Chapter 5
Effects on Ecosystems and Natural Resources

Drainage in the East Fork area. (USDA Forest Service photo)

Natural Resources

Introduction

The fires of 2000 brought many changes to the Bitterroot ecosystem, and its already diverse landscape patterns. This chapter briefly describes the effects of the fires on various resource elements.

Scientists recognize that fire is a natural and essential element of the ecosystem in the Northern Rocky Mountains and elsewhere. Occasional disturbances, caused by fires, floods and storms, and the following recovery processes are recognized as the primary causes of biodiversity in natural ecosystems.

Scientists recognize that fire is a natural and essential element of the ecosystem in the Northern Rocky Mountains and elsewhere.

These disturbance events, their effects on different resources, people and the things people value, are at the core of our ongoing dialogue about how to manage fuels and fire.

The information in this chapter is taken from much more detailed and technical reports prepared to describe post-fire conditions, risks and priorities for management actions. Copies of the technical reports are available from the Bitterroot National Forest.

Fires burned 356,000 acres of federal, state and private land in the Bitterroot Valley during the summer of 2000. (USDA Forest Service photo)

Soils and Watershed

Overview

Watersheds adjust to natural disturbances slowly. Since glacial times no other forces of nature have had as much influence on watershed processes in the intermountain west as wildfire and extreme precipitation. When combined they can cause land-shaping events — changed channel patterns, landslides and erosion, increased stream flow, and flooding of lowlands. A watershed's ability to recover from wildfire is influenced by the extent and severity of the fire and watershed size. The extent of post-fire land shaping events is determined in large part by the amount and timing of precipitation.

The fires of 2000 burned extensively in several large watersheds flowing into the East Fork of the Bitterroot drainage and in the Skalkaho, Sleeping Child, and Rye Creek watersheds. Other larger watersheds that received less extensive fire severity include West Fork of the Bitterroot, Blodgett Creek, Canyon Creek, Mill Creek; and the Selway and Salmon River drainages in Idaho. Some smaller tributary drainages burned extensively. They include the Bitterroot Front tributaries between Canyon Creek and Sheafman Creek, Daly Creek, Medicine Tree Creek, Meadow Creek, Little Bluejoint Creek, and upper Slate Creek.

Effects Specific to the 2000 Fires

Natural restorative processes are already at work. Needles and some trees have fallen, protecting soils from erosion, trees have fallen along streambanks to slow sediment pulses and create new fish habitat, and fall rains have soaked into dry soils with very little runoff.

If watersheds receive average precipitation, land-shaping events may be restricted to very small areas and may go unnoticed in the rest of the watershed. As vegetation recovers, the threat of extreme events will lessen. Still, it's important to be prepared for significant flooding and earth movement that could occur over the years to come.

Substantial problems could occur where a large percentage of a watershed burned. Heavy accumulations of snow combined with a warm, wet spring or extreme summer storms could cause water to run off of burned areas more quickly than usual. The result can be high stream levels, and stream channels could change their course. This is normal stream channel behavior but can destroy adjacent structures including irrigation systems, buildings, bridges, and roads. It may not be safe to drive on roads near streams in severely burned watersheds during high-intensity rainstorms or high snowmelt periods.

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Fire can change the composition and structure of soils. This happened in the Bitterroot in places where fires burned very hot on the ground. Fire consumed the soil's organic material, which is an important factor in soil fertility. In some areas, the fires killed fungi that grow on plant roots and aid plant productivity. When organic material burns intensely, hydrocarbons infiltrate the soil and solidify, cementing soil particles together. The result is very hard, water-repellent or "hydrophobic" soil that can cause flooding and landslides. This condition is not unusual following wildfires.

Next spring the hillslopes will be extraordinarily green.

With the right precipitation conditions landslides may occur, potentially affecting roads. There is also an increased risk of landslides to homes built near the mouth of severely burned steep draws.

Some of the steep, broken terrain burned by the fires is susceptible to high levels of erosion. Topsoil could wash away depending on the weather in the next few years, but this isn't expected to occur across large areas. Burned area rehabilitation teams have worked to reduce these problems.

Burning the forest floor exposes soils to erosion and fine sediment, and ash debris will be delivered by storm and snowmelt runoff. Water clarity will decrease and fine sediment will increase in streams. Fine particles will be carried long distances during high stream flows and may settle out in reservoirs, irrigation ditches, and in backwater areas.

The fires released nutrients contained in vegetation. These nutrients will enter the soil and contribute to a flush of new growth in the next few years. Next spring the hillslopes will be extraordinarily green. Some small areas burned exceptionally hot, so the kinds and rates of vegetation recovery may be different. Severely burned areas need to rebuild important organic soil layers for nutrient cycling.

There will be erosion on steep slopes until organic layers and vegetation are restored. As standing dead trees fall and decompose, nutrient cycling will continue. If fire consumed all the logs and other woody material on a site and there are few standing trees, nutrients may be in short supply in the long term. On warm, dry sites, large woody debris contribute less to the soil's nutrient supply, compared to wetter aspects and higher elevations.

What We Hope to Achieve

Emergency Rehabilitation Work

Immediately after the fires, threats to life, property, or resources were identified. Private landowners at risk were notified and assisted with ideas for stabilization and preparedness. Protective treatments were applied on federal,

state and private lands. This effort was coordinated through several agencies, as discussed further in Chapter 6.

The Forest Service has placed thousands of erosion prevention devices (straw waddles, cross fallen trees) on hillslopes and improved drainage on many miles of roads and trails. These treatments should reduce sediment in streams and may slow the effects of runoff in the most severely burned areas.

Future Watershed Rehabilitation and Stabilization Work

- Prepare for Extreme Weather Events

  Preparations are being made for the impact that extreme weather could bring. Erosion prevention devices will be monitored for effectiveness. Management plans are being discussed for reservoirs to regulate floodwaters if necessary, and to avoid dam breach in smaller reservoirs. The watersheds of most concerned are: Sleeping Child Creek, Skalkaho Creek, Rye Creek, Laird Creek, Rogers Gulch, Medicine Tree Creek, the smaller drainages of Camp Creek, lower East Fork of the Bitterroot, Cameron Creek, and Cow Creek.

  The threat of landslides exists until vegetation recovers and begins to stabilize soils. Landslides have been so infrequent in the past that it's difficult to predict with certainty where they may occur, but the Forest Service has mapped areas of known risk. There is very little, however, that can be done to stop landslides.

- Continue Stabilization Work

  Guidelines have been developed to protect soils from degradation and to promote soil productivity. An emergency closure to all motorized vehicles, with the exception of snowmobiles where not restricted, is in effect in the burns through July 2001 and will be reassessed then to determine if it should be extended in some areas.

We do expect changes in our watersheds. Some of them, at first, may appear to have been greatly impacted. But we have learned that much of what humans do in response to wildfire is overshadowed by nature's ability to recover. Our approach thus far has been proactive (see Chapter 6, BAER and BIRT topics) and additional stabilization work will continue. Ongoing monitoring and evaluation will help us identify when intervention would be effective, and to evaluate when it would not.

We have learned that much of what humans do in response to wildfire is overshadowed by nature's ability to recover.

Fisheries

Overview

Fire and rain have worked together for thousands of years to shape the fisheries on the Bitterroot National Forest. The native bull trout, westslope cutthroat trout, steelhead, and chinook salmon populations have lived with large fires for eons.

Rivers on the Bitterroot National Forest host an important fisheries resource. Recreational fishing is popular and many people, including outfitters and guides, depend on this resource.

Fire and rain have worked together for thousands of years to shape the fisheries on the Bitterroot National Forest.

Effects Specific to the 2000 Fires

During the summer of 2000, portions of 126 named, fish-bearing streams burned on the Bitterroot National Forest. These burned streams occurred in all three of our major river basins (Bitterroot, Selway, and Salmon). Fourteen drainages in the Bitterroot River basin had at least 25% of their fish-bearing stream miles burned by moderate and high severity fire. These drainages are ranked in the following list, by percent of stream length burned.

High severity stream burn. (USDA Forest Service photo)

Drainage	% Burned	#Miles
Reimel	63%	5.6
Maynard	60%	3.4
Laird	50%	6.4
Cameron	48%	18.5
Meadow	43%	12.9
Tolan	43%	6.9
Medicine Tree	40%	2.0
West Creek	39%	3.0
Upper E. Fork	34%	8.9
North Rye	33%	4.7
Chicken	31%	2.4
L. Sleeping Child	29%	3.1
Sleeping Child	25%	15.1
Slate Creek	25%	3.8

The tributaries to East Fork had the most miles of fish habitat burned by moderate and high severity fire, followed by the Sleeping Child Creek and Rye Creek drainages. Most of the fires in the Selway and Selway River basins were low severity.

Immediately after the fires, many of the burned streams were surveyed to assess the short-term impact of the fires on fish populations. Moderate

and severely burned streams for which there is long-term fish population data were the focus, but some unburned and lightly burned streams were also sampled for comparison purposes. Based on these surveys, some general patterns emerged across the Forest.

In the high severity streams, regardless of their location on the Forest, extensive fish kills occurred. It is not clear exactly what killed them. Water temperature does not appear to have increased significantly during the fires. Surveys conducted after the fires found that major fish kills occurred only in the hot burns, and that at least a few live fish remain even in these areas. All species, including bull trout, westslope cutthroat trout, brook trout, sculpin, were represented in the kill in relative proportion to their pre-fire numbers.

Extensive fish kills occurred in severely burned streams such as Little Blue Joint Creek. (photo by Mike Jakober)

In the moderate and low severity streams, fish kills were not evident. Post-fire bull trout and westslope cutthroat trout numbers were not noticeably different from pre-fire numbers.

In streams such as Blue Joint Creek where the burn intensity was low to moderate and many areas were unburned, post-fire fish numbers were not noticeably different from pre-fire levels. (photo by Mike Jakober)

Despite large kills in certain areas, to the best of our knowledge, no bull trout and westslope cutthroat trout populations were lost as a result of the fires. Over the past decade, numerous post-fire fish population studies have been conducted, especially following the1988 Yellowstone fires. The Bitterroot National Forest also experienced two large, fire-caused fish kills, the 1992 Overwhich Creek post-fire landslides and the 1996 Swet Fire in the Wilkerson Creek drainage. Monitoring of the recovery of those two fish populations has shown that if fish habitat was in good condition prior to the fire, and the connection between neighboring fish populations

Surveys conducted after the fires found that major fish kills occurred only in the hot burns, and that at least a few live fish remain even in these areas.

Bitterroot National Forest fisheries biologists use snorkel surveys to count fish in Wilkerson Creek following the 1996 Swet Fire. (photo by Mike Jakober)

Native fish populations have lived with large fires for thousands of years. They are resilient.

is intact (fish can migrate in and out of the drainage throughout the year), full population recovery is likely within three to five years. Similar recoveries have also been documented throughout the western United States.

There are three sources of recovery in post-fire fish populations. A simple way to think of those sources is "survivors, refugees, and tourists." *Survivors* are the fish that somehow survived the burn when the vast majority of the fish in the stream died. *Refugees* are the fish that survived in unburned or lightly burned pockets in close proximity to the areas where large fish kills occurred. *Tourists* are the large, migratory fish that may move into the burned area and spawn soon after the fire. The more "survivors, refugees, and tourists" that are available to recolonize a fish population, the faster that population will recover. Tourists (large, migratory bull trout, westslope cutthroat trout, steelhead, and chinook salmon spawners) are especially critical to a fast recovery because they can lay a lot of eggs at once, and their offspring can quickly recolonize burned areas where most or all of the fish were killed by fire.

Fish populations in the Selway and Salmon River drainages should recover fully within five years. Bitterroot River drainages were more severely affected by the fires, but populations should recover within 10 years at most. Fish populations are likely to recover more slowly in sensitive watersheds.

Large, migratory spawners such as this adult radio-tagged bull trout from the East Fork are especially critical to the quick recovery of burned fish populations. (photo by Mike Jakober)

Some key points to remember about the 2000 fires and the future recovery of fish populations on the Bitterroot National Forest:

- Native fish populations have lived with large fires for thousands of years. They are resilient, but they have to be able to move freely between streams in order to recovery quickly.
- Fish populations with healthy pre-fire habitat and no barriers to movement will usually

recover to pre-fire levels within three to five years. The key to a fast recovery is having all of the populations in a drainage connected to each other by the movement of migratory fish. Isolated populations that are disconnected by dewatering or barriers will recover slower, and are vulnerable to long-term population reductions because of factors such as landslides and displacement by non-native trout species (particularly brook trout in the Bitterroot River basin).

- Although the short-term impact of fire on our native fish populations can appear catastrophic, research has consistently demonstrated that the long-term impact is usually beneficial, or at worst, neutral.
- The long-term effects of dewatering, fish barriers, and displacement by non-native trout are likely to be much more detrimental to bull trout and westslope cutthroat trout than the fires of 2000.

Prior to the fires, there were several watersheds in the Bitterroot River basin where bull trout and westslope cutthroat trout habitat and populations were fragmented and well below their full potential. In these watersheds, three major problems facing the fishery are heavy sedimentation, isolation from dewatering and barriers, and displacement by brook trout. Some of these problem watersheds also had a large proportion of their drainage area burned with moderate and high severity fire during 2000. As a result, their bull trout and westslope cutthroat trout populations are likely to recover more slowly and face a higher risk of long-term population reductions. The watersheds where bull trout and/or westslope cutthroat trout populations could be at risk because of fire-related sedimentation and/or displacement by brook trout include the following drainages:

- Little Sleeping Child Creek (brook trout are common)
- Rye Creek (brook trout are abundant)
- North Rye Creek (brook trout are common)
- Medicine Tree Creek (no brook trout)
- Laird Creek (brook trout are common)
- Camp Creek (brook trout are common)
- Cameron Creek (brook trout are abundant)
- Guide Creek (no brook trout)
- Jennings Camp Creek (no brook trout)
- Reimel Creek (brook trout are common)

Most of these watersheds are located in the lower East Fork and Rye Creek drainages. Native fish habitat could both benefit and suffer from the fires. Dead trees will add woody debris to streams; this will help form pools, which are vital for fish. Where all the trees were burned, however, there will be a large pulse of woody debris as snags fall during the next two decades.

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Dead trees will add woody debris to streams; this will help form pools, which are vital for fish.

After that, there will be very little woody debris supply until a mature tree stand grows back. Ash and sediment could temporarily cover some spawning habitat, but should cease to be a problem after two to five years.

The creation of hydrophobic (water repellent) soils could lead to landslides. In the short term, landslides add sediment to streams, which is detrimental to native fish habitat. Over the long term, however, landslides can contribute to maintaining habitat complexity, and benefit fish.

Native trout prefer cold water. Vegetation shades streams and helps keep water temperature down; where fires burned streamside vegetation, water temperature could increase. At lower elevations, this change would favor non-native trout species tolerant of warmer water. At high elevations where the water is almost too cold even for native trout, a slight increase in water temperature could increase native fish productivity.

A variety of amphibians and aquatic insects may have been affected by the fires. Aquatic insects are important fish food and will probably recover on about the same timeline as fish. The effect of wildfire on amphibians is not well understood. Those that reached water probably survived, but species that move far from water, such as boreal toads, may have been more impacted.

What We Hope to Achieve

There are several actions that the Forest Service can take to aid the natural recovery that is going to occur over the next couple of decades. Some potential actions include:

- Reducing human-caused sediment in the burned areas by graveling sediment-contributing roads and stream crossings, or possibly relocating certain roads and trails that encroach on streams.
- Replacing or removing culverts that act as fish barriers in the burned drainages.
- Adding some woody debris to sections of burned stream that lacked woody debris prior to the fires.
- Speeding the recovery of certain stream bottoms by replanting the severely burned stream banks with the appropriate species.
- All of these actions will help restore habitat for native fish, including threatened and endangered species.

Wildlife

Overview

Native wildlife of the Northern Rockies evolved with fire as an integral part of their environment. Fire-caused changes in vegetation provide habitat for many fire-dependent wildlife species.

Effects Specific to the 2000 Fires

Although fast moving fires injured or killed individual animals or animal families in localized areas, wildlife populations will rebuild over time.

One type of habitat the forest will not lack for some time is snags. Woodpeckers, such as black-backed and northern three-toed, forage on snags created by fire and build nests in them. Many other birds and animals use cavities created by woodpeckers. All these species are expected to benefit from the fires. Guidelines have been developed to ensure that enough snags are left for wildlife where burned timber is salvaged.

Many other wildlife species benefit from early seral stage vegetation as a food source or for cover. Big game animals depend on grass and shrublands for winter forage; over 70 percent of neo-tropical migratory birds nest and feed in shrubs.

Large areas of lynx habitat were burned, much of it with high severity fire. Lynx hunt in young dense forests because snowshoe hares, a primary food source, do well there. Such forests will be created by natural regeneration in high elevation stands of lodgepole pine and spruce.

Of the 11 sensitive species on the Forest, flammulated owl habitat (mature and old ponderosa pine) was the most severely affected. Other old growth-associated species including pileated woodpeckers, and pine marten, depend on large snags or down woody debris for habitat. This type of habitat was reduced wherever moderate or high severity fire visited old growth stands. Thermal cover for elk was likewise reduced as a result of moderate and high severity fire. In certain drainages, the Forest Plan standard requiring maintenance of 25 percent of the area in thermal cover cannot be met until new stands reach crown closure and are 40 feet tall.

Noxious weeds quickly spread to disturbed land, especially where tree canopy cover has been reduced to less than 40 percent. Noxious weeds reduce the quality of wildlife habitat, especially big game winter ranges.

National forest lands became more accessible to motorized vehicles because the fires removed vegetation from old roads and created openings along some gentle ridges. Increased opportunities for motorized access could reduce wildlife security in some areas.

Fire-caused changes in vegetation provide habitat for many fire-dependent wildlife.

What We Hope to Achieve

Big Game Winter Range: There is a need to manage weed infestations to encourage native vegetation restoration, especially on big-game winter range forage areas.

Wildlife Security: One major concern is the loss of elk security areas due to potential increased access and reduction of cover. It may be necessary to extend motorized access restrictions, and work with Montana Fish, Wildlife, and Parks to adjust season limits in some areas.

The Bitterroot National Forest has closed all areas within fire perimeters to all motorized vehicle travel, except snowmobiles in unrestricted areas, until July 2001, when conditions will be reassessed.

Wildlife Monitoring: The fires have created a great opportunity to monitor wildlife population responses to fire. The Bitterroot National Forest will propose several monitoring and research projects to capture information about how threatened, endangered and sensitive species, neo-tropical and resident birds, and other wildlife respond to the changed environment.

Post-fire Land Management Activities and and Habitat Restoration: Habitat requirements for all species listed as threatened and endangered on the Bitterroot National Forest will be considered when prescribing post-fire land management activities. Bald eagle, grey wolf and grizzly bear habitat was largely unaffected by the fires. Large areas of lynx habitat were burned, much of it with high severity fire. Fuel reduction projects and reforestation efforts will provide future snowshoe hare habitat, and therefore lynx prey, and large areas of burned forest will be left to provide future denning habitat.

Prompt reforestation of dry forests will in time provide habitat for the flammulated owl. We plan to closely monitor these owls' response to the fires of 2000.

Other sensitive species have evolved with fire as a part of their history and little needs to be done to restore their habitat.

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The post-fire wildlife objective is to assure natural processes dominate restoration and recovery efforts. On most landscapes vegetation will recover and, although the complement of wildlife species occupying the area will have changed, wildlife populations will more likely reflect the evolutionary history of the ecosystem. We need to maintain old growth habitats, snags, large woody debris, mountain grasslands, and riparian shrubfields in conditions consistent with natural landscapes. The next section of this report provides more information on the landscapes and habitats of the Bitterroot National Forest.

Fire, Fuels, and Forested Plant Communities

Overview

As described in previous sections, Bitterroot ecosystems have long been adapted to fire, although different vegetation types have different types of fire behavior that shape them. Historically, low elevation, warm, dry ponderosa pine and Douglas-fir types burned frequently and with low intensity. The cool lodgepole pine and lower subalpine and timberline habitat types typically burned infrequently and with high intensity. These varying patterns of fire frequencies and intensities are referred to as "historic fire regimes." Each of these plant communities has specific adaptations to these fire regimes.

The geographic extent of the 2000 fires includes a wide range of fire severities across all habitat and moisture regimes. This has resulted in a variety of effects to species and sizes of vegetation, from grasses to old trees.

Though the fires negatively impacted forest resources in some areas, the fires had beneficial effects, such as restoring vegetation diversity and enhancing wildlife habitat, in other areas.

Were the fires of 2000 natural events? Yes and no. In the lower elevation, dry ponderosa pine and Douglas-fir types, the natural or historic fire occurrence was generally frequent and of low intensity with a relatively uniform pattern. Average fire frequency ranged between 5 and 25 years, keeping fuel loading light. Before humans suppressed fires, forest species composition and stand structure was typically more open, park-like, multi-storied, and included multi-aged stands of ponderosa pine and Douglas-fir. With the absence of fires, these stands became overstocked, resulting in unnatural conditions. The lower elevation areas that burned high or moderate in severity last summer should be considered an unnatural fire event, particularly in terms of their extent. Fires that burned as a light underburn more closely resemble the type of fire behavior more typcial in this particular ecosystem.

Much of the other vegetation types found at mid and upper elevations in the Bitterroot did burn as they might have under natural conditions, creating a mosaic pattern across the landscape. However, is the size and extent of these fires natural? Had more fires been allowed to play their natural role in these landscapes in the 20th century, more age and size class diversity would have been created over time (as in the Sleeping Child and Saddle Mountain fires).

Bitterroot ecosystems have long been adapted to fire.

Effects Specific to the 2000 Fires

It is likely the fires of 2000 would not have grown as large as they did if there was more diversity at this landscape scale. Thus, the scale of the fires at mid to upper elevations is likely somewhat larger compared to historic patterns.

How did past management practices influence the fire behavior of 2000? Throughout the burned areas there are examples of past management practices that did reduce fire intensity and influence fire behavior by creating fuel breaks. However, there are also examples of past management practices that did not affect the fire behavior at all, with the end result being a lethal fire, very similar to neighboring untreated areas. The inconsistency is at least partially due to highly variable weather conditions. More information is needed to adequately answer this question.

Fire suppression has created a different mosaic on the Bitterroot landscape than if fires had been allowed to play their natural role.

What are the predicted effects on beetle populations and tree mortality after the fires? Douglas-fir bark beetles are expected to be more widespread. Prior to the fires, the southern half of the Forest was experiencing a bark beetle epidemic. These beetles are attracted to fire-stressed Douglas-fir trees. Given the already high population of bark beetles in the area, and the extent of fire-stressed trees on the Forest, it is likely beetle-caused tree mortality will increase over the next few years, possibly allowing epidemic populations to continue. Beetle mortality can generally be expected in trees predominately blackened and with some foliage browned, and in trees having mixed brown and green foliage. Spruce beetles and pine engraver beetles may also be of concern and have the potential to cause damage in fire-stressed trees. All other tree-attacking beetles will be seen across the burned area, but are not to cause widespread mortality.

What other kinds of mortality can we expect in fire-weakened trees in the next two to five years? Tree mortality estimations can be made based on crown damage and deep char around the bole of the tree, which results in stem and root damage. Generally trees with greater than 30% green crown, less than 50% deep char, and less than 50% bare mineral soil exposure near them have the highest probability of survival.

What are the effects of past fire suppression on forest structure, diversity, and forestland integrity before the fires and what does that mean after the fires? Fire suppression in the 20th century has created a different mosaic on the Bitterroot landscape than if fires had been allowed to play their natural role. The sizes of trees dominating the landscape were fairly consistent prior to the fires of 2000. This condition has contributed greatly to the Douglas-fir bark beetle

epidemic in the southern portion of the Forest prior to the fires. This condition may have also contributed to the size and extent of the fires of 2000 because the vegetation lacked diversity.

New landscape patterns now occur and a more diverse landscape is being shaped. However, the distribution of tree age and size classes across the landscape still does not reflect historic distribution.

What about future fire potential? Future fuel loadings generated by many thousands acres of burned trees are of concern. If dead trees are allowed to accumulate over time and over extensive areas, we may see worse fire conditions in future decades than we had in the summer of 2000. This is of particular concern in priority areas such as the wildland-urban interface, in threatened and endangered species habitat, and where we make near-term reforestation investments.

Fuel loading prior to the fires of 2000 was heavier in some areas, particularly in the low elevation, warm, dry ponderosa pine and Douglas-fir vegetation types. Future heavy fuel loads on these sites pose potential for unnaturally intense fires on these sites with possible severe effects on soils and site productivity.

What are the needs for reforestation? There is a need for "artificial regeneration," or planting trees in some areas. Where the fires burned very hot and killed most of the trees, there is no local, natural seed source for renewing the forest. At the edge of every fire is a "seed wall," the unburned forest. Some of the burns are so big that the seeds from the unburned trees will not make their way to the middle of the burned areas for many decades. Planting will be necessary in these areas.

Timber harvest had taken place in some of the forest stands that burned. Planting will also be needed in many of these stands, especially in plantations that burned.

High priority reforestation will occur in the wildland-urban interface, where ponderosa pine is needed to meet historic species diversity and where no seed sources are available for natural pine regeneration. Planting will begin in a portion of the burned area as early as the spring of 2001 and will likely continue for the next five to seven years.

Shrubs and other small plants also burned. Many of the native species respond well to fire; they will sprout from the unburned roots and grow vigorously in coming, providing important wildlife forage and plant diversity.

Many of the native species of shrubs respond well to fire; they will sprout from the unburned roots and grow vigorously in coming years.

What We Hope to Achieve

Fuels and Vegetation Recommendations within the Burned Area: Priority attention is needed in the burned interface and the low elevation, warm, dry ponderosa pine and Douglas-fir habitat types. Actions in the high and moderate severity areas within the burned interface should focus on:

- Reducing fuels to desired levels
- Reducing the potential for future intense fires
- Removing forest products before value is lost

Treatment would include commercial harvesting, non-commercial harvesting (both mechanical and hand treatments), and prescribed fire.

Management options to accomplish these goals include commercial harvesting, non-commercial cutting, and prescribed fire.

Other fuel and vegetation recommendations include:

- Reducing fuels in older plantations to protect reforestation investments
- Minimizing future Douglas-fir bark beetle losses
- Reducing fuel loading at the landscape scale in the mid and higher elevation habitats

In the ladder areas, fuel reduction work is needed to break up the large expanses of continuous heavy fuel that will accumulate on the ground over the next two decades.

Reforestation: A large percentage of the high and moderate severity burned areas will regenerate naturally and by planting seedlings. Some of the highest priority areas requiring reforestation include:

- Pre-existing plantations
- Areas within the burned wildland-urban interface
- Areas within the warm, dry ponderosa pine and Douglas-fir habitat types.

Planting will need to occur before competing vegetation, especially shrubs and grass, dominates the areas that need to be planted.

Area harvested and underburned to achieve desired levels. (USDA Forest Service photo)

Wildland-Urban and Rural Interface Lands

Overview

The Bitterroot interface, those places where National Forest lands adjoin private lands, are becoming more susceptible to catastrophic wildfire, and the resulting potential for significant loss of property. The susceptibility to fire will continue to grow as fuel loads increase on both private and public forested lands. The increasing potential for significant property loss is growing rapidly, as more private lands are developed for home sites in Ravalli County.

Much of the interface areas, including National Forest, State, and private lands, lie within the low elevation ponderosa pine forests. Fuel conditions before the fires of 2000 were generally much heavier in lower elevations than they were historically, as described in earlier sections of this report.

There remain many areas throughout the interface that would be at great risk if fires started in those locations under similar weather conditions that occurred during the summer of 2000. These areas, like those that burned, are prone to severe impacts from wildfires

Prescribed burning has many benefits. However, an impact that greatly limits prescribed burning is the smoke it creates. To minimize this concern, burning is done when wind and atmospheric conditions promote the venting of most smoke into the upper atmosphere, carrying it out of the Valley. Burning is conducted when conditions are generally moister and the potential for prescribed fires to escape the planned burning area is minimized. Moister conditions result in less impact to soils, allowing nutrients to be recycled into the system. Low intensity underburning also causes less visual impact because fewer trees are scorched.

Effects of the 2000 Fires

The interface forest that lay in the path of the wildfires of 2000 consisted of stands predisposed to high intensity crown fires. Communities and private resources were placed at extreme risk. The weather pattern that had developed over the course of the preceding months set the stage for extreme fire behavior when the dry lightning storms passed through the area at the end of July. By September, these fires had burned about 55,000 acres of the wildland-urban and rural interface, of which 43,000 acres were high intensity crown fires. Significant loss to private land and structures occurred, with 70 residences and 170 other buildings burned.

The increasing potential for significant property loss is growing rapidly, as more private lands are developed for home sites in Ravalli County.

The reintroduction of fire as a natural process will be difficult and has its own set of issues and concerns.

Residential structure threatened, but not burned during the Blodgett Fire. (photo by Theodore Siphakis)

What We Hope to Achieve

Reduce Fuels in the Wildland Urban Interface. An aggressive, comprehensive fuels treatment program anchored in the wildland-urban interface, and continued elsewhere on the Bitterroot National Forest is needed. This couldgreatly reduce the likelihood that future fires disrupt lives and cause significant damage to property.

Fuels treatments provide more natural, park-like stands that also allow for increased firefighter safety during fire suppression. (photo by Steve Rawlings)

The reintroduction of fire as a natural process will be difficult and has its own set of issues and concerns, such as impacts from smoke, possibility of escaped fires and short-term visual impacts from scorched trees. However, underburning in concert with other treatments, such as thinning, with the intent of restoring the low elevation ponderosa pine forests towards a more natural condition, would reduce the potential of future catastrophic wildfires. It will always be necessary to suppress wildfires where resource values are high and human developments exist. With that in mind, fuel reduction work needs to be aggressively pursued to improve firefighter safety and reduce the likelihood of uncontrollable crown fires that present serious threats to both natural and human resources.

Prioritize Areas Within the Wildland Urban Interface. Of greatest concern are communities and neighborhoods located on the west side of the Valley at the base of the Bitterroot Mountains. This area is typically more heavily settled than other portions of the Forest interface. This specific area is located where wildfires typically are ignited upwind and can rapidly spread towards these neighborhoods. The suppression of fires in this area is complex and can present firefighters with significant safety concerns such as difficult access due to the lack of roads and

adequate landing sites for helicopters, rough terrain, and fuel conditions that increase the potential for extreme fire behavior.

Similar concerns exist for other interface areas in the main Bitterroot Valley and its Forks. Additional areas that need fire risk reduction work include the lower West Fork area, the Nez Perce Fork neighborhood, and the Springer Memorial and Bonanza Land neighborhoods in the upper East Fork.

The magnitude of the fires of 2000 and the loss of homes and property should serve as a warning to interface residents and land managers. These areas need active management and landscape-scale planning to help reduce the impacts of future wildland fires.

Fire crew member clearing brush to reduce fuels. (Photo by Karen Wattenmaker)

Noxious Weeds and Range

Overview

The Bitterroot National Forest is regionally known as a "stronghold" for spotted knapweed; about 275,000 acres are infested. In fact, most National Forest lands located on south facing slopes, with less than 40% tree cover, and below 6,500 feet in elevation are infested with spotted knapweed. Other weeds of concern on the Forest include sulphur cinquefoil, leafy spurge and others, but these plants are still at more manageable levels compared to spotted knapweed.

The State of Montana defines a noxious weed as any exotic plant species established or potentially established in the State, which may render land unfit for agriculture, forestry, livestock, wildlife or other beneficial uses.

Weeds are different from other large-scale forest problems in two ways:

- Unlike other large-scale forest disturbances, wildlands do not have the ability to recover from invasive plants without management intervention; and
- Weeds are a dynamic rather than static situation; lack of action allows weeds to spread.

Invading weeds can alter ecosystem processes, including productivity, decomposition, water cycles and nutrient cycling. Changing these

Invading weeds can alter ecosystem processes, including productivity, decomposition, water cycles and nutrient cycling.

processes can lead to displacement of native plant species and poorer quality wildlife habitat.

The degradation of public land resource values caused by noxious weeds also has economic impacts. A 1996 study on the impact of spotted knapweed on Montana's economy found that spotted knapweed infestations in wildlands have affected wildlife-associated recreation expenditures, and soil and water conservation benefits. Total direct impacts of wildland knapweed infestations on Montana's economy are estimated at $3.1 million annually, or $3.95 per infested acre per year.

New infestations are now possible because the ground has been disturbed by fire and a receptive seedbed has been created.

Grasslands on the southern portion of the Bitterroot National Forest. (photo by Frank Guzman)

As the complexity of the weed issue has expanded and intensified, many individuals and agencies realize there is a need to better respond to the impacts of weeds.

Grasslands are relatively rare on the Bitterroot National Forest and the largest threat to native grasslands is noxious weed invasion. The few grasslands not infested are vitally important for forage and plant community diversity. A large portion of the grasslands occur on the southern end of the Forest, and are adjacent to Beaverhead and Granite Counties and Anaconda-Pintler Wilderness, which are all still relatively weed free.

Effects Specific to the 2000 Fires

Weeds: After the fires of 2000, noxious weeds will have the opportunity to further expand their ranges. Areas that were relatively clean of noxious weeds are now more susceptible to infestation.

New infestations are now possible because the ground has been disturbed by fire and a receptive seedbed has been created. In some cases, the fire removed all other plants that previously competed for soil, water and sunlight. This situation makes noxious weed spread more likely.

Since spotted knapweed and leafy spurge have a proven ability to spread after fire, infested acres are likely to increase if no action is taken.

Range allotments: Several National Forest grazing allotments were burned to some extent; the north Sleeping Child and Medicine Tree allotments burned the most severely.

About 70 miles of fence (31 miles of private land boundary) and more than 10 water developments

were destroyed. Some natural barriers, such as thick stands of trees, were used to effectively limited cattle movement as well. Where these burned, additional fencing or adjustments to cattle use in the area will be needed.

Foraging opportunities will increase over time as some areas that were once dense forest will now produce grass and shrubs instead.

A fire destroyed water development in the Medicine Tree allotment**.** (photo by Frank Guzman)

What We Hope to Achieve

Weeds: The overall strategy is to keep weeds out of relatively weed-free areas and contain weeds in currently infested areas.

The Bitterroot National Forest has a weed management program that integrates different control tools. Release of biological agents that affect spotted knapweed and leafy spurge viability will continue. The weed-free hay requirement and implementation of the Montana/Idaho noxious weed "best management practices" will also continue.

Ungrazed test plot that burned exclusively. (photo by Frank Guzman)

Keep weeds out of relatively weed-free areas.

Rehabilitation efforts should be focused on protecting grasslands that are relatively clean and yet more susceptible to infestations after the burn. These areas are very important winter range.

Grasslands adjacent to burned areas, which were infested prior to the burn but have some native vegetation remaining, should also be treated. Efforts should be made to treat areas on a large scale, and not just in the burn. Examples of this are adjacent private lands where owners are interested in treating weeds, and areas that were

The overall strategy is to keep weeds out of relatively weed-free areas and contain weeds in currently infested areas.

only partially burned, but could benefit from treatment.

Treatment should be prioritized for areas that may contribute to the spread of weeds into Beaverhead and Granite counties, and to the Anaconda-Pintler Wilderness, which are relatively free of spotted knapweed now.

Native grasslands on Rombo Ridge. (photo by Frank Guzman)

Aggressively treat new weed infestations, while populations are small and manageable. Reforest areas, to re-establish weed-limiting shade as soon as possible.

In addition to managing weeds in grasslands, re-establishing trees will greatly reduce habitat for weeds in the longer term.

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Analyze use of tools such as aerial herbicide applications to increase the Forest's ability to treat larger and less accessible areas safely, effectively and efficiently.

Aerial herbicide applications should be considered a viable tool to re-establish native plant dominance. Cost effectiveness, safety, and a more uniform application are key reasons aerial application is preferable in the steep, inaccessible terrain on which many of these grasslands occur. Seeding of native grasses should be used in conjunction with herbicide spraying in heavily infested areas, where the viability of native vegetation is limited.

Implement a roadside herbicide application program in areas affected by the burn.

Roads can serve as a major artery for spread of noxious weeds, including new weeds that may have been imported by fire suppression vehicles from elsewhere. A roadside herbicide application program should also be considered in areas affected by the burn.

Monitor the Selway-Bitterroot and the Anaconda-Pintler Wilderness areas for new weed infestations and for sources of spread.

Outfitter camps and other concentrated stock user sites, trails, and dispersed campsites can be avenues for weeds to become established. Herbicide use to contain weeds in the Frank Church-River of No Return, and along trails on the Montana side of the Selway-Bitterroot Wildernesses should be continued.

Range Allotments:

Evaluate each grazing allotment that was visited by fire in 2000 to determine if adjustments to the annual operating plans are necessary.

While the majority of allotments have areas that cattle can graze without impacting the burned area, some may need to be rested from cattle grazing during the 2001 grazing season, to allow for recovery. One streamside area on Reimel Creek will be excluded for at least one year since it burned with greater intensity than the surrounding area.

Within allotments, we will work with permittees on a grazing plan to minimize disturbance to sensitive areas. If this can be done only by excluding livestock, we will try to locate an alternative grazing area that would be suitable.

Range improvements, such as water developments and fences, should be repaired, replaced or removed as soon as possible.

Infrastructure, Trails and Roads

Overview

Infrastructure includes administrative sites, bridges, signs, range fences, campgrounds, cabin rentals, ski area, water systems, survey corners and landlines, irrigation ditches, communication sites, roads, and trails. The condition of infrastructure on the Bitterroot National Forest was in the process of being inventoried with detailed surveys before the fires. In many cases, there was a backlog of maintenance needs that was only exacerbated by the fires.

Effects Specific to the 2000 Fires

Bridges: A few bridges on private land were damaged directly by the fires or by fire suppression efforts. No damage is known to have occurred to bridges on National Forest roads or trails. A number of bridges on private and state land, and a few on National Forest land, are at risk of damage if during post-fire floods or landscapes occur. Burned Area Emergency Rehabilitation work to reduce those risks has been completed.

Signs: Many signs were damaged or destroyed. A complete inventory has not yet been conducted.

A number of bridges on private and state land, and a few on National Forest land, are at risk of damage if during post-fire floods or landscapes occur.

About 93 miles of property boundary line and 366 posted section corners were damaged or destroyed by the fires.

Administrative sites: The Sula Peak Fire Lookout was the only administrative building lost to the fires. The tower was constructed in 1957 and was staffed right up until it burned.

The burnt remains of Sula Peak Fire Lookout. (photo by Traute Parrie)

Range improvements: Many miles of range fence were burned during the fires. Roughly 70 miles of fence and more than 10 livestock water facilities were destroyed.

Campgrounds and day-use sites: The fires affected five National Forest campgrounds. Most of the damage consisted of burned brush, although some signs, barrier posts, and fences burned as well. There were some trees killed in the Warm Springs Campground. Three day-use sites sustained similar types of damage.

Cabin rentals: Several recreation rental sites were at risk during the fires, but none sustained any fire damage.

Ski area: The Full Circle fire that burned in the Saddle Mountain area threatened the Lost Trail Ski Area. The fire burned into the planned expansion area, and some lift towers that had not yet been erected were burned over and sustained some paint damage. Two large Forest Service interpretive signs at the top of the mountain near the expansion were also lost. There are roughly five acres of burned hazard trees now within the ski area boundary.

Damaged bearing tree signs. (photo by Don Patterson)

Landline investments: About 93 miles of property boundary line and 366 posted section corners were damaged or destroyed by the fires.

Irrigation ditches: Below the Blodgett fire there are several irrigation ditches that could be affected by increased runoff or debris flows. These irrigation ditches sustained some damage from fire suppression activities. There is at least one irrigation ditch in the Sula area that crosses

National Forest lands in several places and may have been used during suppression activities. Fire-fighting related repair work was done as part of suppression rehabilitation efforts.

Communication sites: The Sula Peak Lookout housed a Forest Service radio repeater and a Ravalli County Sheriff's Department repeater. The repeaters are necessary for public health and safety.

Roads and trails: The fires did not directly cause a great deal of damage to roads and trails. A few culverts and pipes were burned or melted, wooden drainage structures were destroyed and vegetation in or under fills burned out, leaving holes. Secondary effects of the fires could include culverts becoming plugged with burned debris and overtopped by high water, increasing the risk of flooding and erosion on roads and trails. Roads and trails will be impacted in coming years as fire-killed trees fall across them.

Where the fires burned hot across large areas, homes, roads, dams, and bridges are at increased risk from flooding and landslides. Burned area rehabilitation teams have identified specific areas at risk and have worked to minimize the danger.

Temporary communication set up after Sula Peak burned. (photo by Carol Lagodich)

Many culverts have already been replaced with larger ones. (USDA Forest Service photo)

Secondary effects of the fires could include culverts becoming plugged with burned debris and overtopped by high water, increasing the risk of flooding and erosion on roads and trails.

What We Hope to Achieve

Priority for infrastructure work will be placed on ensuring health and safety—for example replacing fire towers, certain signs, or reestablishing communications sites. Some immediate needs for road repairs are being addressed through BAER (Burned Area Emergency Rehabilitation).

Other infrastructure restoration should be coordinated in conjunction with the fire recovery work necessary for natural resources. For example, landline restoration will be prioritized based on planned fuel management activities in the wildland-urban interface, and on public-private boundary fence replacement projects.

Fuel treatments in the wildland-urban interface may need to be focused along roads and trails or other developed sites where human activity is concentrated. Facilities in unburned areas may be at risk and should be evaluated in terms of defensibility, particularly remote guard stations, lookouts, developed recreation sites, and recreation rental cabins.

Road and trail restoration priorities include:

- Monitoring high-risk areas during heavy rain or rain-on-snow events. Many culverts have already been replaced with larger ones, but all are susceptible to being plugged by debris.

Many culverts have already been replaced with larger ones, but all are susceptible to being plugged by debris.

- Repair and stabilization of roads. Road repairs include graveling road segments, stabilizing cut and fill slopes now devoid of vegetation, and constructing drive-through drainage dips and other road drainage features as needed.

- Reconstruction and/or post-fire maintenance on about 194 miles of trails. We expect to find additional tread damage in the burned areas next spring due to soil instability.

Damaged property boundary posts will be replaced. (photo by Don Patterson)

Recreation

Overview

Tourism and recreation are a major part of the economy in the Bitterroot Valley and the main reason many people visit the area. The 2000 fire event shut down recreation on public lands in the Bitterroot Valley for a significant portion of the summer.

Effects Specific to the 2000 Fires

The fires affected tourism, developed and dispersed recreation, and public safety in the following ways:

Loss of revenue for the community and Forest Service. Recreation opportunities in the Bitterroot Valley were greatly reduced because of fire danger and closures. Views of the scenic mountains were obstructed by smoke. Residents could not recreate on public lands and non-residents cancelled plans to visit the Bitterroot Valley. Early season hunting opportunities were curtailed by the fires. Hunting outfitters and guides also experienced some loss of business.

A percentage of fees from Forest Service campgrounds, outfitter permits, and cabin and lookout rentals under the Fee Demo Program are used for upkeep and improvements. The reduction in collections due to the fires reduced the funding available for future upkeep and improvements.

Inconvenience to public land users. Developed recreation sites, including cabin and lookout rentals, campgrounds, and recreation residents, were closed to public use for over a month.

The National Forest did not lose any developed recreation sites, although a few campgrounds and picnic grounds suffered minor damage, and work on other sites was delayed.

Fires burned through the west side of the Spring Gulch Campground, and burned one leg off an interpretive sign. (photo by Mary Laws)

All the rental lookouts were successfully protected from the flames with fire-resistant wrap. The historic Magruder Ranger Station experienced some water damage.

Parts of Lost Trail ski area burned. Ski area expansion work was interrupted by the fires, but will continue next year. Chief Joseph Pass, a popular cross-country skiing and snowmobiling area, was not burned.

Developed recreation sites, including cabin and lookout rentals, campgrounds, and recreation residents, were closed to public use for over a month.

Magruder Ranger Station was protected with barricade gel fire retardant and sprinklers. (USDA Forest Service photo)

The national and international attention the Bitterroot Valley received during the fires may increase tourism in future years.

Dispersed recreation sites on public land were also closed. After the Forest reopened, road access and repair limited use on some severely burned areas. Use of off-highway vehicles is prohibited within blackened areas until July 2001 when the emergency restriction decision will be reviewed.

Over-snow travel is not restricted, since it is not likely to damage soils.

Many of the Forest's hundreds of miles of trails now traverse a blackened landscape, and some reconstruction or re-routing may be necessary.

Delayed implementation of planned projects. Planned projects on public land were postponed because of fire danger or because employees were occupied with fire duty. The ski area expansion at Lost Trail Powder Mountain was set back about six weeks. Indian Trees Campground improvement project, Gird Point Lookout restoration, Sula Campground concession contract, Bass Creek Campground access, and Lewis and Clark bicentennial planning are some of the delayed projects.

Safety concerns. In all burned areas, the fires left hazards that visitors to the Forest may not expect. Standing dead trees can fall at any time, but are especially dangerous during high winds. The ground can cave in over burned roots. Rocks and debris are more likely to roll downhill if the vegetation that held them in place burned. In some places, wood debris was in the fill under trails and may have burned out, leaving an uneven surface. Many of the hazard trees along roads and trails and in campgrounds will be cut down and trails will be restored, but Forest users should still exercise caution.

What We Hope to Achieve

- Plan for and serve increasing numbers of visitors.

Tourism decreased during the fires but the national and international attention the Bitterroot Valley received during the fires may increase tourism in future years. After the 1988 fires in Yellowstone National Park, visitation records were set for five consecutive years. Travel Montana's ad campaign for the 2001 summer tourist season will highlight fires and its renewing effects on

the landscape, applying lessons learned from the Yellowstone fires. Many of those who visited Yellowstone after the intense fires came to see the recovery. Tourists following the Lewis and Clark Trail will also continue in increasing numbers.

- Expand our interpretation and conservation education programs. Key topics to cover include fire prevention, defensible space around homes, and fire ecology.
- Prepare for and administer a mushroom harvesting program.

Recreational and commercial mushroom harvesting may be popular for the next few years. An influx of mushroom harvesters could be one side-effect of the fires. Morel mushrooms often grow in great numbers following forest fires, and can bring a good price. Other National Forests have experienced high demand for mushroom permits following wildfires. The Bitterroot hopes to learn from other Forest's experiences and prevent problems, such as sanitation concerns at temporary camps, and conflicts between recreational and commercial pickers.

- Improve recreation areas by removing hazard trees, reducing nearby fuels, and cleaning up fire debris. It is also an opportunity to examine certain dispersed recreation impacts to riparian areas.
- Continue to share Forest information.

The Bitterroot Forest web page became established as an information source during the fires. The web will continue to be an information resource for residents and visitors.

Burned Continental Divide Trail sign. (USDA Forest Service photo)

Recreational and commercial mushroom harvesting may be popular for the next few years.

Wilderness

Overview

The Bitterroot National Forest includes parts of three designated wilderness areas that total just under 750,000 acres: the Anaconda-Pintler, Selway-Bitterroot, and Frank Church-River of No Return. Of this total 95,399 acres, or about 13 percent, burned this year. Nearly 20,000 acres burned very hot. The remainder burned with moderate to low intensity. The burn patterns on the landscape are mixed. In fire-dependent ecosystems, such as the Northern Rockies, fire is a critical, major part of natural processes and is an integral part of wilderness preservation. The long-term ecological effects are deemed generally beneficial, with the exception of established noxious weed populations which are very likely to expand into fire-disturbed suitable habitat.

Two-thirds of the Bitterroot's nearly 42,000 acres of this wilderness burned in the summer of 2000.

Wilderness firefighting in the Idaho Wilderness complex went full circle in 2000. Some natural fires were allowed to burn early in the season before fire conditions became extreme. Suppression then became the norm after the Little Blue fire issued its wake-up call in mid-July. Finally, minimal suppression occurred in late July, August and into September when fires in populated areas commanded scarce resources and created a firefighting triage situation.

In mid-July, several wilderness fires were suppressed. But in the extreme fire conditions of late summer the lightning-sparked fires grew large very quickly. Much of the firefighting effort went to protecting improvements, such as buildings at the Magruder Ranger Station, and bridges. The ranger station, the Cooper's Flat and Horse Haven cabins, the Paradise Guard Station, and Salmon, Spot and Hell's Half Acre fire lookout towers were all wrapped in flame-proof material. The Magruder Ranger Station was doubly protected by a sprinkler system installed to keep the building wet. Another building in the Salmon River corridor, Blacky Foster's cabin, which is listed on the National Register of Historic Places, was saved by firefighters. All bridges were also saved.

Effects Specific to the 2000 Fires

The Anaconda-Pintler Wilderness is on the Bitterroot and Beaverhead-Deerlodge National Forests. Two-thirds of the Bitterroot's nearly 42,000 acres of this wilderness burned in the summer of 2000. The fires probably burned more intensely and became larger that they would have without the effects of past fire suppression. Nevertheless, since most of the forest in the Anaconda-Pintler Wilderness is lodgepole pine, intense fires are part of the natural fire cycle. Burned stands should regenerate naturally. Fires burned around popular destinations such as Kelly, Ripple, and Hidden Lakes, but not in the lakeshore camping areas.

The Anaconda-Pintler's relatively small size has made it difficult to allow many natural fires to burn. The small size increases the risk that natural fires could escape the wilderness boundary. Thus, over the decades, there has been comparatively more fire suppression in the Anaconda-Pintler than in the larger wilderness areas, and much more fuel build-up. The result in the Anaconda-Pintler during the summer of 2000 was an overdue "correction" in heavy fuels build-up.

Fires in the much larger Selway-Bitterroot and Frank Church-River of No Return Wilderness areas were mostly lower in severity. The severity and pattern of the burns were more typical of the historic fire regime. At the landscape scale the conditions of the entire complex of wilderness areas did not change radically.

The fires that burned 63,000 acres in the Selway-Bitterroot and Frank Church-River of No Return Wilderness Areas could have been much more intense had it not been for a decision made 28 years ago to allow some natural fires to burn. Fire managers recognized then, as now, that fire is a natural and valuable part of the ecosystem.

When wilderness fires occur, fire managers have options on how to best manage them. They can allow a fire to burn if it won't burn outside the wilderness boundary and meets other predetermined criteria; or the fire can be suppressed. The decision to let wilderness fires burn is not one made lightly, especially when there may still be weeks or months of dry, hot weather ahead. But the decisions made in the past three decades to allow hundreds of fires in the Idaho Wilderness Areas to burn naturally helped slow the spread of the 2000 fires. The Hamilton Creek Fire of 2000, for example, burned into the 40,000-acre 1996 Swet Fire, and was slowed by the reduced ground fuels there.

Noxious weeds pose the greatest risk to wilderness integrity. Invading weeds can alter ecosystem processes including native plant composition and productivity, water cycles, nutrient cycling, and natural disturbance patterns such as wildfire frequency and intensity. These changes, in turn, impact wildlife and recreation, and mar scenic beauty. The most vulnerable areas are near trailheads; along road, trail, or river corridors; near helicopter landing areas; on firelines and other features relating to fire suppression; and in burned areas adjacent to previous infestations. The Anaconda-Pintler Wilderness is largely weed-free. Recreation use, including camping, hunting, riding, and hiking patterns may change. This could allow some areas to recover from use while others may have new impacts. New campsites in pristine areas are of most concern.

The decision to let wilderness fires burn is not one made lightly, especially when there may still be weeks or months of dry, hot weather ahead.

Outfitters may temporarily need alternate camps in some cases. Game use of areas and hunting patterns will change. It is not anticipated that either of these effects will have a major impact on most outfitters. The most heavily impacted outfitters are on the East Fork of the Bitterroot River and in the Kim Creek Saddle areas in Idaho.

An increase in encroachments into wilderness by OHVs or snowmobiles may occur because fire has opened up terrain that was previously heavily forested. Because of terrain, the Anaconda-Pintler is the most vulnerable to this threat.

Commercial mushroom gathering is illegal in wilderness areas but may be attempted in readily accessible areas that have burned. The Anaconda-Pintler and areas adjacent to the Magruder Corridor Road are most apt to attract gatherers.

A significant challenge for wilderness managers in the next two decades lies in trail maintenance and reconstruction. The work needed is extensive and will be costly and difficult since access is only by foot or horseback, and the work will be done with crosscut saws and other hand tools. As trees fall over the next two or more decades, keeping trails open for hikers and livestock will be a huge workload.

Fire is a natural and valuable part of the ecosystem.

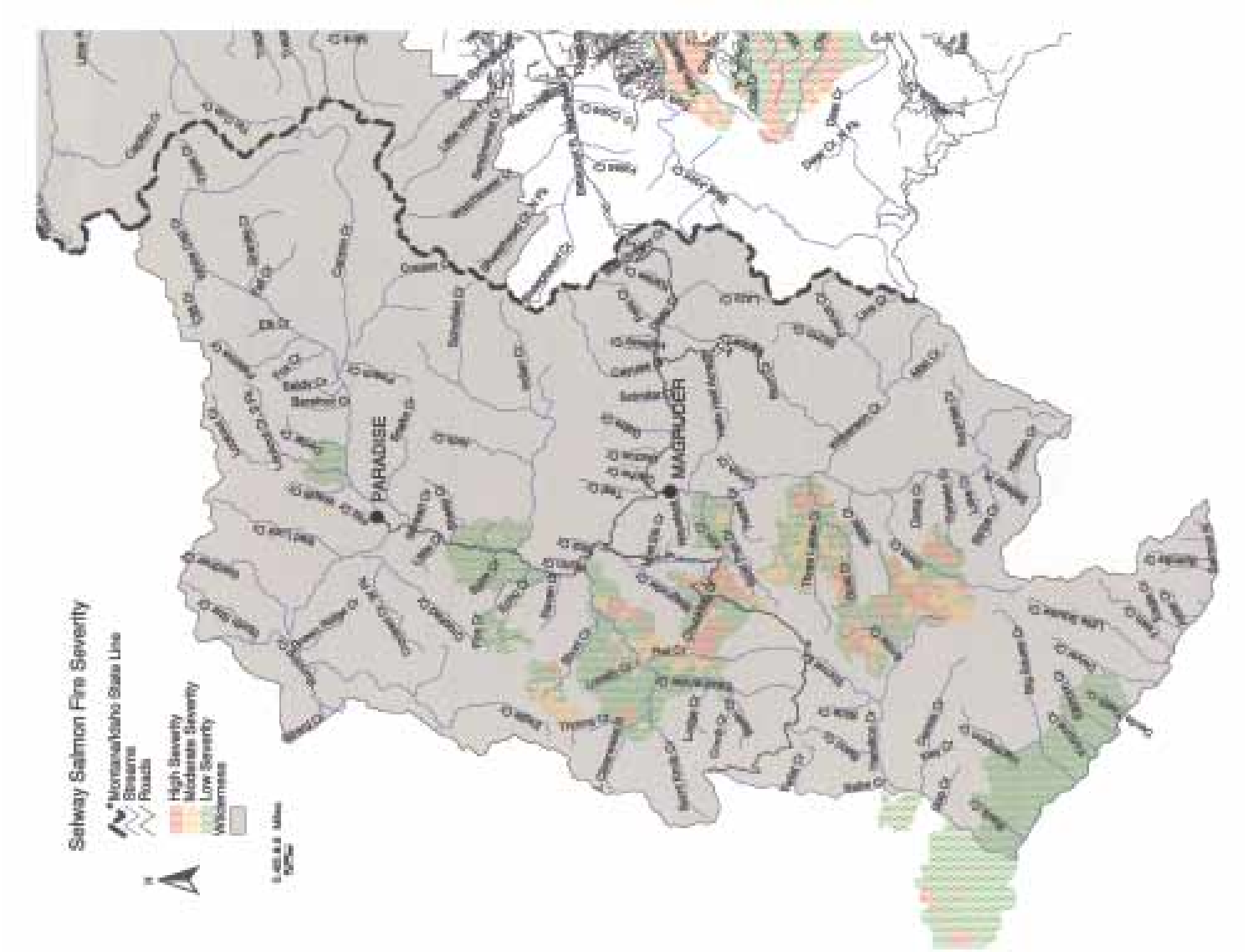
What We Hope to Achieve

The relative lack of human disturbance in these areas provides unique opportunities to learn about the natural world. Fire is a natural part of the wilderness, and the Forest Service does not plan to conduct the same recovery and rehabilitation projects here as in the non-wilderness parts of the Forest. The Forest will:

- Use the wilderness to illustrate the role of natural fire in ecosystems.
- Work with outfitters so their businesses are not disrupted and so they share information with their clients about the necessity of fire in the ecosystem.
- Minimize weed infestations through an active program of education, prevention, inventory, treatment, monitoring, and evaluation.
- Prevent damage to wilderness from changed use, motorized infringement, and mushroom pickers.
- Restore and maintain damaged trails so they are available for public use and do not increase erosion threats to waterways.

Trail damage in severely burned area. (USDA Forest Service photo)

Figure 20: Wilderness Fire Severity.



This page provided for your personal fire observations.