.
Socio Economic	(H-) No long term effect of improved wildlife habitat.	(H+) Habitat improvement in long term.
	(H-) Minimal loss commercial timber.	(M-) Potential loss commercial timber.
	(H-) Minimal loss private property	(M-) Potential loss private property.
	(H-) Minimal disruption by evacuation.	(M-) Potential evacuation.
	(H+) High employment by suppression organization.	(L-) Moderate employment Level by suppression organization.
	(M-) Disruption by influx of crews.	(M+) Moderate cost to suppression organization.
	(H-) Extremely high cost to suppression organization.	(H+) Minimal cost to suppression organization <u>if</u> hazard reduction programs are implemented.

Table 9
Effect of Preferred Alternative

MANAGEMENT UNIT: Entire planning area

AGENCY: BIA

LAND STATUS: Native Allotments

SPECIAL CONSIDERATIONS: Heavy equipment approved case-by-case only. Avoid human water sources when using retardant. Identify and protect historical sites with presuppression plans; identify and protect NAs with improvements and develop presuppression plans.

PREFERRED ALTERNATIVES: Critical, Full

NATURE OF CRITICAL SITES: NAs with improvements (structures, fish wheels, smoke racks, cabins, etc.)

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O*	O to L-	L
Air	O	O	O
Water	O	O	O
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O	O	O to L-
Wildlife: Terrestrial	O	L-	O
Aquatic	O	O	O
Threatened and Endangered Species: Plants	O	O to L-	O to L-
Animals	O	O to L-	O to L-
Wilderness	O	O	O
Vegetation	O	O to L-	L-
Socio-Economic	O	L-	M+ to H+

*O = no impact; L = low impact; M = moderate impact; H = high impact; + = positive; - = negative

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Big River

PREFERRED ALTERNATIVE(s): Full, Modified

AGENCY: BLM

LAND STATUS: BLM; State of Alaska; Native corporations

NATURE OF CRITICAL SITES:Native allotments

SPECIAL CONSIDERATIONS: Presuppression plans at historical sites and Iditarod Trail; install Remote Automated Weather Stations (RAWS) to aid in prescription development; clear trails after fire; contour firelines; avoid retardant in salmon streams; clear log jams as needed; no suppression at T&E species sites; limit heavy equipment.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	H+	H+	L-
Air	H-	O	M-
Water	O	O	L-
Cultural: Surface	O	O	L-
Subsurface	O	O	H-
Visual	L-	H+	L- to M-
Wildlife: Terrestrial	O to L-	H+	L- to M-
Aquatic	O to L-	O	L-
Threatened and Endangered Species: Plants	O to L-	H+	L- to M-
Animals	O to L-	H+	L- to M-
Wilderness/Rec.	O	H+	L- to M-
Vegetation	O to L-	H+	L-
Socio-Economic	L+	H+	L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Birches

PREFERRED ALTERNATIVE(s): Full

AGENCY: BLM

LAND STATUS: BLM; FWS; State of Alaska; Native corporations

NATURE OF CRITICAL SITES: None known

SPECIAL CONSIDERATIONS: Presuppression plans at special sites; no suppression at T&E sites; limit use of heavy equipment.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O to L-
Air	L-	O	O to L-
Water	O	H+	O to L-
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O to L-	H+	O to L-
Wildlife: Terrestrial	O to L-	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	O	H+	O to L-
Vegetation	O	H+	O to L-
Socio-Economic	O to L-	O	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Birches

PREFERRED ALTERNATIVE(s):Full

AGENCY: FWS

LAND STATUS: BLM; FWS; State of Alaska; Native corporations Native allotments

NATURE OF CRITICAL SITES:

SPECIAL CONSIDERATIONS: Presuppression plans at special sites; no suppression at T&E sites; limit use of heavy equipment.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O to L-
Air	L- to M-	O	O to L-
Water	O	H+	O to L-
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O to L-	H+	O to L-
Wildlife: Terrestrial	O to L-	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	O	H+	O to L-
Vegetation	O	H+	O to L-
Socio-Economic	O to L-	O	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Lower Nowitna

PREFERRED ALTERNATIVE(s): Limited

AGENCY: BLM

LAND STATUS: BLM; FWS; State of Alaska; Native corporations

NATURE OF CRITICAL SITES: None known

SPECIAL CONSIDERATIONS: No suppression at T&E sites; no heavy equipment.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O
Air	O to L-	O	O
Water	O	H+	O
Cultural: Surface	O	O	O
Subsurface	O	O	O
Visual	O	H+	O
Wildlife: Terrestrial	O	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	H+	H+	O
Vegetation	O	H+	O
Socio-Economic	O	H+	O

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Lower Nowitna

PREFERRED ALTERNATIVE(s): All

AGENCY: FWS

LAND STATUS: BLM; FWS; State of Alaska; Native corporations

NATURE OF CRITICAL SITES: Native allotments

SPECIAL CONSIDERATIONS:Presuppression plans at critical sites and other sites; no suppression at T&E sites; limit use of heavy equipment; no straight firelines.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERMS	FIRE SUPPRESSION
Soil	O	M+	L-
Air	L-	O	O to L-
Water	O	O	O to L-
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O to L-	H+	O to L-
Wildlife: Terrestrial	O to L-	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	O	H+	O to L-
Vegetation	O	H+	O to L-
Socio-Economic	O to L-	O	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Cosna

PREFERRED ALTERNATIVE(s): Limited, Modified, Full

AGENCY: BLM

LAND STATUS: BLM; State of Alaska; PossibleNative corporations

NATURE OF CRITICAL SITES: Native allotments

SPECIAL CONSIDERATIONS: Presuppression plans for special and critical sites; no suppression at T&E species sites; limit use of heavy equipment.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O to L-
Air	L-	O	O to L-
Water	O	H+	O
Cultural: Surface	O	O	O
Subsurface	O	O	O
Visual	O to L-	H+	O to L-
Wildlife: Terrestrial	O to L-	H+	O to L-
Aquatic	O	H+	O
Threatened and Endangered species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	O	H+	O to L-
Vegetation	O	H+	O to L-
Socio-Economic	O to L-	H+	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Melozitna

PREFERRED ALTERNATIVE(s): Limited, Full

AGENCY: BLM

LAND STATUS: BLM; State of Alaska; Native corporations (near mouth of Melozitna)

NATURE OF CRITICAL SITES: None known

SPECIAL CONSIDERATIONS: Presuppression plans at historical sites; no suppression at T&E species sites; no heavy equipment; monitoring.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O to L-
Air	L-	O	O to L-
Water	O	O	O
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O to L-	H+	O
Wildlife: Terrestrial	O to L-	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	H+	H+	O to L-
Vegetation	O	H+	O
Socio-Economic	O to L-	H+	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Minto Flats

AGENCY: BLM

LAND STATUS: BLM; State of Alaska; Native corporations

SPECIAL CONSIDERATIONS: Presuppression plans at special and critical sites; no suppression at T&E species sites; use of heavy equipment on case-by-case basis.

PREFERRED ALTERNATIVE(s): Full, Modified

NATURE OF CRITICAL SITES: Private property; Trans-Alaska Pipeline System; pump station

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	M+	O to M-
Air	L to M-	O	O to L-
Water	O	M+	O to M-
Cultural:			
Surface	O	O	O
Subsurface	O	O	O to L-
Visual	L-	L+	L- to M-
Wildlife:			
Terrestrial	O to L-	L+	L- to M-
Aquatic	O	O to L+	O
Threatened and Endangered Species:			
Plants	O to L-	O to L+	O to L-
Animals	O to L-	O to L+	O to L-
Wilderness/Rec.	O	O	O to L-
Vegetation	O to L-	O to L+	L-
Socio-Economic	O	O	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: North Fork Kuskokwim

PREFERRED ALTERNATIVE(s): Modified

AGENCY: BLM

LAND STATUS: BLM; State of Alaska; Native corporations

NATURE OF CRITICAL SITES: Possible future settlement

SPECIAL CONSIDERATIONS: Presuppression plans; clear trails after fire; contour firelines; clear log jams as needed; no suppression at T&E species sites; limit use of heavy equipment.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	H+	H+	O to L-
Air	H-	O	L-
Water	O	O	L-
Cultural: Surface	O	O	L-
Subsurface	O	O	H-
Visual	L-	L+	L-
Wildlife: Terrestrial	O to L-	H+	L-
Aquatic	O to L-	O	L-
Threatened and Endangered Species: Plants	O to L-	H+	L- to M-
Animals	O to L-	H+	L- to M-
Wilderness/Rec.	L-	H+	H-
Vegetation	O to L-	H+	O
Socio-Economic	L∀	H+	L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Rampart

AGENCY: BLM

LAND STATUS: BLM; State of Alaska; Native corporations Alaska

SPECIAL CONSIDERATIONS: Presuppression plans at special and critical sites; no suppression at T&E species sites; use of heavy equipment on a case-by-case basis.

PREFERRED ALTERNATIVE(s): Modified, Full

NATURE OF CRITICAL SITES: Trans-Pipeline System: Native allotments; pump station; Yukon crossing developments

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	M+	O to M-
Air	L- to M-	O	O to L-
Water	O	M+	O to M-
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	L-	L+	L- to M-
Wildlife: Terrestrial	O to L-	L+	L- to M-
Aquatic	O	O to L+	O
Threatened and Endangered Species: Plants	O to L-	O to L+	O to L-
Animals	O to L-	O to L+	O to L-
Wilderness/Rec.	O	O	H-
Vegetation	O to L-	O to L+	O to L-
Socio-Economic	O	O	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Ray River
AGENCY: BLM

PREFERRED ALTERNATIVE(s):
Modified, Full

LAND STATUS: BLM; State of Alaska; Native Corporations

NATURE OF CRITICAL SITES: Trans-Alaska Pipeline System; development of Ray River Hot Springs

SPECIAL CONSIDERATIONS: Presuppression plans at special and critical sites; no suppression at T&E sites; use of heavy equipment on case-by-case basis.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	M+	L-
Air	L- to M-	O	L-
Water	O	M+	O to L-
Cultural:			
Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O to L-	M+	O to L-
Wildlife:			
Terrestrial	O to L-	M+	O to L-
Aquatic	O	M+	O to L-
Threatened and Endangered Species:			
Plants	O to L-	M+	O to L-
Animals	O to L-	M+	O to L-
Wilderness/Rec.	O to L-	M+	O to L-
Vegetation	O to L-	M+	L-
Socio-Economic	O to L-	M+	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Toklat

AGENCY: NPS

LAND STATUS:: NPS; State of Alaska; Native corporations

SPECIAL CONSIDERATIONS: No heavy equipment; site specific presuppression plans for special sites; no suppression at T&E sites; maximize natural processes.

PREFERRED ALTERNATIVE(s): Limited, Modified, Full

NATURE OF CRITICAL SITES: Improvements, Native allotments, Denali Park Headquarters; Stampede area

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O to L-
Air	L-	H+	O
Water	O	H+	O
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O	H+	O to L-
Wildlife: Terrestrial	O	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O	H+	O
Animals	O	H+	O
Wilderness/Rec.	H+	H+	L- to M-
Vegetation	O	H+	L- to M-
Socio-Economic	O to L-	H+	M-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Tozitna

PREFERRED ALTERNATIVE(s): Full, Limited

AGENCY: BLM

LAND STATUS: BLM; State of Alaska; Native corporations;

NATURE OF CRITICAL SITES: Homesites on Tozitna River

SPECIAL CONSIDERATIONS: Monitoring; presuppression plans for special and critical sites; no suppression at T&E sites; limit use of heavy equipment.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O to L-
Air	L-	O	O to L-
Water	O	O	O
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O to L-	H+	O to L-
Wildlife: Terrestrial	O to L-	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	H+	H+	O to L-
Vegetation	O	H+	O to L-
Socio-Economic	O to L-	H+	L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Tonzona

PREFERRED ALTERNATIVE(s): Limited, Modified

AGENCY: NPS

LAND STATUS: NPS; State of Alaska; Native corporations

NATURE OF CRITICAL SITES: None known

SPECIAL CONSIDERATIONS: No heavy equipment; no suppression at T&E sites; identify natural barriers; maximize natural processes.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	L-
Air	L-	H+	L-
Water	O	H+	O
Cultural: Surface	O	O	O
Subsurface	O	O	L-
Visual	O	H+	L-
Wildlife: Terrestrial	O	H+	L-
Aquatic	O	H+	O to L-
Threatened and Endangered Species: Plants	O	H+	O
Animals	O	H+	O
Wilderness/Rec.	H+	H+	M-
Vegetation	O	H+	M-
Socio-Economic	O to L-	H+	M-

Table 9. Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Upper Nowitna

AGENCY: BLM

LAND STATUS: BLM; FWS; State of Alaska; Native corporations

SPECIAL CONSIDERATIONS: Presuppression plans at historical sites; no suppression at T&E sites; limited use of heavy equipment; monitoring.

PREFERRED ALTERNATIVE(s): Limited, Modified

NATURE OF CRITICAL SITES: None known

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	M+	L-
Air	L-	O	O to L-
Water	O	O	O
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O to L-	H+	O to L-
Wildlife: Terrestrial	O to L-	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	O	H+	L-
Vegetation	O	H+	O to L-
Socio-Economic	O to L-	H+	O to L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Upper Nowitna

AGENCY: FWS

LAND STATUS: BLM; FWS-Nowitna Wild River and Refuge, State of Alaska

SPECIAL CONSIDERATIONS: Presuppression plans at possible NAs and historical sites; no suppression at T&E sites.

PREFERRED ALTERNATIVE(s): Limited

NATURE OF CRITICAL SITES: Possible Native allotments

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O
Air	O to L-	O	O
Water	O	H+	O
Cultural: Surface	O	O	O
Subsurface	O	O	O
Visual	O	H+	O
Wildlife: Terrestrial	O	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O to L-	H+	O
Animals	O to L-	H+	O
Wilderness/Rec.	H+	H+	O
Vegetation	O	H+	O
Socio-Economic	O to L-	H+	O

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Upper Kantishna

PREFERRED ALTERNATIVE(s): Modified

AGENCY: BLM

LAND STATUS: NPS; BLM; State of Alaska; Native corporations

NATURE OF CRITICAL SITES: None known, possible settlement area in future

SPECIAL CONSIDERATIONS: Presuppression plans; limited use of heavy equipment; contour firelines; clear trails after fire; clear log jams as needed; no suppression at T&E sites.

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	H+	H+	O to L-
Air	H-	O	L-
Water	O	O	O to L-
Cultural: Surface	O	O	L-
Subsurface	O	O	H-
Visual	L-	H+	L-
Wildlife: Terrestrial	O to L-	H+	L-
Aquatic	O to L-	O	L-
Threatened and Endangered Species: Plants	O to L-	H+	L- to M-
Animals	O to L-	H+	L- to M-
Wilderness/Rec.	L-	H+	H-
Vegetation	O to L-	H+	O
Socio-Economic	L∀	H+	L-

Table 9, Continued
Effect of Preferred Alternative

MANAGEMENT UNIT: Upper Kantishna

AGENCY: NPS

LAND STATUS: NPS; BLM; State of Alaska; Native corporations

SPECIAL CONSIDERATIONS: No heavy equipment except at previously disturbed areas at Kantishna; no suppression at T&E sites; maximize natural processes; identify natural barriers.

PREFERRED ALTERNATIVE(s): Limited, Modified, Full

NATURE OF CRITICAL SITES: Wonder Lake area and other improvements; Native allotments

ENVIRONMENTAL COMPONENT	FIRE SHORT-TERM	FIRE LONG-TERM	FIRE SUPPRESSION
Soil	O	H+	O to L-
Air	L-	H+	O
Water	O	H+	O
Cultural: Surface	O	O	O
Subsurface	O	O	O to L-
Visual	O	H+	O to L-
Wildlife: Terrestrial	O	H+	O
Aquatic	O	H+	O
Threatened and Endangered Species: Plants	O	H+	O
Animals	O	H+	O
Wilderness/Rec.	H+	H+	L to M-
Vegetation	O	H+	L to M-
Socio-Economic	O to L-	H+	M-

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APPENDIX A

PUBLIC ISSUES AND COMMENTS

1. Will there be a reduction in the fire suppression organization is some areas do not receive full suppression?

No. The designation of some areas as "no suppression" (Limited Action) areas will probably not cause a reduction in suppression forces. Currently the fire organizations are hard pressed during "bust" situations to handle the entire fire load. The designation of "no suppression" areas will make it easier to prioritize the assignment of limited fire suppression forces. Some suppression actions may still be done on fires in Limited Action areas to keep a fire within the boundaries of the area or to protect identified resources within the area.

2. What is the Tanana/Minchumina Fire Management Plan going to do to Emergency Fire Fighting (EFF) crew hiring for fires within the planning area?

Implementation of the plan will probably have little or no effect on the numbers of crews hired. While one of the primary objectives of the plan is to reduce the costs of fire suppression in the planning area, the area encompassed by the plan is not large enough to significantly influence the state-wide fire suppression organization's manning levels.

3. Can suppression forces, eepecially local villagers, be put to work in slack seasons on prescribed burns?

   Yes. Native crews, as well as seasonal fire fighters, may be used on prescribed burns; however, funding for prescribed fire is very limited at this time.

4. How far from a village can a fire be before it is judged as potentially dangerous?

   Each situation is different and there is no one answer. Weather and fuel conditions, and numerous other factors must be considered. Villages, of course, have the highest protection standards and receive priority over other lands.

5. Will BLM fight fire on Native land?

   Yes. By law (ANCSA) the Federal land management agency within which area the Native land is located is responsible for the protection of those Native lands. The BLM protects most Federal lands in the planning area and will continue to suppress fires on Native lands.

6. How will priorities be set for available fire fighting forces when two or more different land manager/owners want protection but not enough forces are available?

   The Tanana/Minchumina Fire Management Plan helps establish priorities for the fire organization. Critical areas will receive the highest protection available. Full Protectlon, Modified Action, and Limited Action Areas have progressively lower priorities.

If a conflict between land manager/owner(s) exists during an on-going fire operation it can be presented to the Interagency Fire Coordination Group of the Alaska Land Use Council.

7. The situation presently exists where the State of Alaska pays for fire protection and the Native lands receive free fire protection as granted by ANCSA. Will this influence the decision on how suppression forces are allocated?

   No. This will not have an effect. Fire fighting forces will be allocated to State and Native lands based on the priorities established in the plan. Native lands will receive full suppression at all times.

8. Who makes the decisions on what will occur on village lands?

   Doyon Limited (Regional Native Corporation) and the Tanana Chiefs Conference represented the individual villages during the development of the fire management plan and selected the management option for all affected Native lands. During the suppression of fires, the Fire Boss implements the strategic decisions that have been made jointly by the Zone Fire Management Officer and the involved land manager/owners.

9. Will private landowners be billed for suppression costs on their lands?

The State of Alaska (Division of Natural Resources) is responsible for the protection of private property. In many areas, the State, under agreement, pays BLM to provide fire protection. Regardless of the suppression agency, normally there are no costs to the landowner for protection and/or suppression of fire on private property. However, if the landowner is negligent in some manner or is in violation of State fire regulations, a claim may be filed against the landowner to recover suppression costs.

10. How can villages get assistance to reduce the fire hazard near the villages?

    Each village council needs to contact the Tanana Chiefs. They in turn can either contract the service or work with Federal or State agencies for technical assistance. With proper safeguards and coordination with the affected land management agencies, prescribed burning may be used to accomplish this need. Tools and supplies for hazard reduction projects would have to be purchased by the villages.

11. Will the villages be liable if a prescribed fire on village land goes on to another manager/owner's land?

    Villages, like other private landowners, could be liable for negligence if a prescribed fire escaped their lands. Each case would have to be tried separately in the courts and judged independently.

12. Will cables be located on maps whereby their location may become too well known and be susceptible to vandalism and burglary?

No. Locations of cabins must be known by the land managers involved to make sure the sites are given adequate fire protection. However, this information will not be circulated to the general public.

13. Does the Plan address the problem of smoke pollution within the airsheds of concerned communities?

Yes. If smoke from the planning area becomes a problem (shutting down air traffic) the Plan provides for the immediate suppression of all new fire starts. The general issue of smoke in Alaska is currently being addressed by the Fire Management Project Group (Alaska Land Use Council) and the State Department of Environmental Conservation.

14. Will traplines be protected?

Traplines and their associated improvements will not be automatically protected. The decision to protect them remains the responsibility of the land manager/owner, after evaluating potential impacts on the area's economy, individual life styles, resource objectives, and fire protection priorities. During our travels through the villages, a number of residents expressed a desire to see more fires in areas where their traplines now exist because the habitat production is decreasing and trapping success is declining.

15. The Lands Bill mandates protection of subsistence opportunity.

(a) What does this mean as far as fire is concerned?

Fire is a natural part of the Alaskan ecological system. In the short-term, fire may sometimes reduce the local subsistence opportunities. On the long-term, fire can improve the subsistence opportunities in areas where habitat quality and quantity has deteriorated.

(b) In the fire plan, are you protecting these areas from fire or providing for fire to help sustain and enhance habitat and wildlife?

Providing fire to help sustain and enhance habitat and wildlife is one factor in deciding how to manage fire within the planning area. This benefit is weighed against many other factors to determine what level of protection is provided for a given area.

16. If fire will benefit the moose populations, will a comparable increase in sport hunting result, thus making it more difficult for local subsistence hunters?

An increase in moose population due to improved browse quality could result in increased sport hunting. The Alaska Department of Fish and Game would be aware of any population changes, and as in other areas of the State, would regulate use of wildlife resources.

17. Will siltation foul spawning streams after a fire?

Siltation of rivers and streams is not common after fire in interior Alaska. Soil erosion and stream siltation can result from improper fireline construction and/or location during fire suppression activities. However, the fire organizations are aware of potential problems and take appropriate tactical and reclamation actions to reduce the threat.

18. How long will it be for burned-over areas to be productive again?

Depending on habitat type and fire severity, there can be a great deal of variation in post-fire vegetation recovery. No single answer could properly address the issue. Fire effects, specifically site productivity, are discussed in the fire management plan in sections II and VII.

19. Wouldn't it be better to start fires when we can control them rather than let wildfires occur any time if we want to use fire as a resource management tool?

The vegetative mosaic that currently exists in Alaska has resulted in large part from recurrent fires over a long time. Prescribed burning can be a suitable means of managing specific resources in specific locations. The development and implementation of a prescribed burn plan is a complex process and must be repeated for each specific site and objective. Allowing some natural fires to burn by implementing the fire management plan may result in some resource benefits that a prescribed fire could be designed to accomplish. However, a primary objective of the Tanana/Minchumina Fire Management Plan is to reduce the commitment of the fire suppression forces in selected areas when and where the risk of property loss and resource damage is low. Designation of some lands as Limited Action areas will also help to restore the natural fire regime under which the ecosystems developed.

20. Does the plan allow for land managers to do prescribed burning?

The plan neither directs nor precludes individual land manager/owner's prescribed burning programs.

21. What is Denali National Park and Preserve's position on fire?

Denali National Park and Preserve is a cooperating member of the Tanana/Minchumina fire management planning team. The plan designates most of Denali as a Limited Action area where natural fires are allowed to burn except that fires are not allowed to escape into neighboring areas with more restrictive suppression standards. As in other Federal lands in Alaska, prescribed burning can also be used for resource management in the area.

22. What is Doyon's position regarding fire?

Doyon has made it clear from the very beginning that they want no less than full fire suppression on all of their lands. Doyon feels that until such time as a comprehensive review of the resources located on corporation lands is accomplished, the corporation is unable to designate any selected or conveyed lands as not having valuable resources and is resolved to require that all Native lands receive the maximum available fire suppression to insure the protection of any and all valuable resources located thereon.

23. Has fire history been established in preparation of the plan?

    Chapter III, Fire Management Information, outlines all available fire occurrence information (1957-1981) for the planning area.

24. Why not wait and see how the plan works in other areas first before implementing it completely, or wait for results of the 40-Mile Plan?

    The 40-Mile Fire Management Plan has been evaluated and information gained from it has helped to steer the development of the Tanana/Minchumina Fire Management Plan. However, the two planning areas have their own unique characteristics and the two plans have their own set of objectives. Further evaluation of the 40-Mile Plan will continue, but is not necessary to proceed with the implementation of the Tanana/Minchumina Plan. In fact, standards developed in the Tanana/Minchumina planning process may soon be used to update the 40-Mile Plan.

25. Can the Tanana/Minchumina Fire Management Plan be changed?

    Yes. A review and update of the Plan is required every year. (See Section I.H., Revision (p. 5.)).

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APPENDIX B

CLIMATIC DATA FROM EXTENDED RECORDS FOR McGRATH, ALASKA
(62E 58' N., 155E 37' W., 334 ft. MSL)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
TEMPERATURE													
Degreee F													
Daily Maximum	0.8	11.5	22.1	39.8	54.8	67.5	68.6	63.0	52.2	34.2	13.4	1.6	35.8
Daily Minimum	-18.7	-11.3	-5.6	15.3	33.3	45.4	48.7	45.2	35.5	19.4	-2.9	-15.6	15.7
Record Hlgh	54	55	51	67	80	89	88	83	76	61	47	44	89
Record Low	-64	-64	-51	-28	-2	30	33	28	6	-22	-49	-67	-64
Days													
Maximum #32EF*	30	25	24	8		0	0	0		15	27	30	159
Maximum ∃70EF*	0	0	0	0	1	10	13	5		0	0	0	29
Deg. Days 65EF	2294	1817	1758	1122	648	258	208	338	633	1184	1791	2232	14283
Deg. Days 35EF	1354	1017	840	307	23	0	0	0	11	311	897	1419	6179
PRECIPITATION													
Inches													
Rainfall	0.0	0.0	0.0	0.17	0.88	1.66	2.43	3.79	2.51	0.72	0.08	0.0	12.24
Snowfall	17.1	13.6	12.3	4.5	0.6	T	0.0	T	0.9	7.6	13.6	14.9	85.1
Total	1.26	1.14	0.93	0.47	0.88	1.66	2.43	3.79	2.61	1.32	1.08	1.01	18.58
Days - Rainfall is:													
∃.10 inches	3	3	3	2	2	4	6	8	7	3	3	2	46
∃.50 inches	**	**	**	**	**	1	1	2	2	**	**	**	6

* Heating degree days.

** Average is >0 <0.5 days

The symbol ∃ means "equal to or greater than"
means "equal to or less than"

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APPENDIX C

CLIMATIC DATA FROM EXTENDED RECORDS FOR FAIRBANKS (UES), ALASKA
(64E 51' N., 147E 52' W., 481 ft. MSL)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
TEMPERATURE													
Degreee F													
Daily Maximum	1.7	12.0	24.8	42.7	60.2	71.7	72.7	67.3	55.4	36.1	13.8	2.3	38.4
Daily Minimum	-16.0	-8.7	1.2	17.0	33.6	44.1	46.8	43.0	33.6	18.6	-2.3	-14.1	16.2
Record Hlgh	42	49	56	71	88	95	99	90	85	67	59	58	99
Record Low	-65	-59	-56	-32	0	26	29	19	7	-28	-54	-62	-65
Days													
Maximum #32EF*	30	25	21	5		0	0	0	11	11	20	27	139
Maximum ∃70EF*	0	0	0		5	18	21	12	0	0	0	0	57
Deg. Days 65EF	2241	1795	1624	1029	561	237	174	322	615	1163	1764	2198	13723
Deg. Days 35EF	1401	1093	713	204	10	0	0	0	12	280	964	1401	6078
PRECIPITATION													
Inches													
Rainfall	0.0	0.0	0.0	0.09	0.78	1.48	2.10	2.43	1.32	0.39	0.04	0.0	8.64
Snowfall	10.9	7.0	6.6	2.0	0.2	0.0	0.0	0.1	0.6	7.0	7.7	8.5	50.6
Total	0.83	1.14	0.42	0.24	0.80	1.48	2.10	2.44	1.36	0.93	0.63	0.57	12.31
Days - Rainfall is:													
∃.10 inches	3	2	1	1	2	4	5	6	4	3	1	2	34
∃.50 inches	0	0	**	0	**	1	1	1	1	**	**	**	4

* Heating degree days.

** Average is >0 <0.5 days

The symbol ∃ means "equal to or greater than"
means "equal to or less than"

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Appendix D

Land Status Map Map is attached to plan. Shows Land Ownership

Maps were prepared at the 1:250,000, 1:500,000, or 1:1,000,000 scales

Appendix E

Management (Watershed) Units and Fire Management Options Map is attached to plan.

Maps were prepared at the 1:250,000, 1:500,000, or 1:1,000,000 scales

APPENDIX F
MODIFIED INITIAL ATTACK ANALYSIS
FIRE ANALYSIS

Management Unit___________________________ Date____________________________

Land Status____

Adjacent Land Status and Fire Management Option(s)______________________________

Weather (past, including present day):

5-Day Cumulative Precipitation____

General-Past 10 Days (or longer)____

Weather (predicted 5-day outlook)____

Weather (extended range outlook)____

Fuels in Area____

Topography____

Natural Barriers____

Fire History to Date____

Anticipated Fire Behavior____

Completed By: ______________________________
Fire Representative

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Appendix F, Continued

MODIFIED INITIAL ATTACK ANALYSIS
RESOURCE ANALYSIS

Management Unit__________________________ Date____________________________________
Land Status____
____
____

Adjacent land Status and Fire Management Options(s)______________________________
____
____

Anticipated Fire Impacts

Soil____
____
____

Water____
____
____

Vegetation____
____
____

Wildlife____
____
____

Air____
____
____

Recreation____
____
____

Cultural/Historic____
____
____

Appendix F, Continued

MODIFIED INITIAL ATTACK ANALYSIS
RESOURCE ANALYSIS

Visual____
____
____

Social____
____
____

Political____
____
____

Life/Property____
____
____

Other____
____
____

Completed By: __________________________________
Land Manager/Owner Representative

MODIFIED INITIAL ATTACK ANALYSIS
DECISION RECORD

Management Unit____

____ Continue Initial Attack
____ Discontinue Initial Attack

Fire Suppression Summary Statement____

Signature ____________________________
Fire Representative

Date ________________________________

Land Manager/Owner Summary Statement____

Signature _______________________________
Land Manager/OwnerRepresentative

Date ____

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APPENDIX G
ESCAPED FIRE ANALYSIS
FIRE ANALYSIS

Management Unit_______________________ Fire Management Option______________
Fire Number___________________________ Fire Coordinates____________________
Fire Name_____________________________ Date________________________________
Land Status____

____

Adjacent Land Status and Fire Management Option(s)____________________________

____

____

Weather (past, including present day):
5-Day Cumulative Precipitation____
General-Past 10 Days (or longer)____

____

____

Fine Fuel Moisture Today____
Weather (predicted 5-day outlook)____

____

____

Fuels in Area____

____

____

Topography____

____

____

Natural Barriers____

____

____

Fire Behavior - Past 5 Days____

____

____

Fire Behavior - Present Day____

____

____

(Continued on next page)

ESCAPED FIRE ANALYSIS
FIRE ANALYSIS

Fire Behavior - Anticipated____

Fire Size____

Control Action to Date (specific details, such as percent containment)________

Completed By: ____________________________
Fire Representative

ESCAPED FIRE ANALYSIS
RESOURCE ANALYSIS

Management Unit________________________ Fire Management Option_______________
Fire Number____________________________ Fire Coordinates______________________
Fire Name______________________________ Date__________________________________
Land Status____
____
____

Adjacent land Status and Fire Management Options(s)____________________________
____
____

Anticipated Fire Impacts

Soil____
____
____

Water____
____
____

Vegetation____
____
____

Wildlife____
____
____

Air____
____
____

Recreation____
____
____

Cultural/Historic____
____
____

ESCAPED FIRE ANALYSIS
RESOURCE ANALYSIS

Visual____
____

Social____
____
____

Political____
____
____

Life/Property____
____
____

Other____
____
____

Completed By:__________________________________
Land Manager/Owner Representative

ESCAPED FIRE ANALYSIS
ALTERNATIVE ACTION PLAN

Management Unit________________________ Fire Management Option______________
Fire Number____________________________ Fire Coordinates_____________________
Fire Name______________________________ Date_________________________________
Land Status____
____Adjacent land Status and Fire Management Options(s)___________________________
____

Alternative 1
Action Description____
____
____
Suppression Capability Needed____
____
Size at +24 hrs.__________ Size at +72 hrs.__________ Size at +5 days__________
Est. Control Date_________ Est. Control Size_________ Est. Control Cost________

Alternative 2
Action Description____
____
____
Suppression Capability Needed____
____
Size at +24 hrs.__________ Size at +72 hrs.__________ Size at +5 days__________
Est. Control Date_________ Est. Control Size_________ Est. Control Cost________

Alternative 3
Action Description____
____
____
Suppression Capability Needed____
____
Size at +24 hrs.__________ Size at +72 hrs.__________ Size at +5 days__________
Est. Control Date_________ Est. Control Size_________ Est. Control Cost________

Completed By: _____________________________
Fire Representative

NOTE: Do not destroy. Add additional alternative action plans as they are required. This will provide an on-going record of the fire situation.

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ESCAPED FIRE ANALYSIS
DECISION RECORD

Fire Number________________________ Management Unit_____________________
Fire Name__________________________ Date________________________________
Alternative Action Plan Recommended 1 2 3 (circle one)
Suppression Method Impact on Resources_____________________________________

Special Operational Considerations____

Summary Statement (be particular in describing why the particular action plan was recommended)____

Signature_________________________________
Land Manager/Owner Representative

Signature_________________________________
Fire Representative

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APPENDIX H

PREVENTION OBJECTIVES

A. EDUCATION

Heighten public awareness and concern to attempt prevention of all fires near human habitations and physical developments.

B. HAZARD REDUCTION

Heighten awareness of the resident public to prescribed burning programs, including legal constraints and fire suppression limitations and technical assistance. Examples include:

1. Involvement in early spring burning near dwellings and physical improvements.

2. Firebreaks near dwellings and other physical improvements.

C. FIRE SAFETY

Heighten awareness and concerns of resident public to fire safety design considerations in and near dwellings and physical improvements. Examples include:

1. Wood stove placement and design.

2. Burning barrel placement and design.

3. Spark arresters on motorized equipment.

D. INVESTIGATION AND ENFORCEMENT

The suppression organizations will provide preliminary fire investigations on all man-caused fires. Enforcement of applicable State and Federal rules, regulations, and statutes will be done by the land manager/owner(s).

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APPENDIX I

TANANA/MINCHUMINA FIRE MANAGEMENT PLAN
MONITORING PROCEDURES

The Tanana/Minchumina Fire Management Plan establishes four fire management options which a land manager/owner can use to help achieve resource objectives, while effectively maximizing each dollar spent on fire suppression. The four options are: Critical Protection, Full Protection, Modified Action, and Limited Action. The Critical and Full Protection options specify that all fires receive immediate and aggressive suppression action. Fires in Modified Action areas receive aggressive initial attack until the critical portion of the fire season has ended. Fires in Limited Action areas are not suppressed unless they threaten escape to an area in a higher protection level.

The plan specifies that fires will be monitored in Limited Action areas, and in Modified Action areas after the decision to stop initial attack has been made. Monitoring is conducted to provide information to management which will be used to estimate fire behavior. Information may also be used to assess fire effects on resources, and provides a chronological history of the fire and suppression decisions.

Each dispatch office will have an atlas of inch-to-a-mile maps covering their area, which show management units, fire management option boundaries, land status, and special resource concerns. Another complete set of inch-to-a-mile maps, and specific forms, will be available for monitoring use.

The following monitoring procedures will be used. When the situation requires surveillance of a fire start or management unit, surveillance personnel obtain the field surveillance forms and inch-to-a-mile map quads for the area of interest. At the fire site, fire behavior is estimated, and fuels and major resource concerns, such as cabins, are mapped. Dispatch personnel obtain spot weather forecasts, and compile previous weather data from the two weather stations nearest to the fire site. Fire behavior predictions are made by a qualified individual, using the fuels map and spot forecast. This prediction, and the supporting information, is given to the Fire Management Officer, who, in consultation with the land manager/owner, decides what further action should be taken. Control may be taken to prevent the fire from leaving the Modified or Limited areas, or to reduce resource impact. If no suppression action is to occur, monitoring will continue at an interval determined by the FMO. This same procedure is used for every subsequent monitoring action. The procedure is outlined in Figure 9.

Figure 9
Operation Decision Chart
Monitoring Procedure

The forms provided on the following pages are to be used:

Field Surveillance Report - summarizes fire site weather, terrain, observed fire and smoke behavior, and special concerns.

Weather and Fire Behavior Report - used in the dispatch office to itemize spot forecast and previous weather; and to summarize forecasted fire behavior.

Monitoring Decision Record - documents decisions related to the monitoring process and proposed contingency and strategic control plans.

While no form is provided, a specific format is used for fuel type mapping. The specific procedure follows:

Fuels are to be mapped on an inch-to-a-mile topographic map. Letter and numerical modifiers are selected for each fuel type using the list on the following page. For example:

I. A.2 B.3/4	=	Black Spruce, moderately dense with an understory of low shrubs (greater than 3 feet tall) and lichens/moss.
IV. A.2 B.2/4 C.2	=	Hardwoods, moderately dense, with an understory of low shrubs and spruce trees; hardwood canopy in full leaf (should change map notation when canopy condition changes).

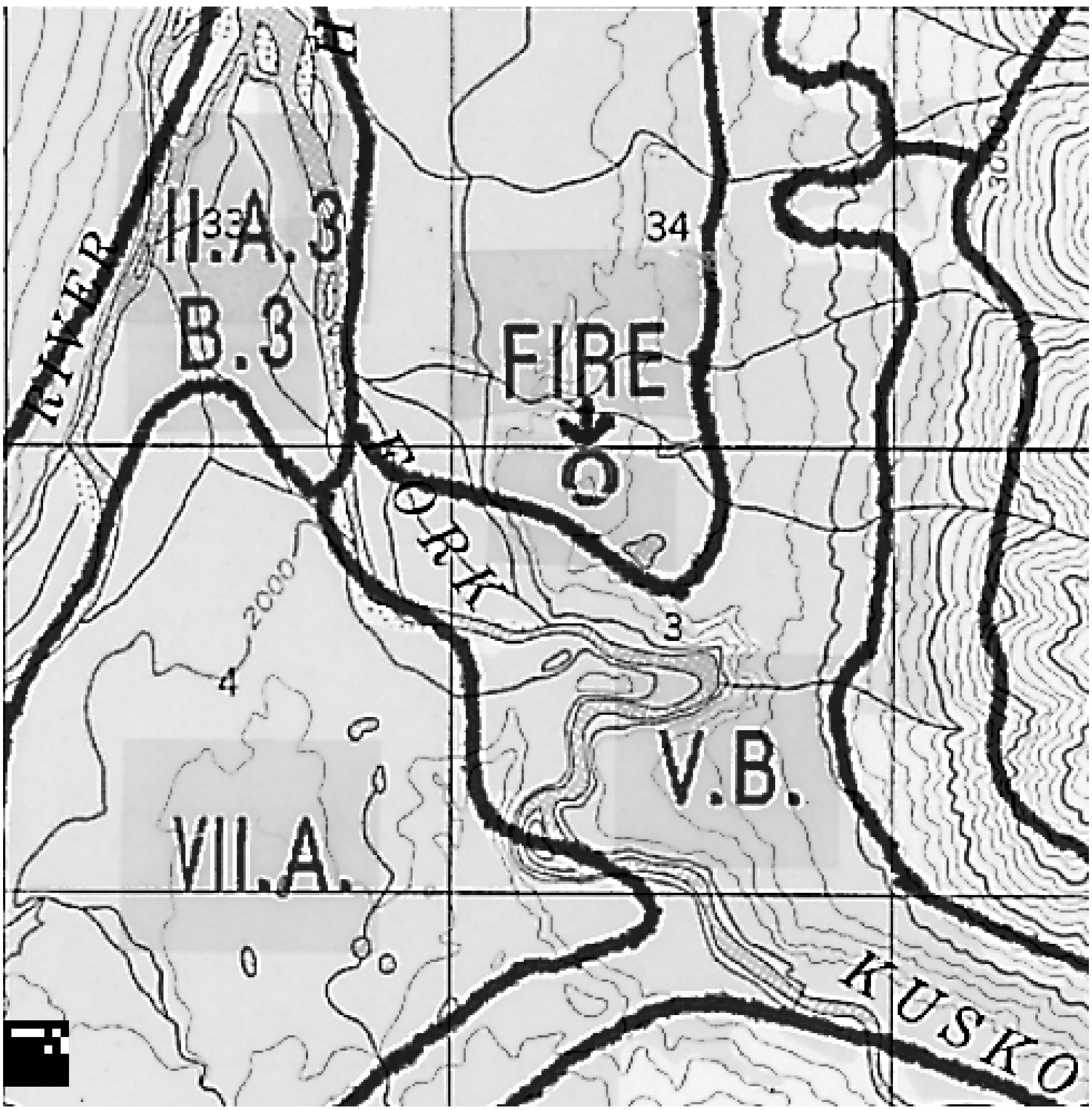
Use of the format just described will permit the selection of the proper fire behavior fuel model. An accurate map of fuels in the vicinity of the fire must be made on the first surveillance flight, even if it requires extra fIight time. This map should be used on each monitoring flight, and improved if necessary. An example of a fuel type map is shown in Figure 10.

FUEL MAPPING CATEGORIES

I.	BLACK SPRUCE		
	A. Tree Density*:	1. Scattered	2. Moderately Dense
		3. Dense	
	B. Understory Vegetation:	1. Tussocks	2. Shrubs 0-3 ft.
		3. Shrubs >3 ft.	
		4. Lichens/Moss	
II.	WHITE SPRUCE		
	A. Tree Density*:	1. Scattered	2. Moderately Dense
		3. Dense	
	B. Understory Vegetation:	1. Shrubs 0-3 ft.	2. Shrubs >3 ft.
		3. Lichens/Moss	4. Other (describe)
III.	SPRUCE/HARDWOOD MIX	(Note on Map % Srpuce and % Hardwood)	
	A. Tree Density *:	1. Scattered	2. Moderately Dense
		3. Dense	
	B. Understory Vegetation:	1. Shrubs 0-3 ft.	2. Shrubs >3 ft.
		3. Lichens/Moss	4. Grass
		5. Other (describe)	
IV.	HARDWOODS		
	A. Tree Density*:	1. Scattered	2. Moderately Dense
		3. Dense	
	B. Understory Vegetation:	1. Shrubs 0-3 ft.	2. Shrubs >3 ft.
		3. Lichens/Moss	4. Spruce
		5. Grass	6. Other (describe)
	C. Canopy Condition:	1. Before Green-Up	2. Full-Leaf
		3. Leaf-Fall	
V.	SHRUBS	A. (0-3 ft.)	B. (>3 ft.)
VI.	TUSSOCK/SHRUB MIX	(Note on Map % Tundra and % Brush)	
	A. Shrub Height:	1. (0-3 ft.)	2. (>3 ft.)
	B. Tussock Height:	1. (0-1 ft.)	2. (>3 ft.)
VII.	TUSSOCK TUNDRA		
	Tussock Height:	A. (0-1 ft.)	B. (>3 ft.)
VIII.	ALPINE TUNDRA	A. Continuous Vegetation	B. Discontinuous Vegetation
IX.	BARE ROCK		
X.	GRASS		
	Grass Height:	A. (0-3 ft.)	B. (>3 ft.)
XI.	OTHER		
	Describe:____________________		

* Tree Density: Scattered - trees >15 ft. Apart
Moderately dense - trees 5-15 ft. Apart
Dense - trees <5 ft. Apart

Fig. 10
Fuel Type Map



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Date________________
Observation Time________________
Observer________________________
Fire Number____________________

TANANA/MINCHUMINA FIRE MANAGEMENT PLAN
Field Surveillance Report

GENERAL (information provided by Dispatch)

Date Fire Started____________ Longitude___________ Latitude___________
Management Unit______________ Township______ Range______ Section______
Fire Management Option______________________ Geographic Location____________
Land Status____

FIRE SITE WEATHER

General Weather Conditions____

____

Wind Direction_________________ Estimated 20-Foot Windspeed____________

Check Appropriate Category(ies):

Clear (less than 1/10 of sky cloud covered)	___________
Scattered clouds (1/10 to 5/10 cloud covered)	___________
Broken Clouds (6/10 to 9/10) cloud covered)	___________
Overcast (more than 9/10 of sky cloud covered)	___________
Foggy	___________
Drizzling (precipitation of numerous fire droplets; in some areas referred to as Amisting@)	___________
Raining	___________
Snowing or Sleeting	___________
Showering (showers in sight or occurring at station)	___________
Thunderstorm in progress (lightning or thunder heard)	___________
Estimated distance to thunderstorm	___________

TERRAIN

General Area		At Fire Site	
Flat	___________	Flat	___________
River Valley Bottom	___________	Lower 1/3 of slope	___________
Rolling Hills	___________	Upper 1/3 of slope	___________
Mountainous	___________	Ridgetop	___________
Other (describe)	___________	Other (describe)	___________
___________________________		___________________________	

OBSERVED FIRE BEHAVIOR

Estimated Rate of Spread______________ Estimated Flame Length_______________

Direction of Forward Speed___________ Estimated Width of Flaming Front_____________________

Type of Fire (check appropriate category):

Ground (smoldering) ____ Surface ____ Crown____

Single trees torching out ____
6 or more trees torching out ____
Running crown fire ____

Spotting: ____Yes ____No Distance ahead of fire front________

Comments____

SMOKE

Column Height_____________ Direction of Movement______________
Color: Black____________ White____________
Comments____

SPECIAL CONCERNS (note here and on map any people, cabins, development, etc., in vicinity of area)

Date ___________
Time ___________
Reporter ___________
Fire Number___________

TANANA - MINCHUMINA FIRE MANAGEMENT PLAN
Weather and Fire Behavior Report

Date Fire Started_______________ Long._____________ x Lat._____________
Management Unit _______________ Twp._______ Rge.________ Sec._______
Fire Mgt. Option _______________ Geographic Location_________________
Land Mgr./Owner(s)____

Adjoining Land Mgr./Owner(s) and Fire Mgt. Option of Each______________________
____WEA
THER SUMMARY (NOTE: Obtain a spot weather forecst each day. The complete spot forecast can be attached to this report.)

Spot Weather Forecast for Today=s Burning Period

1400 Temp _________ Max RH _________ Precip. Amount _________
1400 RH _________ Time _________ Precip. Duration _________
Max Temp _________ Min RH _________
Time _________ Time _________
Min Temp _________ Wind Dir._________
Time _________ Max Wind Speed _________
Time _________

Thunderstorm activity predicted (describe type)____________________
____

Spot Weather Forecast for Today=s Burning Period

1400 Temp _________ Max RH _________ Precip. Amount _________
1400 RH _________ Time _________ Precip. Duration _________
Max Temp _________ Min RH _________
Time _________ Time _________
Min Temp _________ Wind Dir. _________
Time _________ Max Wind Speed _________
Time _________

Tunderstorm activity predicted (describe type)____________________
____

3-5 Day Spot Weather Forecast______________________________________
____

SEASONAL TREND

Past 10-day weather observation from two fire weather stations nearest fire

Station name ______________

Day	State of Weather	Dry Bulb Temp.	Fuel Stick Moisture	Max. Temp.	Min. Temp.	Max. R.H.	Min. R.H.	Precip. Dur.	Precip. Amt.
9									
8									
7									
6									
5									
4									
3									
2									
1									

Today's weather observation:

Station name ______________

Day	State of Weather	Dry Bulb Temp.	Fuel Stick Moisture	Max. Temp.	Min. Temp.	Max. R.H.	Min R.H.	Precip Dur.	Precip. Amt.
9									
8									
7									
6									
5									
4									
3									
2									
1									

Today's weather observation:

Additional Comments ____

FINE DEAD FUEL MOISTURE CALCULATIONS

a. Projection point						
b. Day or night (D/N)	D/N	D/N	D/N	D/N	D/N	D/N
DAY TIME CALCULATIONS						
c. Dry bulb temperature, °F						
d. Relative humidity, %						
e. Reference fuel moisture, % (from Table A)						
f. Month						
g Exposed or shaded (E/S)	E/S	F E/S	F E/S	E/S	E/S	E/S
h. Time						
i. Elevation change B = 1000'-2000' below site L = ±1000' of site location A = 1000'-2000' above site	B/L/A	B/L/A	B/L/A	B/L/A	B/L/A	B/L/A
j. Aspect						
k. Slope						
l. Fuel moisture correction, % (from Table B, C, or D)						
m Fine dead fuel moisture, % (line e + line l) (to line 9, other side)						
NIGHT TIME CALCULATIONS						
n. Dry bulb temperature, °F						
o. Relative humidity, %						
p. Reference fuel moisture, (from Table E)						
Use Table F only if a strong inversion exists and a correction must be made for elevation or aspect change.						
q. Aspect of projection point						
r. Aspect of site location						
s. Time						
t. Elevation change B = 1000'-2000' below site L = ±1000' of site location A = 1000'-2000' above site	B/L/A	B/L/A	B/L/A	B/L/A	B/L/A	B/L/A
u. Correction for projection point location (from Table F)						
v. Correction for site location (L) (from Table F)						
w. Fuel moisture correction, % (line u - line v)						
x. Fine dead fuel moisture, % (line p + line w) (to line 9, other side)						

(January 1980)

FIRE BEHAVIOR WORKSHEET

Name of fire ______________ Fire Behavior Officer ______________ Sheet ___ of ___

Date ______________ Time ________ Proj. Period Date ______________ Project time from ______ to ____

No.	Item	Keystroke	Over-Lay Label							TI-59 reg. no.
1	Projection point									
2	Fuel model									
3	Fuel model proportion, %									
4	20-foot windspeed, mph									
5	Wind reduction factor									
6	Shade (0=0-10%;1=10-50% 2=50-90%;3=90-100%)		SHADE							60
7	Dry bulb temperature, °F		DB							61
8	Relative humidity, %		RH							62
9	Fine dead fuel moisture, % or 1 H TL FM, %		1 H							28
10	10 H TL FM, %		10 H							63
11	100 H TL FM, %		100 H							30
12	Live fuel moisture, %		LIVE							33
13	Midflame windspeed, mph		M WS							79
14	Windward slope, % (W) -or-		PCT S							80
15	Maximum slope on flank, % (F)			W/F	W/F	W/F	W/F	W/F	W/F	
16	Projection time, hr		PT							81
17	Map scale, in/mi -or-		MS							82
18	Map conversion factor									
19	Effective windspeed, mph									
	************************************	Keystroke								
20	Rate of spread, ch/hr	A	ROS							88
21	Heat per unit area, BTU/ft²	R/S	H/A							90
22	Fireline intensity, BTU/ft/s	B	INT							53
23	Flame length, ft	R/S	FL							54
24	Spread distance, chains		SD							42
25	Map distance, inches	R/S	MD							43
26	Perimeter, chains	D	PER							40
27	Area, acres	R/S	AREA							89
28	Ignition component	E	IC							44
29	Reaction intensity, BTU/ft²/min	R/S	IR							52

October 1979

Date ________________
Time ________________
Forecaster ________________
Fire Number ________________

FIRE BEHAVIOR FORECAST

1. Describe the predicted fire behavior (attach a map showing the projected fire perimeter at 10 AM tomorrow, and at the end of tomorrow=s burning period).

2. Given the 3-5 day weather outlook, is escape from the designated area a likely occurrence?

INTENTIONALLY LEFT BLANK

Date _____________
Observaton Time _____________
FMO _____________
Fire Number _____________

TANANA/MINCHUMINA FIRE MANAGEMENT PLAN
Monitoring Decision Record

Is a flight with the land/manager owner required in order to make a suppression decision?____
If so, when?____
____

If no suppression action will be taken, identify the next action in the monitoring sequence:____
____
____
____
____
____

What is the contingency plan or strategic control plan should the fire threaten an endesirable escape from the area?________________________________
____
____
____
____
____

Additional comments:____
____
____
____
____
____

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GLOSSARY OF TERMS

ANCSA: Alaska Native Claims Settlement Act - the act authorizing land conveyance to Alaska Natives, passed in 1971; P.L. 92-203.

ANILCA: Alaska National Interest Lands Conservation Act - the bill which established national parks, monuments, and wildlife refuges, and other national conservation units in Alaska, passed in 1980; P.L. 96-487.

Contingency Plan: Predetermined alternative tactical course of action and its consequences. The plan provides for smooth transition of the control effort when new direction is required.

Control of a Fire: The completion of control lines around a fire, any spot fires, and interior islands to be left unburned; burning out any unburned area adjacent to the fire side of the control lines; and cooling down all hot spots that constitute immediate threats to the control lines until these can reasonably be expected to hold under foreseeable conditions.

Cooperative Agreement: A written document which identifies who, what, when, where, why, and how certain actions will be done by each individual or agency involved. This is signed by the designated land manager(s).

Cultural Resources: Prehistoric and historic remnants and physical and oral evidence of human activities.

Deficiency Lands: Lands designated for selection by village and regional corporations when there is insufficient land for selection in their core townships or regions.

Designated Physical Development: Physical structures, improvements or specific sites that the land manager/owner selects and lists as needing the highest priority fire protection.

Direct Attack: Fireline is built at the edge of the fire, or the edge and interior of the fire are worked on directly.

Escaped Fire: An unwanted fire which is not contained by the suppression forces.

Fire Behavior: The manner in which fuel ignites, flame develops, and the fire spreads and exhibits other phenomena.

Firebreak: A natural or constructed barrier utilized to stop or check fires that may occur, or to provide a control line from which to work.

Fire Effects: Any changes in resources which result from the interaction between a fire and the environment.

Fire Management: Application of fire, both natural or prescribed, land management objectives within sound ecological, environmental, and economical objectives and constraints.

<u>Fire Management Options</u>: A range of alternatives which defines the kind and extent of fire activity acceptable or desirable on a given land area.

<u>Headquarter Site</u>: A parcel of land not to exceed five acres which must be used in conjunction with a business. Applicant does not have to occupy for any definite period of time.

<u>Indirect Attack</u>: A method of suppression in which the control line is located along natural firebreaks, favorable breaks in topography, or at considerable distance from the fire.

<u>Initial Attack</u>: Actions constituting the first suppression work on a fire.

<u>Interim Conveyed Lands</u>: Lands approved for conveyance to the Native corporations and a document of Interim Conveyance issued. This document is used for conveyance until survey has been accomplished and a patent issued. Lands are administered and managed by Natives.

<u>Land Manager/Owner</u>: The responsible Line Officer for the Federal agencies or designated individual in Federal, State, and private organizations who is authorized to make decisions concerning the management of specified land areas.

<u>Management Fire</u>: Fire which contributes to the attainment of management objectives of an area. This includes any fire not suppressed because it meets established criteria.

<u>Management Units</u>: Geographic subdivisions within the planning area which are surrounded by barriers to fire spread and within which fire management options are implemented.

<u>Monitoring</u>: The process of observing and evaluating fire behavior, weather, and affected resources for the purpose of making fire management decisions.

<u>Native Allotments</u>: Each Alaska Native of 1/8 Native blood, Athabascan, Tlingit, Aleut, Eskimo, is entitled to 160 acres in not more than four parcels for which they must show occupancy and use. Allotments on record, if not appealed or with conflict, were administratively approved by ANILCA.

<u>Native Selected Lands</u>: Lands withdrawn for Native selection and selected by Native village or regional corporations.

<u>Over Selecting Lands</u>: Lands selected by the Native corporations and State in excess of thir entitlements.

<u>Patented Land</u>: Lands for which Native corporations or the State of Alaska have recieved the final document of ownership - subject to reservations by the U. S. Government

<u>Patented Mining Claims</u>: A mining claim that has had a validity check and been approved for patent and a patent document issued. This patent conveys "surface rights" well as subsurface - subject to valid existing rights.

Prescribed Fires: An administratively approved fire (natural or man-ignited) burning under approved and coordinated plans in wildland fuels, confined to a specific area with the intent of achieving certain planned and desirable land or resource objectives.

Private Patented Lands: Lands that have been conveyed to private individuals or organizations. These lands are owned in "Fee Simple." They have a patent which assures ownership.

Project Fire: A fire which requires a Class I or Class II Fire Overhead Team as determined by either the suppression organization or the land manager/ owner.

Regional Corporation: An Alaska Native Regional Corporation, established under the laws of the State of Alaska in accordance with the provisions of ANCSA. The State of Alaska has been divided into twelve Native Regional Corporations with a thirteenth formed for Alaska Natives which live out of Alaska. Regional Corporations receive all subsurface rights of lands acquired by Village Corporations within their region. They also receive the surface and subsurface rights of lands conveyed to the region.

Resource Objective: A desirable management decision of a course of action which provides targets for program accomplishment.

State Selected: Land selected by the State for future possible conveyance.

Strategic Action Plan: A plan which identifies and takes into consideration all information about a fire, how the various resources are affected, and specific agency and/or management concerns, and develops a recommended course of action for control of the fire.

Strategy: The broad scale planning and direction for an escaped fire situation. Strategic plans integrate considerations of land management objectives and direction, resource locations and values, fire size, suppression capabilities, the effects of the fire and suppression activities, and costs.

Suppression: The work of extinguishing or confining a fire beginning with its discovery.

Sustained Attack: Continuing suppression action on a fire until control is achieved.

Tactic: The selection of suppression methods and the coordination of all forces committed to a fire to accommodate a designated strategy.

T & M Site: A parcel of land up to 80 acres in size conveyed under the trade and manufacturing site regulations. Applicant must have a going business when land is conveyed.

Tentatively Approved: Lands tentatively approved for conveyance to the State of Alaska. When land has been TA'd, BLM relinquishes management.

Unpatented Mining Claim: A parcel of land upon which a mining claim has been filed but no document of fee simple ownership has been issued. Applicant has only rights to subsurface estate and limited rights to the surface estate.

Village Corporation: An Alaska Native Village Corporation, organized under the laws of the State of Alaska as a business for profit or nonprofit corporation to hold, invest, manage ant/or distribute lants, property, funds, and other rights and assets for and on behalf of a Native Village in accordance with the terms of ANCSA. Village Corporations receive ownership of the surface estate on the land conveyed to them. The Village Corporation entitlement varies from three (3) to seven (7) townships, depending on their population as of 1970.

Wildfire: Any wildland fire not prescribed for the area by an authorized plan.

I recommend the Bureau of Land Management and State of Alaska fire suppression organizations implement the Alaska Interagency Fire Management Plan: Tanana/ Minchumina Plan Area. I concur with the fire management option(s) to be applied on the lands administered by my organization. I have reviewed the Plan and recognize the fire management options to be applied by the other cooperating organizations on lands adjacent to those administered by my organization.

Curtis McVee
State Director
Bureau of Land Management

Date 22 Mar 1982

Theodore Smith
State Forester
Department of Natural Resources

Date Mar 22, 1982

John Cook
Regional Director
National Park Service

Date March 23, 1982

for Ronald O. Skoog
Commissioner
Alaska Department of Fish and Game

Date 4-5-82

Jacob Lestenkof
Area Director
Bureau of Indian Affairs

Date 18 April 1982

Tim Wallis
President
Doyon Limited

Date 5-6-82

for Keith Schreiner
Regional Director
Fish and Wildlife Service

Date

Robert Cunningham
Superintendent
Denali National Park/Preserve

Date 3-25-82

William C. Williams
President
Tanana Chiefs Conference, Inc.

Date 5/11/82