4A.4 MANAGING FIRE IN THE URBAN INTERFACE OF INTERIOR ALASKA

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1. SUPPRESSION CHANGES FORESTS AND SUBSEQUENT FIRE RISK

The interior of Alaska has a hot, dry summer climate and frequent lightning. These conditions, plus an abundance of highly flammable spruce trees (*Picea* spp.), make this the most fire-prone portion of the state. The forests of this region are collectively known as the boreal or taiga (Fig. 1). Most of the wildland fires in Alaska occur in this region (U.S. Bureau of Land Management 2003). Human settlement in the boreal forest creates an interesting paradox: wildland fires are needed to protect against fire, and fire suppression is needed to cost-effectively manage lands and resources in the urban interface.

Spruce trees (*Picea* spp.) dominate boreal forest landscapes that have not burned recently. Deciduous shrubs and trees such as willow (*Salix* spp.), quaking aspen (*Populus tremuloides*), and paper birch (*Betula papyrifera*) occupy the burned sites during the first 100 years post-fire. Eventually, the slower growing and longer-lived spruce overtop the deciduous trees and create conditions less suited for them. This would set the stage for vast expanses of spruce forest if it were not for the fact that spruce trees, especially black spruce (*P. mariana*), burn so readily. Most black spruce stands burn before they are 100 years old (Foote 1983, p. 100). The fire return interval is usually longer for white spruce (*P. glauca*) stands; most are 100–200 years old when fire returns. In areas where lightning regularly occurs, the boreal landscape is a mixture of different age stands due to recurring wildland fires. The boreal forest is considered a fire-dependent ecosystem; recurring fires are necessary to maintain the flora and fauna that have adapted to fire and the resulting forest mosaic (Kelsall, Telfer, and Wright 1977).

Experience has shown that fires can't be kept out of the boreal forest forever; suppression just postpones the inevitable. During some summers, severe burning conditions may occur but ignitions do not. During other years, there may be lightning ignitions but poor burning conditions allow initial attack to be effective. It is when these two requisites, ignition sources and severe burning conditions, coincide that fire suppression becomes expensive, problematic, and often dangerous. A new fire start may spread so rapidly that it is beyond the capability of initial attack forces by the time they arrive, or multiple ignitions will exhaust available fire resources, forcing managers to leave some fires unstaffed.

Although suppression cannot exclude fire from the boreal forest, it certainly can change the makeup of the forest by keeping fire out for extended intervals. In the absence of fire, diversity decreases at both the stand and landscape level as the early-succession broadleaf species are replaced by spruce (Foote 1983, Haggstrom and Kelleyhouse 1996). At the same time, future suppression risks and costs escalate as continuous expanses of the more flammable spruce develop. This suppression-caused shift in forest characteristics increases the probability of large, severe fires.

The consequences of attempted fire exclusion are bad for people. The risk to homes and other developments becomes much greater when the adjacent broadleaf forest converts to spruce. A forest with a large broadleaf component is much more resistant to burning than a forest dominated by conifers. A fire usually spreads more slowly in hardwood stands because there are fewer surface fuels and the trees generally do not have branches near the ground to carry the fire into the crown.

Attempted fire exclusion is also bad for most wildlife species. Wildlife becomes less abundant and diverse as the early-succession broadleaf plants become under-represented in the forest. Most wildlife species in the boreal forest thrive best in areas with either early-succession vegetation or a patchwork of young and old stands (Kelsall et al. 1977, Haggstrom and Kelleyhouse 1996).

Some fire and land managers in Alaska believe they fixed this problem years ago with policy changes that replaced attempted fire exclusion with various suppression responses determined by the values at risk and the availability of firefighting resources. I will show that

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this is not necessarily true. I have worked with fire and land managers in interior Alaska since the mid-1970s to address the negative effects of fire management on wildlife habitat and believe there is still a very serious fire exclusion problem.

2. FIRE PLANNING REDEFINES THE PROBLEM

Fire management decisions on most lands in Alaska are now guided by the Alaska Interagency Wildland Fire Management Plan (AIWFMP; Alaska Wildland Fire Coordinating Group 1998), which is a consolidation and amendment of regional fire plans prepared in the 1980s. Under the AIWFMP, land managers place their lands in one of four fire management options: Critical Management for inhabited areas with the highest priority for suppression; Full Management for areas with uninhabited private property, high resource values, or cultural and historic sites; Modified Management for areas where aggressive suppression efforts are only needed during extreme burning conditions; and Limited Management where human values needing protection are so few that fire spread can usually just be monitored. Lands in the Modified Management Option are treated much like Full Management areas during the hot, dry early summer period and like Limited Management areas during the cooler, wetter late summer period. As a result of this planning process, two-thirds of the lands in Alaska are now placed in the Limited Management Option, where little action is taken on most fires because there are few values needing protection.

One of the incentives for fire planning, from a suppression perspective, was to prioritize fires in terms of human values needing protection. This would help ensure that available firefighting resources were assigned to the most critical fires and that identified values were protected. In this regard, the plan was a tremendous success.

What does this mean for the land and resource managers? Many fires in the remote portions of the state are now allowed to burn. Suppression efforts in these areas are usually focused on protecting structures and Alaska Native allotments (private parcels <65 ha owned by individuals) rather than preventing fire spread. This is good from a land and resource management perspective because fire, the most prominent natural disturbance factor in the boreal ecosystem, is now allowed to shape the forest in most of the state as it always had before suppression was superimposed on the landscape in the last half of the 20th century.

Wildlife managers and cost-conscious officials certainly welcome this change, but the remote areas never really posed a protection problem. It was more an ideological problem that reflected societal values at the time. The real challenge is managing fires where most of the state's people live, recreate, and harvest resources. This is where our planning lacks foresight. Under the AIWFMP, most of the areas around our communities and road system are placed in the Full Management Option, where suppression is geared to keeping fires as small as possible. This is an untenable situation, unless other means are available to maintain the broadleaf component of the forest in the absence of wildland fire. Therein lies the problem. In interior Alaska, the alternatives to wildland fire have proven to be too costly and politically charged to implement on the scale necessary to keep pace with human developments.

Historically, managers have turned to prescribed fire and mechanical treatment to manage fuels and enhance habitat in the urban interface where wildland fires are usually suppressed. However, far fewer hectares are treated than are necessary to maintain the broadleaf component of the boreal forest in the absence of wildland fire. For example, commercial timber is harvested from less than 400 hectares (<6% of the annual allowable cut) of the 730,000 hectare Tanana Valley State Forest (TVSF; Fig. 2; Alaska Department of Natural Resources 2001, p. 52) annually because of the high costs of getting forest products to potential markets. Yet, to the extent possible, fires are being excluded from about 95 percent of the TVSF (Alaska Department of Natural Resources 2001, p. 7).

It is even harder to treat other lands outside the state forest without a saleable timber product. The high costs of prescribed burning and mechanical treatments, plus the personal liability and political risks of prescribed burning, are major obstacles to overcome. For example, Alaskan managers have been trying without success to conduct an urgently needed prescribed burn for wildlife on the Tanana Flats near Fairbanks for almost ten years (Haggstrom and Kurth 2001).

Thus, fire planning has reduced the negative impact of fire suppression on the state as a whole, but in doing so has exacerbated long-term management problems in the smaller portions of the state where the bulk of the people live. The solution to this dilemma is to move beyond the relatively simple initial attack options available in

the Critical, Full, Modified, and Limited management options of the AIWFMP (a largely reactive approach) to a program of active wildland fire management (proactive approach), and augment it with focused prescribed burning and mechanical treatments. Actively managing wildland fires to help meet fire suppression, land management, and resource management objectives is the only way to reduce the amount of land needing prescribed burning or mechanical treatment to a manageable size.

3. MOVING OUTWARD FROM DEFENSIBLE SPACE

Fire prevention programs have traditionally encouraged homeowners to remove vegetation adjacent to structures to create a "defensible space." Managers are only beginning to take the next logical step: manipulation of forest fuels on lands immediately adjacent to subdivisions or communities. This approach focuses limited funds on one of our most critical protection needs: the protection of homes abutting black spruce stands, our most volatile forest fuel. It also will provide needed habitat improvements, which is why the Alaska Department of Fish and Game is helping fund one of the first projects of this kind in the Fairbanks area. The Alaska Department of Natural Resources, Division of Forestry (DOF), will use a shearblade equipped dozer to strip fire prone vegetation from about 485 hectares of public land adjacent to homes (Fig. 3). The windrowed debris will then be burned.

Localized habitat improvements will be realized when broadleaf plants replace black spruce in the treated areas. Broader benefits will accrue outside the treated areas because it will be less risky to manage wildland fires in the urban interface. Treated areas become effective control lines from which to backfire if wildland fire threatens adjacent homes.

Learning to manage wildland fires in the urban interface is really the long-term solution for both fuels and habitat management needs. Fires in the boreal forest are simply more manageable when a substantial broadleaf component is present. It is easier to protect subdivisions or communities from a fire spreading through mixed forest than one spreading through black spruce. At present, the fire return interval is being extended everywhere there are human values to protect, with potentially dire consequences. Proactive management of wildland fires in the urban interface will create forest conditions that allow localized fuel treatment efforts to be effective under a wider range of burning conditions. It will also reduce the need for the costly or politically untenable alternatives to wildland fire, bringing the total area that must be treated with prescribed burning and mechanical treatment down to a size that may be feasible.

To do this, managers must continue to redefine the role of fire suppression in the boreal forest. All fires in the fire-dependent boreal forest provide, by definition, some ecological benefits. By extension, these ecological benefits translate to human benefits, since a diverse and productive forest is essential to support people's traditional uses of the boreal forest. Thus, federal policy, which tries to provide a standardized approach nationwide across a myriad of vastly different ecosystems, seems to be based on a tenet that is arguably inappropriate for the boreal forest ecosystem, namely that some wildland fires are unwanted and therefore should be suppressed (National Wildfire Coordinating Group, 2003). A more realistic approach would be to assume all fires are part of the natural pattern of burning that defines the boreal forest and, thus, are "wanted." Then shift the focus of suppression to protecting identified human values and not on extinguishing the fire.

4. COST-BENEFIT EVALUATIONS NEED LONG-TERM PERSPECTIVE

We now know that it is to everyone's advantage to allow a fire to burn *if* the situation is manageable. Identified human values still must be protected, but often that can be accomplished without putting the fire out as quickly as possible. Once the short-term immediacy of protecting human values has been addressed, fire managers need to start looking for opportunities to accommodate or even actively manage the fire for the long-term benefits and cost-efficiencies it may provide. This is what should be happening right now when a fire receives initial attack or strategies are formed for continued action on a fire. There is a fair amount of flexibility in the AIWFMP and the Wildland Fire Situation Analysis (WFSA) to select the most appropriate management response. Unfortunately, decisions based on short-term efficiencies and expediencies are still the norm, and many opportunities to manage fires for long-term benefits and cost savings are lost.

One possible solution would be for the Alaska Wildland Fire Coordinating Group to amend the AIWFMP so it more clearly allows line officer discretion. Most of the land in the urban interface in interior Alaska falls within the Full Management Option. The current policy for fires occurring in the

Full Management Option is that they *will* receive *aggressive* initial attack. The stated objective for initial attack is to control the fire at the *smallest area possible*. With such strong direction in the policy and objective sections of the AIWFMP, is it any wonder that the discretion allowed in the operational considerations section (i.e., suppression tactics are selected after balancing suppression costs with the values identified for protection) often goes unnoticed? It is time to acknowledge that fires in the Full Management Option areas, like those elsewhere, occur under a wide range of conditions and the requirements for protecting identified values vary greatly depending on burn conditions, fuel types, and location. If we are serious about wanting to maintain some burning in the urban interface for the long-term protection and ecological benefits it can provide, then we must make it easier for line officers to tailor initial attack responses to the situations they encounter in the field.

Another problem that always exists is that it is relatively easy to project the short-term suppression costs of various alternative strategies in a WFSA (e.g., number of fire crews, loads of retardant, etc. that may be needed), but extremely hard to put a dollar sign on the long-term suppression benefits (e.g., reduced costs on future fires in this area). It is even harder to factor in less tangible land and resource benefits so an objective comparison can be made. In my 25-year experience working with fire managers, I have observed that decision makers often choose an alternative that reduces their short-term costs without tying up so many firefighting resources that other fire operations will be jeopardized. There is still a strong suppression bias when fire strategies are developed and little incentive to change. If aggressive suppression strategies are used, there is less liability risk to the individual line office and the agency. Resources to implement the strategies are seldom denied unless they are needed elsewhere. The traditional suppression funding mechanism used by the federal and many state governments does not encourage or reward truly cost-effective decisions.

5. PROGRESS BRINGS POTENTIAL SOLUTIONS AND NEW CHALLENGES

At the state level, cost-effective decisions are being encouraged. Starting last summer, Alaska changed the way it funds fire suppression in an attempt to foster greater fiscal responsibility. The DOF is given a fixed allocation that reflects the average costs of fighting fires over the last ten years, with the high and low years excluded, and the division is expected to keep fire costs within budget. Now, each expenditure leaves less money for future firefighting efforts. This change should provide the impetus for more managers to opt for less expensive indirect attack strategies and consider alternatives that save money over the longer term.

”Pre-attack planning” for areas under the Full Management Option, starting with those deemed most critical from a fuels and habitat management perspective, may also save money and benefit resources. When the Fish Creek Wildland Fire (Fig. 4) started in summer 2001 in an area southwest of Fairbanks, Alaska, managers were able to allow the fire to spread eastward in a Full Management Option area because the area was covered by the Western Tanana Flats Prescribed Burn Plan (Haggstrom and Kurth 2001). The prescribed burn plan identified the human values at risk from fire, forest fuels, and land and resource management objectives. Similarly, pre-attack planning at the landscape-scale in key areas of the urban interface will greatly increase our options for managing wildland fires (T. Kurth, DOF, Fairbanks, personal communication).

Currently, the line officer making the decisions on a new fire in the urban interface has relatively little information on which to base initial decisions. In many instances, the line officer may know little more than the fire’s coordinates and the AIWFMP fire management option for that location. With a pre-attack plan in place, the line officer would also know what human values need to be protected, where they are, how defensible they are, what fuels are involved, who to contact, and the land and resource management objectives relative to fire. The pre-attack plan could also describe conditions under which fire spread is considered manageable. This information would allow the line officer to more quickly assess the situation and decide whether an initial response different from the default fire management option response (aggressive direct attack on the fire start) is warranted.

The WFSA that is completed, if continued suppression action is required after initial attack, attempts to gather these data and make them available for fire decisions. However, this information arrives too late in the process. Most of the wildland fires that could be managed for land and resource management purposes occur under conditions that allow firefighter to contain them with the initial attack response. Thus, most of our opportunities to use wildland fires to reduce future suppression risks and costs, and attain resource

benefits, are foreclosed before the land managers are even aware that a fire has started. We must either change the AIWFMP and the way suppression staff view fire so these opportunities can be realized during initial attack or complete pre-attack planning efforts to further clarify the conditions under which wildland fires can be managed for land and resource benefits. I suggest that we do both because, based on my experience writing plans for landscape-scale prescribed fires, preparing pre-attack plans for the vast area needing them will be a time-consuming task that the state, at least, lacks staffing to undertake.

Every fire must be viewed as an opportunity. Land and fire managers alike need to look beyond the short-term emergency response aspects of a fire in the urban interface to how it can be managed to provide optimal benefits for society. From the moment firefighters respond to a fire call, two very important things have happened from a management perspective that preset the stage for further options: ignition has already occurred and firefighting forces are either onsite or enroute. Ignition is important; personal and agency liability for decisions is much less when managing an ongoing wildland fire than when they ignite the fire themselves in a prescribed fire situation (T. Kurth, personal communication). Capitalizing on the presence of firefighting resources also makes fiscal sense; the expertise and equipment are already onsite. To come back at a later date to burn for management purposes requires a second mobilization at additional cost.

From a land and resource management perspective, ignition source makes no difference. It does not matter whether the fire is human caused or due to lightning. Irresponsible and illegal behavior should be punished if laws are broken, but that should remain a separate action that has no bearing on how the fire is managed after ignition. What matters is whether the fire is burning in a way that (1) is manageable and (2) will provide fire effects within a range acceptable for land and resource management needs.

Historically, wildland fire suppression was considered an emergency action that was funded separately from other activities. The concept of a suppression fund for emergency fire situations was valid in the past when all fires were considered harmful and protection focused on fire exclusion, but it is an outdated concept today with regard to the boreal forest, where long-term suppression needs go hand in hand with land and resource management needs. Virtually every action taken to use fire to meet a land or resource objective will also reduce future suppression costs, and every action taken to use fire to manage forest fuels for protection needs will also provide needed resource benefits. Fire suppression and the use of fire to meet objectives are inherently linked functions. Now that funding strategies have changed at both the federal (Zimmerman and Bunnell 1998, p. 86) and state of Alaska levels, one of the last obstacles for integrating suppression and management has been removed. Unfortunately, it takes time for a cultural shift to occur among fire professionals who are used to doing their jobs as defined by past policies and practices. The transition from fire suppression to fire management is not proceeding as quickly as many of us would like.

As part of this paradigm shift, there is a need for fire managers to become more proactive. Allowing a fire to spread naturally is a fairly passive approach that may or may not accomplish desired results. It leaves too much to chance and, in some areas, the problems created from past fire exclusion are too pressing to wait for nature to rectify the situation. Aerial ignition should be used more often to purposely spread wildland fires when conditions are favorable for its use. Although aerial ignition has been used successfully in fighting fire when burning conditions are too severe to safely work the fire directly, the goal usually was to limit fire spread. Managers now need to actively use aerial ignition in situations where they previously would not have had to from a purely suppression point of view. They need to take advantage of less severe burning conditions to actively spread an existing fire to ensure that critical areas are included in the burn. This will require a change in thinking on part of fire managers who are used to only considering short-term suppression needs. However, this change is necessary if we, collectively, want to responsibly manage public lands in the urban interface and provide for the protection needs of those who live near the wildlands.

6. LITERATURE CITED

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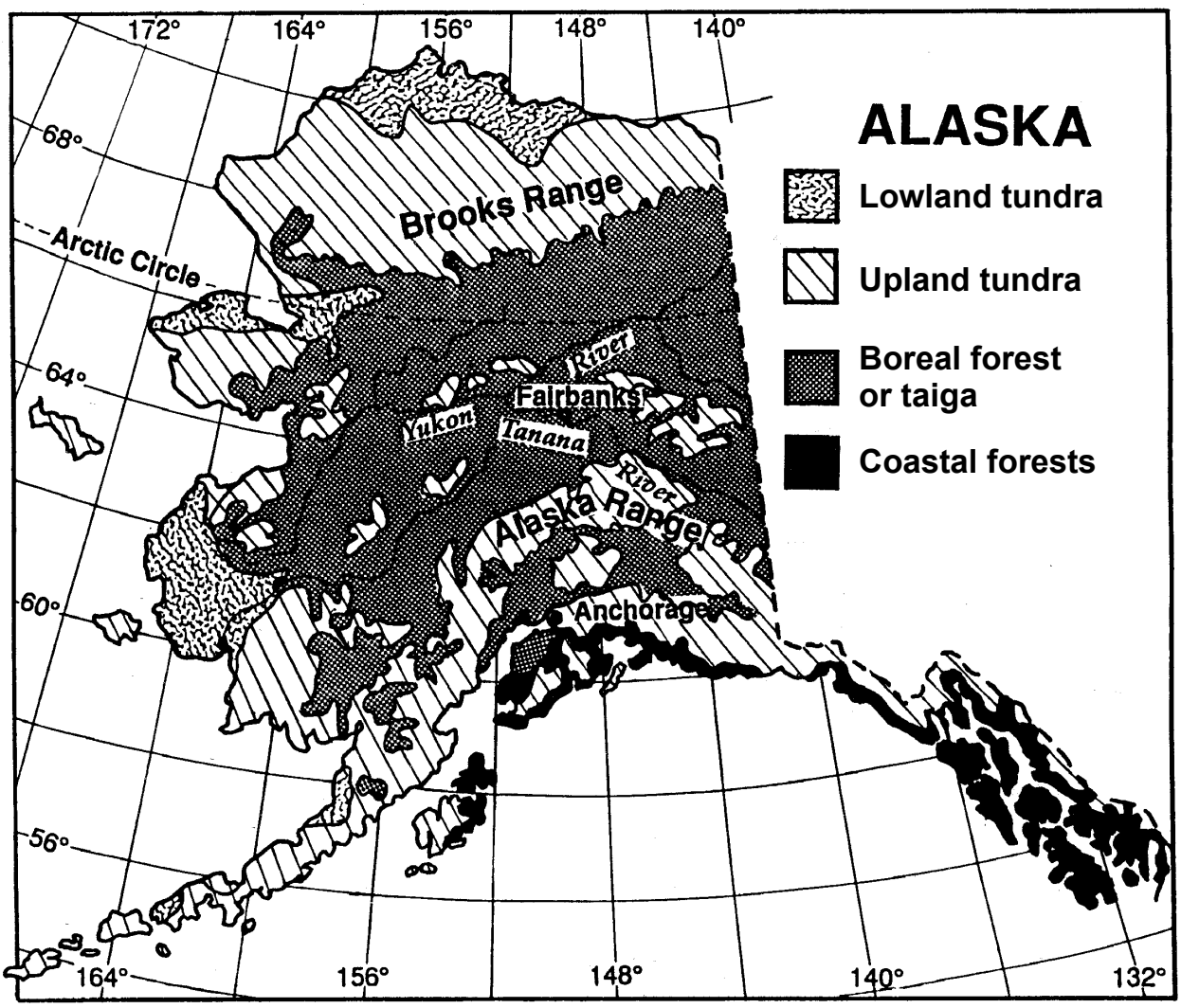

Fig. 1. Boreal forest (taiga) distribution in interior Alaska (Viereck et al. 1992, p. 9).

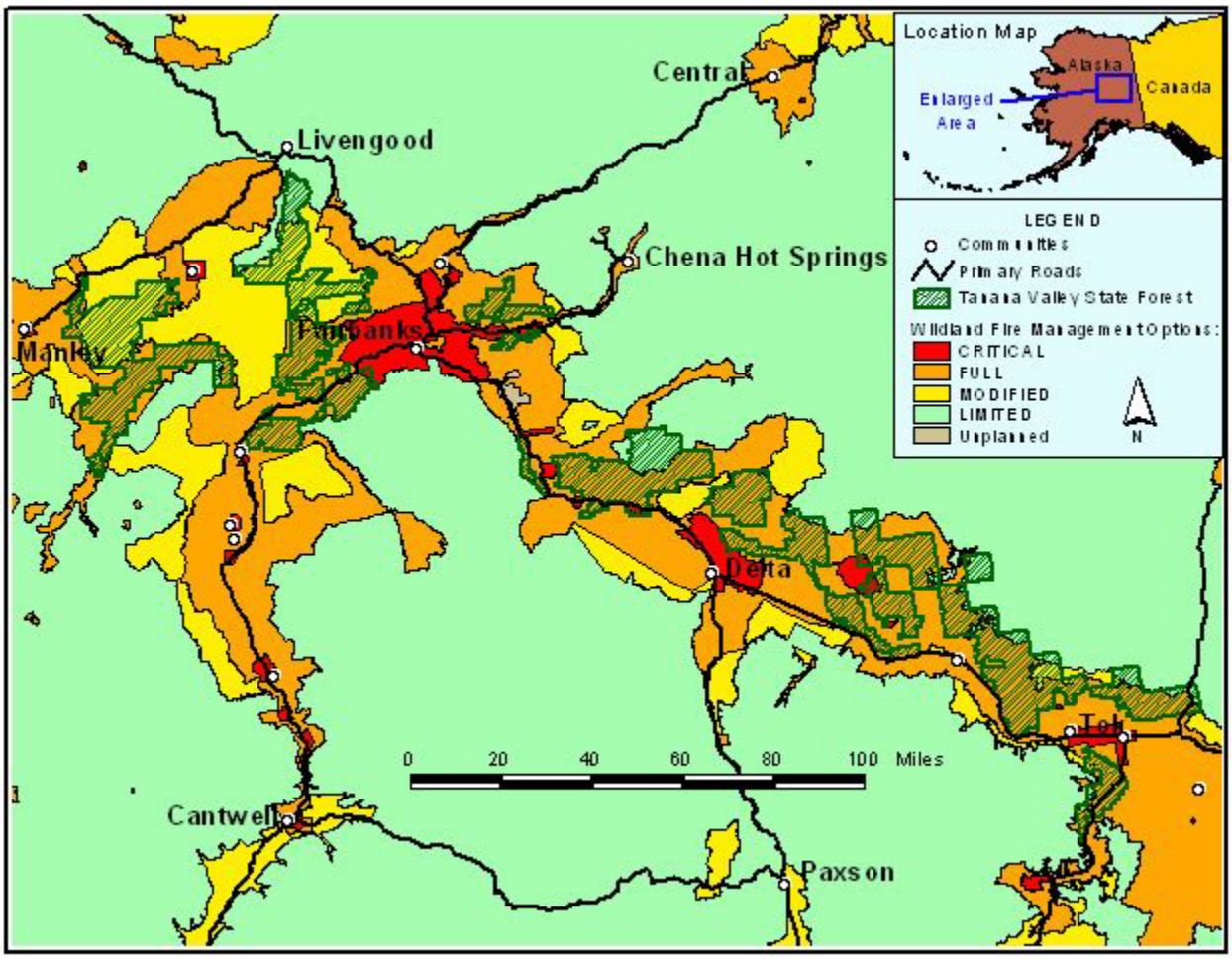

Fig. 2. The Tanana Valley State Forest, communities, and road system of interior Alaska in relation to the wildland fire management options.

Fig. 3. Little Chena River fuels treatment project near Fairbanks, Alaska (note: the green band is the approximate location of the treatment area).

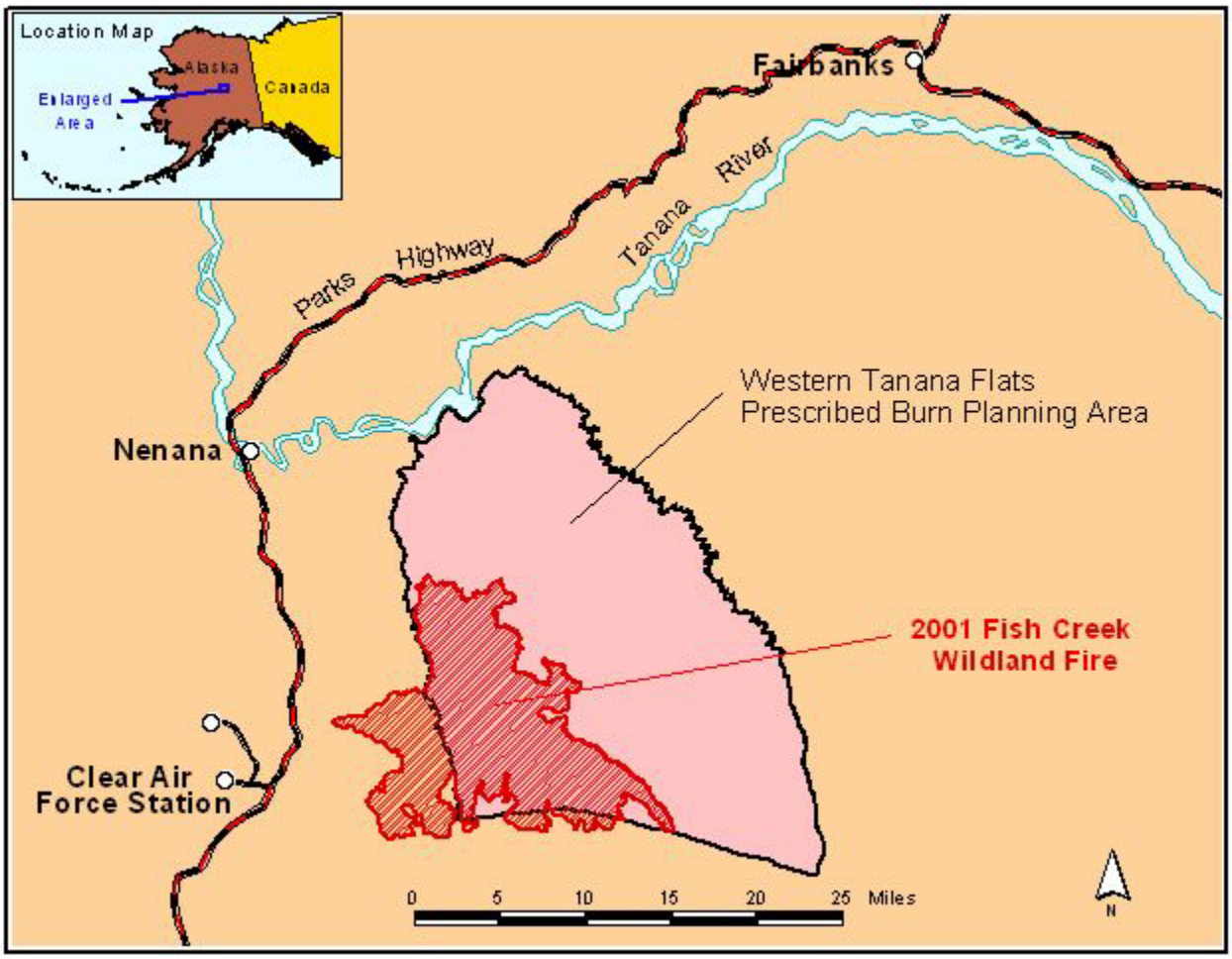

Fig. 4. The location of the 2001 Fish Creek wildland fire southwest of Fairbanks, Alaska, in relation to the Western Tanana Flats Prescribed Burn Plan.