

- 2) "Design or modify all management practices as necessary to protect land productivity".

The soil analysis indicates that all alternatives and all activities proposed by the alternatives would meet the Region 1 Soil Quality Standards through the implementation of management practices outlined in Chapter 2 and restoration of landings and heavily used skid trails, if needed, to reduce the total amount of detrimental soil impacts. All Forest Plan management direction would be met by the proposed alternatives.

3.7 FISHERIES

3.7.1 INTRODUCTION

ANALYSIS AREA AND INFORMATION SOURCES

Information for this analysis has been gathered from a variety of sources. The Flathead National Forest (NF) and Montana Department of Fish, Wildlife, and Parks (MDFWP) have conducted site-specific fish habitat condition and population status inventories within the watershed for more than twenty years. Forest Service biologists prepared a baseline Biological Assessment (BA) of the status of bull trout in 1998 and updated it for the North and Middle Forks of the Flathead River in 2000 (USDA Forest Service 2000).

Quantitative habitat and biological data for this report was gathered from reports for Canyon Creek in the Robert Fire area, and Teepee, Whale, Shorty, and Trail Creeks in the Wedge Canyon Fire. In addition, Forest Service biologists prepared a Burned Area Emergency Stabilization and Rehabilitation (BAER) Plan for the Robert and Wedge Canyon Fires in the fall of 2003. Most of the stream condition information is from this report and the BA prepared for the Burned Areas Road Maintenance Project on the Flathead National Forest (USDA Forest Service 2004). Electrofishing surveys conducted by the MDFWP provide the basis for the westslope cutthroat trout information. Flathead NF R1/R4 survey data from 1995 for Shorty Creek, and 1996 from South Shorty Creek, were also used. Temperature data from a variety of sources and some sediment monitoring data are included as well.

The fisheries analysis area for this project encompasses a range of spatial scales which to large degree reflect the current status of bull trout (*Salvelinus confluentus*). This analysis area includes the North Fork Flathead River (952 square miles; 609,280 acres) and Flathead Lake (1,144 square miles; 732,680 acres). The Flathead River below the dam is not part of this analysis. The construction of Kerr Dam in 1938 isolated fish populations above the dam from populations in the lower river. Similarly, dams in both the South Fork Flathead River and the Swan River have isolated fish populations. Access to these river systems is no longer available to fish residing in and above Flathead Lake (Weaver and Fraley 1991). The broad-scale analysis area for this project, therefore, includes the upper Flathead basin, which encompasses Flathead Lake, the North and Middle Forks of the Flathead River, and the intervening river channel that connects them.

At a finer resolution, this analysis focuses primarily upon the Canyon Creek drainage (including Kimmerly, Depuy and McGinnis creeks) and the Deep Creek drainages for the Robert Fire area, and the Whale Creek (including Shorty Creek), Teepee, and Trail Creek drainages for the Wedge Canyon Fire. All of these creeks flow west to east and join the North Fork above the confluence with the Middle Fork.

3.7.2 AFFECTED ENVIRONMENT

This section describes the current condition of the aquatic environment and the principal species that are part of that environment. This assessment is largely based upon the BAER Plan prepared in the fall of 2003 and the BA prepared for the Burned Areas Road Maintenance Project on the Flathead NF (USDA Forest Service 2004) as well as the Soils and Hydrology sections of this document. For each fire area, the discussion includes a brief description of fish species and habitat, and any parameters that have changed from the baseline bull trout matrix written in 2000.

ROBERT FIRE

Environmental Baseline – Species and Habitat Indicators

Action agencies authorizing activities within lands occupied by bull trout are also mandated by the Endangered Species Act of 1973, as amended, to consider effects to bull trout that would likely occur as a result of management actions. Agency biologists use the Matrix of Pathway Indicators (matrix) for bull trout to evaluate and document baseline conditions and to determine the likelihood of “take” of bull trout. Matrix analysis incorporates 4 biological indicators and 19 physical habitat indicators. Analysis of the matrix habitat indicators provides a thorough investigation of the existing baseline condition and potential impacts to bull trout habitat. Determinations of indicator status are listed as “Functioning Appropriately”, (FA), “Functioning At Risk” (FAR), and “Functioning At Unacceptable Risk” (FUR). Baseline status determinations for the Robert Fire are taken from the Section 7 Baseline BA for the North and Middle Fork Flathead River, as updated (USDA 2000).

Species Status and Ecology

Bull Trout (Threatened Species)

Bull trout are considered sensitive species on the Flathead NF, defined as a species which is susceptible to activity impacts or habitat alterations. The species has also been identified as a “management indicator species” in the Flathead NF Forest Plan. Management indicator species are species identified in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important

Two basic life history forms of bull trout are known to occur: resident and migratory. Resident bull trout spend their entire lives in their natal streams, while migratory bull trout travel downstream as juveniles to rear in larger rivers (fluvial types) or lakes (adfluvial types). The North Fork of the Flathead River populations are considered an adfluvial migratory group, with juveniles moving downstream to Flathead Lake at age 2-3, and returning around age 6 to spawn. Bull trout spawning occurs in the fall, and the eggs incubate in the stream gravel until hatching in January (Fraley and Shepard 1989). The alevins remain in the gravel for several more months and emerge as fry in early spring. Unlike many anadromous salmonids, which spawn once and die, bull trout are capable of multi-year spawning (Fraley and Shepard 1989). The historic range of the bull trout stretched from California, where the species is now extinct, to the Yukon Territory of Canada (Hass and McPhail 1991). The decline of bull trout across most of their historic range in the United States resulted in their listing as a threatened species under the Endangered Species Act in 1998.

Several factors have contributed to the decline of bull trout. Habitat degradation, interaction with exotic species, over-harvest, and fragmentation of habitat by dams and diversions, are all factors contributing to the decline (Rieman and McIntyre 1995). A change in the species composition of Flathead Lake, however, is perhaps the most important factor in the decline of the upper Flathead bull trout subpopulation (McIntyre 1998). Opossum shrimp (*Mysis relicta*) were documented in Flathead Lake in 1981. Between 1968 and 1975, these shrimp were stocked in 3 lakes which all had tributaries that feed into Flathead Lake, allowing the shrimp to migrate downstream. Numbers peaked in 1986. Two non-native species: lake trout (*S. namaycush*) and lake whitefish (*Coregonus clupeaformis*) expanded as juvenile fish benefited from the addition of shrimp to the prey base.

It is believed that the expansion of these two species contributed to the decline of bull trout (McIntyre 1998). The mechanisms of the decline are not well understood, however, it is assumed that competition between these fish species was a major contributor to the decline in bull trout. Bull trout populations remain healthy in Swan Lake and Hungry Horse Reservoir where lake trout are absent.

Bull trout numbers in Flathead Lake have been estimated based upon redd counts. In 1982, the highest bull trout redd count year, about 13,000 adult bull trout were estimated in Flathead Lake (Weaver 1998). The lowest redd count year was 1996 and adult bull trout were estimated at 916 fish (Weaver 1998). It is important to note that these are gross estimates based on complex assumptions, but these numbers do provide an indication of the precipitous rate of decline the population suffered in less than two decades.

Canyon Creek (including McGinnis, Kimmerly, and Depuy Creeks)

Bull trout have been documented in limited numbers in Canyon Creek below barrier falls, located approximately 400m above the confluence with the North Fork of the Flathead River. No bull trout spawning habitat is known to exist in this lower reach between the falls and the confluence. This reach was not proposed as critical habitat in the Draft Bull Trout Recovery Plan (USDA Forest Service 2000).

McGinnis Creek was once fully accessible to trout from the North Fork Flathead River. In the mid 1990s, however, landslides near the mouth of McGinnis formed a barrier to fish passage. This landslide is located about 100 m above the confluence with Canyon Creek. Before the landslide, bull trout were known to use McGinnis Creek, but there was no known spawning habitat. No redd counts have been conducted in McGinnis Creek. However, juvenile populations were measured in 1980. It was determined that the short reach below the falls in McGinnis Creek was an important rearing stream, with a density of 1.5 bull trout per 100 square meters of stream.

The environmental baseline for the Canyon Creek watershed is reflected in the baseline bull trout matrix for Canyon Creek. This matrix has been updated to reflect the changes in landscape since the year 2000. The specific parameters that are updated include: 1) *Sediment*; 2) *Disturbance history*; 3) *Disturbance regime*, and 4) *Peak flows*. Other minor changes have occurred and are noted in the table.

Approximately 50% of slopes draining into McGinnis Creek burned at high severity. Of particular concern is the slope on both sides of the stream from the slide downstream to confluence with Canyon Creek. Burn severity further exacerbated conditions in this unstable area. In addition, there are two slumps caused by the Robert Fire located in the Canyon Creek inner-gorge just below the McGinnis Creek confluence and just south of FR# 803 approximately 0.4 to 0.5 miles west of the North Fork and FR# 803 confluence.

Management restoration activities are not proposed in proximity to these failures. It is believed that over time these slumps will stabilize as the vegetation within the Robert Fire Area re-establishes. However, the fire may result in increased sediment levels in the lower reaches. The post fire cumulative sediment yield in the Canyon Creek watershed is expected to be 64,452 tons

with a dramatic decrease every year after this (see Hydrology section). To reflect this increase in sediment yield, the *Sediment* rating in the Canyon Creek matrix has been lowered from FAR to FUR.

Canyon, Kimmerly, Depuy, McGinnis and Deep Creek drainages were first entered for large-scale timber management purposes in the early 1900's. The only harvest that occurred in the RHCAs in the Robert Fire Area in the last 20 years was in 1992. At that time, 110 acres were harvested. The most recent harvest activity has involved removal of hazard trees along the main roads. However, the equivalent clearcut area (ECA) for the Canyon Watershed is 16% when adjusted for watershed harvest (see Hydrology section). Criteria in the bull trout matrix for FAR for the *Disturbance History* rating is a ECA of less than 15%. Therefore, the environmental baseline indicator for *Disturbance History* has been downgraded to FUR from FAR.

The fire burned within the Canyon Creek drainage (including the Kimmerly, Depuy and McGinnis creek drainages) and Deep Creek drainages. The Robert Fire burned approximately 52,900 acres in the project area. As presented in the Hydrology section, 36% of the acres in Canyon Creek drainage burned, 100% in McGinnis Creek, 8.1% in Kimmerly Creek and 99.7% in the Depuy Creek drainage. Similarly, 80.8% of Deep Creek drainage burned. Within this area, approximately 2,866 acres were burned within the RHCAs at varying severities. Only 7 acres remained unburned (Table 136). The ECA for Canyon Creek adjusted for the burn is 36%. Thus, 36% of the watershed was consumed by fire. This percentage moves the *Disturbance Regime* rating from FA to FAR.

Table 136. GIS acres of Fire Severity in the RHCAs in the Robert Fire Project Area.

Fire Severity	Acres
High	1,495
Low	755
Medium	617
Unburned	7
Total Acres	2,874

Post-fire annual water yield is expected to increase 20% in Canyon Creek as a result of the fire. In general, stream channels with *fair* to *good* Pfankuch stream stability ratings are not at risk of increased channel erosion with water yield increases of less than 10 percent over natural conditions. Water yield increases in the 10-15% range may cause increased channel erosion (see Hydrology section). Thus the environmental indicator for *Peak flow* have been lowered FAR from FA to reflect this new landscape condition.

There are few if any data available for bull trout populations and habitat in Kimmerly or Depuy Creeks. Canyon Creek was evaluated for suitability for bull trout in the 2000 BA. In 2000, all the matrix variables for Canyon Creek were ranged from FA to FUR. It was concluded that Canyon Creek and its tributaries were never important bull trout streams due to the barrier falls. The *Integration of Species and Habitat Condition* rating is listed as FUR (Table 137).

Deep Creek

Based on the soil burn severity map, hillslopes above Deep Creek burned at low to moderate severity and are expected to revegetate quickly. There are few if any data available for bull trout populations and habitat in Deep Creek; consequently, no further discussion or evaluation of bull trout populations and habitat in this stream will occur.

Table 137. Environmental Baseline Matrix in the Canyon Creek Drainage Updated from the Robert Fire and Recent Data (changes shown in bold).

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
Subpopulation size	FUR	FUR	Dependent on the Flathead Lake bull trout population to maintain its numbers.
Growth and survival	FUR	FUR	This subpopulation is most likely in decline and will not improve until measures are taken to alleviate the changes in Flathead Lake.
Life history diversity & isolation	FAR	FAR	No change.
Persistence & genetic integrity	FAR	FAR	No change.
Temperature	FA	FA	Soil burn severity map indicates most hillslopes in Canyon Creek and lower portions of Depuy and Kimmerly Creek burned at high severity. Higher stream temperatures may result in the lower drainages of Canyon Creek, where the riparian vegetation suffered high mortality. However, based on temperature data collected in Whale creek, higher stream temperatures are not expected.
Sediment	FAR	FUR	Collection of McNeil sediment samples is recommended in Canyon Creeks to verify % fines.
Chemical contamination /nutrie	FAR	FAR	No change.
Habitat access (physical barriers)	FA	FA	Four replaced culverts will provide improved habitat for westslope cutthroat trout, but bull trout habitat will not be affected.
Substrate embeddedness	FA	FA	FNF does not measure embeddedness.
LWD	FAR	FAR	Should see an increase as a result of the

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
			RHCA mortality. However, there may be a lag after the initial recruitment of dead wood.
Pool frequency and quality	FAR	FAR	Should see an increase with increase in LWD.
Large pools	FAR	FAR	No change.
Off-channel habitat	FA	FA	No change.
Refugia	FAR	FAR	No change.
Wetted Width/Max. Depth ratio	FAR	FAR	No change.
Streambank stability	FUR	FUR	The R-1 Stream Channel Stability Ratings for Canyon Creek completed between 1976 to 1980 ranged from <i>good</i> and <i>fair</i> . The streambanks along the middle portion of Canyon Creek is unstable due to downcutting through glacial-fluvial deposits.
Floodplain connectivity	FAR	FAR	No change.
Peak flow	FAR	FAR	A 20% increase in water yield as a result of the fire is expected (see Hydrology report).
Drainage network increase	FAR	FAR	No change.
Road density and location	FUR	FUR	The main road infringes on the streams meander pattern and is the most impactful road in North Fork system. The road density in Canyon Creek is presently 2.8 miles per square mile.
Disturbance history	FAR	FUR	The present Equivalent Clearcut Area (ECA) adjusted for watershed harvest is 16%.
Riparian Conservation Areas	FAR	FAR	Riparian areas throughout the fire burned with varying degrees of severity. In general, the organic horizon was not consumed and viable roots persisted. Accelerated post-fire growth of riparian plant species is expected.
Disturbance regimes	FA	FAR	The present ECA for Canyon Creek adjusted for the burn is 36%.

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
Integration of species & habitat concerns	FUR	FUR	Canyon Creek and its tributaries do not have the potential to be important bull trout streams due to the barrier falls (USDA Forest Service 2000).

FA = Functioning Appropriately, FAR = Functioning at Risk, FUR = Functioning at Unacceptable Risk

Westslope Cutthroat Trout (Sensitive Species, Management Indicator Species)

Westslope cutthroat trout is considered a sensitive species on the Flathead NF, defined as a species which is susceptible to activity impacts or habitat alterations. The species has also been identified as a “management indicator species” in the Flathead NF Forest Plan. Management indicator species are species identified in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.

Westslope cutthroat trout have three possible life forms, adfluvial (migrates to lakes), fluvial (migrates to rivers) or resident (stays in streams). All three life forms spawn in tributary streams in the springtime when water temperature is about 10 Celsius and flows are high (Liknes and Graham 1988). Cutthroat trout spawn when they are about 4 or 5 years old and only a few survive to spawn again (McIntyre and Rieman 1995). Fry emerge in late June to mid July and then may spend one to four years in their natal streams. While resident fish spend their entire life in tributary streams, migratory life forms can travel several hundred kilometers as they move between adult and spawning habitat.

There are four primary reasons for the decline of this species. Habitat loss is considered to be a widespread problem. Cutthroat trout have declined due to poor grazing practices, historic logging practices, mining, agriculture, residential development and the lingering impact of forest roads. Fish have been unable to use countless miles of spawning habitat due to dewatering of streams for irrigation and because of barriers created by dams and road culverts.

The North Fork Flathead River watershed encompasses 952 square miles of which genetically pure westslope cutthroat trout occupy 67 miles (27 stream reaches) (MTFWP, in litt. 1998). Of the total linear amount of stream habitat known to be occupied by westslope cutthroat trout in the North Fork of the Flathead River watershed, 81.9% lie on lands administered by federal agencies (MTFWP, in litt. 1999). Based on data presented in the species status review, westslope cutthroat trout stocks are strong or predicted strong in four HUCs; depressed or predicted depressed in 31 HUCs; and absent or predicted absent in the remaining one HUC that collectively constitutes the North Fork Flathead River watershed.

The US Fish and Wildlife Service has been petitioned to include the westslope cutthroat trout under protection of the Endangered Species Act. In 2000, the US Fish and Wildlife Service determined that listing was not warranted, due to the species wide distribution, available habitat in public lands and conservation efforts underway by state and federal agencies.

Canyon Creek (including McGinnis, Kimmerly and Depuy Creeks)

The barrier falls on Canyon Creek inhibits upstream migration of non-native salmonids. Currently there is 7.8 miles of accessible westslope cutthroat trout habitat above the barrier falls. The stream network above the barrier falls forms a local conservation population for westslope cutthroat trout that is not threatened by introgression or competition with non-native salmonids.

The westslope cutthroat trout population in McGinnis Creek above the slide is now temporarily isolated. This population is not genetically pure and introgression probably occurred before the slide formed a fish barrier. The BAER Team noted that there are four miles of westslope cutthroat trout habitat above the slide in McGinnis Creek and there are no man-made barriers to fish passage above the slide (USDA Forest Service 2003). The genetic integrity of this population (90% pure; 2002) is still at levels considered to represent an important population as determined by the latest U.S. Fish and Wildlife Service ruling on the petition to list the westslope cutthroat trout as a threatened species under the Endangered Species Act (U.S. Fish and Wildlife Service 1999).

There are few if any data available for westslope cutthroat trout populations and habitat in Kimmerly or Depuy Creeks. However, in 2002 westslope cutthroat trout populations in Depuy Creek were genetically tested and found to be 100% pure populations.

Emergency hillslope treatments have been implemented through the BAER plan in high severity burn areas to reduce the amount of sediment that enters critical spawning reaches in Canyon Creek and McGinnis Creek. The following treatments of the BAER Plan have been, or are recommended to be, implemented to reduce sedimentation delivery to streams occupied by westslope cutthroat trout and open additional suitable habitat: 1) Seeding of slopes in Canyon Creek and McGinnis Creek with high potential to deliver sediment; 2) Modification or replacement of four culverts in Canyon Creek to allow for fish passage, and; 3) Road maintenance and drainage designed to reduce threat of road failures.

Deep Creek

Approximately 3.25 miles of potential fish habitat occurs in Deep Creek but habitat quality is thought to be marginal. Because of the fire danger in this watershed, BAER survey crews were unable to assess habitat conditions or population status. It is unlikely that fish occur in Deep Creek due to high gradient. At its confluence with the North Fork Flathead River, there is a major barrier to fish passage formed by the standpipe culvert under the North Fork Flathead River road. In addition, a culvert located approximately 2.5 miles upstream from the confluence is another likely fish passage barrier. However, habitat quality upstream from this culvert is marginal.

Other Species

These watersheds support all native fish and amphibian species believed to have been historically present. In addition to bull trout and westslope cutthroat trout, three aquatic groups are native and assumed present, one or more species of fish from the genus sculpin (*Cottus sp.*), mountain whitefish (*Prosopium williamsoni*), and tailed frog (*Ascaphus trueii*).

WEDGE CANYON FIRE

Environmental Baseline – Species and Habitat Indicators

Similar to the Robert Fire, this section follows the matrix found in the 1998 U.S. Department of Interior publication “A framework to assist in making endangered species act

determinations of effect for individual or grouped action at the bull trout subpopulation watershed scale.” Baseline status indicators for Whale and Trail Creeks are from the Section 7 BA prepared for the Burned Areas Road Maintenance Project on the Flathead National Forest (USDA 2004). Baseline status indicators for Teepee Creek are based on status determinations taken from the Section 7 Baseline BA for the North and Middle Fork Flathead River (USDA 2000).

While assessing potential effects to bull trout as a species, agencies have concurrently provided an analysis of effects to the primary constituent elements (PCEs) for bull trout critical habitat and related habitat indicators. Critical habitat designations for bull trout have been proposed but are not yet finalized. Whale and Trail Creek drainages are priority watersheds and are proposed critical habitat, as are the larger downstream water bodies into which they flow. These include the North Fork of the Flathead River, the Swan River, and Hungry Horse Reservoir. The following table (Table 138) includes the PCE for bull trout critical habitat and associated habitat indicators.

Table 138. Primary Constituent Elements for Bull Trout Critical Habitat and Associated Habitat Indicators.

PCE#	PCE Description	Associated Habitat Indicators
1	Permanent water having low levels of contaminants such that normal respiration, growth and survival are not inhibited.	Sediment, Chemical contamination/nutrients, Peak flow
2	Water temperatures ranging from 2 to 15C, with adequate thermal refugia available for temperatures at the upper end of this range.	Temperature, Refugia, Avg. wetted width/max depth ratio, Streambank stability, Peak flow, Riparian conservation areas (RCA), Floodplain connectivity
3	Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures	LWD, Pool frequency and quality, Large pools, Off-channel habitat, Refugia, Ave wetted width/max depth ratio, Streambank stability, RCA, Floodplain connectivity
4	Substrates of sufficient amount, size and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival.	Sediment, Substrate embeddedness, LWD, Pool frequency and quality
5	A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, a hydrograph that demonstrates the ability to support bull trout populations.	Peak flow, Drainage network, Disturbance history, and Disturbance regime.

PCE#	PCE Description	Associated Habitat Indicators
6	Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity.	Peak flow, Drainage network, Disturbance history, Riparian conservation areas, Floodplain connectivity, and Chemical contamination/nutrients.
7	Migratory corridors with minimal physical, biological, or chemical barriers between spawning, rearing, overwintering, and foraging habitat, including intermittent or seasonal barriers induced by high water temperatures or low flows.	Life history diversity and isolation, Persistence and genetic integrity, Temperature, Chemical contamination/nutrients, physical barriers, Wetted width/maximum depth ration, Peak flows, and Refugia
8	An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Growth and survival, Life history diversity and isolation, Riparian conservation areas, and Floodplain connectivity.
9	Few or no predatory, interbreeding, or competitive non-native species present	Persistence and genetic integrity and Physical barriers

Species Status and Ecology

Bull Trout (Threatened Species)

General information about the life history and status of bull trout in the project area is included under the earlier bull trout discussion for the Robert Fire area. The discussion below will focus on the environmental baseline indicators, proposed critical habitat, and PCEs of Whale, Trail, and Teepee Creek drainages. Any changes to the indicators and PCEs as a result of recent events and activities (including the Wedge Canyon fire) are documented below.

Whale Creek (including Shorty Creek)

Whale Creek is considered critical habitat in the draft Bull Trout Recovery Plan (U.S. Fish and Wildlife Service 2002) and has been identified as an INFISH priority watershed on the Flathead NF. Whale Creek is also a critical watershed in one of six Restoration Emphasis Areas identified by the Flathead NF (USDA Forest Service 2003). Bull trout occupy approximately 18.5 miles of streams within the Whale Creek drainage. Of these, approximately 9 miles are located upstream of the area burned and are not affected. The lower 9.5 miles were either within the burn area or in areas downstream or downslope of burned areas.

Bull trout distribution in Whale Creek is limited to just above the Shorty Creek confluence where a waterfall prevents upstream movement. Bull trout have been found several miles up Shorty Creek. However, redd counts in Shorty Creek in the period 1979-1999 showed a substantial decline, particularly from 1982 to 1997, when redds decreased from 52 in 1982 to 2 in 1997 (USDA Forest Service 2000).

According to annual bull trout spawning site inventories from 1980-2001 (Delaray et. al 1999; USFS file data), Whale Creek supports up to 67% of the total bull trout spawning redds counted in the North Fork Flathead system and up to 42% of redds counted in the entire Flathead River system. The stream is closed to recreational fishing to protect adfluvial spawning and rearing bull trout.

The environmental baseline indicators, proposed critical habitat, and PCEs for the Whale Creek draiange is reflected in the baseline bull trout matrix for Whale Creek (Table 139). This matrix has been updated to reflect the changes in landscape since the writing of the 2000 and 2004 BAs. The only parameters updated at this time are the *Sediment* and *Disturbance regime* ratings. Other minor changes have occurred and are noted in the table. The changes reflect the effects of the fire on species and habitat indicators and proposed bull trout critical habitat.

The post fire cumulative sediment yield in the Whale Creek watershed is expected to be 28,209 tons, with a dramatic decrease every year after this (see Hydrology section). Upper slopes of one unnamed catchment, southwest of Hornet Mountain, burned with moderate/high severity, while mid to lower slopes burned with moderate to low severity with mosaic patterns of unburned vegetation. This catchment drains directly into critical spawning areas, and there is potential for fine sediment to be delivered to the stream and reduce spawning habitat quality at the lower most end of the bull trout spawning reach. Data acquired from running the WEPP model indicated that approximately 18 tons/acre of sediment could be generated under the new landscape condition, with 3,097 tons delivered to the stream. It is difficult to know if this amount of sediment yield will increase embeddedness in the critical spawning reaches. Thus, to be conservative, the *Sediment* indicator and associated PCEs for the Whale Creek drainage have been lowered from FAR to FUR.

Emergency hillslope treatments were recommended to be completed through implementation of the BAER plan in high severity burn areas that could contribute high amounts of sediment to critical spawning reaches of Whale Creek and Trail Creek. Many of these recommended projects have already been completed. For example, the steep slope southwest of Hornet Peak, that drains directly into a critical spawning reach of Whale Creek, was recommended for treatment along with high severity burn slopes draining into the critical spawning reaches of Trail Creek. Similarly, a natural landslide on the Trail Creek road, which contributes sediment to the uppermost reach of the spawning area, was identified for stabilization. A treatment is proposed in the BAER plan to relocate a short reach of the Trail Creek channel that currently abuts the base of the slide. This treatment would reduce the amount of sediment delivered from the unstable slide area to the stream.

The following activities were recommended by the BAER Team to reduce the potential for sedimentation into affected streams.

1. Seeding, as recommended in the vegetation report.
2. Heli-mulch basin southwest of Hornet Mountain to alleviate the potential to deliver sediment to Whale Creek.
3. Heli-mulch slopes in upper end of Trail Creek to reduce delivery of sediment to critical spawning reaches.
4. Relocate the stream channel at the base of the Trail Creek slump.
5. Pull or modify culvert in Teepee Creek to allow for fish passage.
6. Implement road treatments identified in the road report to improve road drainage and reduce threat of road failures and sediment delivery to streams.

As stated previously, the fire burned within both the Whale Creek and Hornet Creek drainages. As presented in the Hydrology section, 11.7% or 4,806 acres of the total 40,959 acres in the Whale Creek drainage burned and 100% or 1,827 acres in Hornet Creek. The ECA for Whale Creek adjusted for the burn is 11% and 91% in the Hornet Creek drainage. To reflect this watershed change the *Disturbance Regime* rating has been lowered from FA to FAR.

In general, habitat in Whale Creek is in fair condition and recovering from impacts from old logging. The stream is connected and provides good refugia. Bull trout numbers, however, are depressed as a result of changes in Flathead Lake. Therefore, the *Integration of Species and Habitat Condition* rating for this drainage is listed as FUR.

Table 139. Environmental Baseline Matrix and Proposed Critical Habitat in the Whale Creek Drainage Updated from the Wedge Canyon Fire and Recent Data (changes shown in bold).

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
Subpopulation size	FUR	FUR	Redd counts in the Whale Creek drainage fell to a low of 12 in 1992. Recent redd count numbers indicate that the bull trout population may be recovering from the low levels of the early 1990s.
Growth and survival	FUR	FUR	No change.
Life history diversity & isolation	FAR	FAR	No change.
Persistence & genetic integrity	FAR	FAR	No change.
Temperature	FA	FA	Stream temperatures were measured in Whale Creek to evaluate whether the fire had an effect on stream temperatures. According to the data collected by the Hungry Horse Ranger Station, substantial changes in the stream temperatures were not detected.
Sediment	FAR	FUR	Whale Creek is listed on the state 303d list for impaired watersheds due to increased sediment loads. Fines have consistently been higher than other North Fork Flathead River tributaries and should continue to be monitored.
Chemical	FAR	FAR	No change.

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
contamination/nutrients			
Habitat access (physical barriers)	FA	FA	No man-made barriers in this watershed.
Substrate embeddedness	FA	FA	FNF does not measure embeddedness.
LWD	FAR	FAR	There should be an influx of LWD from the fire area.
Pool frequency and quality	FAR	FAR	Should increase with the addition of LWD.
Large pools	FAR	FAR	No change.
Off-channel habitat	FA	FA	No change.
Refugia	FA	FA	No change.
Wetted Width/Max. Depth ratio	FAR	FAR	No change.
Streambank stability	FA	FA	No change.
Floodplain connectivity	FA	FA	No change.
Peak flow	FAR	FAR	A 4% increase in water yield is predicted (see Hydrology report).
Drainage network increase	FAR	FAR	No change.
Road density and location	FAR	FAR	Road density is presently 1.3 miles per square mile.
Disturbance history	FAR	FAR	The present ECA adjusted for harvest is 14%.
Riparian Conservation Areas	FAR	FAR	No change.
Disturbance regimes	FA	FAR	Approximately 4,806 acres burned in the Whale Creek watershed (11.7%) (see Hydrology Report)
Integration of species & habitat concerns	FUR	FUR	Habitat in Whale Creek is in fair condition and recovering from old logging impacts. The stream is connected and would provide a good refuge. However, bull trout are depressed as a result of changes in Flathead Lake.

FA = Functioning Appropriately, FAR = Functioning at Risk, FUR = Functioning at Unacceptable Risk

Trail Creek

Similar to Whale Creek, Trail Creek is considered critical habitat in the draft Bull Trout Recovery Plan and has been identified as an INFISH priority watershed on the Flathead NF. Approximately 9.6 miles of bull trout nodal, spawning, and juvenile rearing/migratory habitat exists in Trail Creek just below Thoma Creek. At this point, the stream goes subsurface for about 1 mile upstream. Bull trout have not been found above this point, however, juvenile bull trout do have access to the upper reaches during high flow periods. Most of the critical spawning reach (approximately 3 miles long) is located downstream of the fire perimeter. Approximately 0.33 miles of spawning habitat is located within the burned area. The lower 3 miles of Trail Creek above its confluence with the North Fork Flathead River burned with moderate to low severity. This reach of Trail Creek is considered important bull trout juvenile rearing habitat. Topography is gentle, and sediment generated from this area of the fire is expected to be minimal. Significant vegetative recovery is expected to occur within the first two years post fire.

According to annual bull trout spawning site inventories from 1980-2001 (Deley et. al 1999; USFS file data), these spawning sections of Trail Creek support up to 43% of the total bull trout spawning redds counted in the North Fork Flathead River and up to 26% of redds monitored in the entire Flathead River system. The stream is closed to recreational fishing to protect adfluvial spawning and rearing bull trout.

A landslide exists in the subsurface reach of Trail Creek. The slide is similar to several other slides throughout the North Fork area and is assumed to be a natural event. The north side of the Trail Creek channel abuts the toe of the slide. During spring runoff, the slide contributes sediment to the stream. A road cut through the middle of the slide exacerbates sediment input. Slopes above the slide burned with moderate to high severity, further decreasing slope stability and increasing active erosion and sediment inputs to the stream. The expected increase in sediment from the fire is only 140 tons (see Hydrology report).

The environmental baseline indicators, proposed critical habitat, and PCEs for the Trail Creek drainage is reflected in the baseline bull trout matrix for Trail Creek (Table 140). This matrix has been updated to reflect the changes in landscape since the writing of the 2000 and 2004 BAs. The only parameter updated at this time is *Disturbance regime* rating. Other minor changes have occurred and are noted in the table. The changes reflect the effects of the fire on species and habitat indicators and proposed bull trout critical habitat.

The extreme upper slopes of most unnamed catchments flowing north into Antley and Yakinikak creeks, headwater tributaries to Trail Creek, burned with a high to moderate severity. Some slopes are >30%. Most of the mid to low level slopes, with <30% slopes, generally burned at a moderate severity. North and south facing catchments, draining directly into Trail Creek above the Thoma Creek confluence, also burned with a moderate severity. These slopes are steep (>65%). Overall 18.5% of the Trail Creek Watershed burned. The *Disturbance regime* rating has been updated to reflect this landscape change.

In general, habitat conditions provide very good rearing and spawning habitat in Trail Creek, however, the migratory bull trout form has been greatly depressed as a result of changes in Flathead Lake. The *Integration of Species and Habitat Condition* rating for this drainage is listed as FAR.

Table 140. Environmental Baseline Matrix and Proposed Critical Habitat in the Trail Creek Drainage Updated from the Wedge Canyon Fire and Recent Data (changes shown in bold).

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
Subpopulation size	FUR	FUR	Recent redd count numbers indicate that the bull trout population may be recovering from the low levels of the early 1990s. Habitat degradation is not a leading factor for decline in Trail Creek.
Growth and survival	FUR	FUR	No change.
Life history diversity & isolation	FAR	FAR	No change.
Persistence & genetic integrity	FAR	FAR	No change.
Temperature	FA	FA	Stream temperatures were measured in Trail Creek to evaluate whether the fire had an effect on stream temperatures. According to the data collected, substantial changes in the stream temperatures have not been detected.
Sediment	FA	FA	McNeil core samples have been taken in Trail Creek since 1982. Fines have fluctuated from a high 34.6% in 1991 to a low of 24.8% in 1995. The post fire cumulative sediment yield in the Trail Creek watershed is expected to be 140 tons, with a dramatic decrease every year after this (see Hydrology section).
Chemical contamination/nutrient	FA	FA	No change.
Habitat access (physical barriers)	FA	FA	No man-made barriers in this watershed. As mentioned above, adult bull trout do not have access to upstream reaches.
Substrate embeddedness	FA	FA	FNF does not measure embeddedness.
LWD (LWD)	FAR	FAR	Should increase as result of the fire.
Pool frequency	FAR	FAR	Should increase with LWD.

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
and quality			
Large pools	FAR	FAR	No change.
Off-channel habitat	FA	FA	No change.
Refugia	FA	FA	No change.
Wetted Width/Max. Depth ratio	FAR	FAR	No change.
Streambank stability	FA	FA	No change.
Floodplain connectivity	FA	FA	No change.
Peak flow	FA	FA	A 5% increase is expected in peak flow based on WATSED modeling (see Hydrology report).
Drainage network increase	FA	FA	No change.
Road density and location	FA	FA	Present road density is 0.6 miles per square mile.
Disturbance history	FAR	FAR	Present ECA adjusted for watershed harvest is 2%
Riparian Conservation Areas	FA	FA	Significant vegetative recovery is expected to occur within the first two years post fire. The fire burned across the lower 2 miles of Trail Creek, which is below the bull trout spawning area. This area burned with a low to moderate intensity.
Disturbance regimes	FA	FAR	The present ECA adjusted for the watershed burn is 16% which is over the threshold of FA.
Integration of species & habitat concerns	FAR	FAR	Habitat conditions provide very good rearing and spawning habitat, however, the migratory bull trout form has been greatly depressed as a result of changes in Flathead Lake.

FA = Functioning Appropriately, FAR = Functioning at Risk, FUR = Functioning at Unacceptable Risk

Teepee Creek

Bull trout distribution is limited to the first 3 miles to just below Teepee Lake. Bull trout occur in limited numbers and no redd counts for bull trout have been conducted in Teepee Creek. Teepee Creek is not a priority bull trout watershed.

A Flathead NF electrofishing survey in 1992 failed to find any bull trout in two stations near the Ford Work Station and above Road #5399 crossing. Similarly, no bull trout were collected in Teepee Creek in 1955 (Block 1955). Several bull trout were however captured near Teepee Lake the following year in 1993. No population estimates were derived from this sample. It is assumed that bull trout were never abundant in Teepee Creek.

The environmental baseline for the Teepee Creek watershed is reflected in the baseline bull trout matrix for Teepee Creek (Table 141). This matrix has been updated to reflect the changes in landscape since the year 2000. The specific parameters that have been updated include: 1) peak flow; 2) road density; 3) disturbance history; and 4) disturbance regime. Other minor changes have occurred and are noted in the table.

As noted in the hydrology section of this report, post-fire annual water yield is expected to increase 22% in Teepee Creek as a result of the fire. In general, stream channels with fair to good Pfanckuch stream stability ratings are not at risk of increased channel erosion with water yield increases of less than 10 percent over natural conditions. Water yield increases in the 10-15% range may cause increased channel erosion. Thus, the *Peak flow* rating in the Teepee Creek bull trout matrix has been lowered to FUR to reflect this new landscape condition.

Table 141. Environmental Baseline Matrix in the Teepee Creek Drainage Updated from the Wedge Canyon Fire and Recent Data (changes shown in bold).

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
Subpopulation size	FUR	FUR	In all likelihood, bull trout were never abundant in Teepee Creek. The parameter rating is based on the fact that this population is part of the larger Flathead Lake meta-population.
Growth and survival	FUR	FUR	No change.
Life history diversity & isolation	FAR	FAR	No change.
Persistence & genetic integrity	FAR	FAR	No change.
Temperature	FA	FA	During and just after the Wedge Canyon Fire maximum temperatures did not exceed 61°F. Ground water does not augment the stream flows in Teepee Creek, like it does Whale and Trail Creeks, and as a result, stream temperatures are naturally warmer. These high stream temperatures most likely

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
			preclude bull trout from spawning in Teepee Creek.
Sediment	FA	FA	McNeil core samples have never been taken in Teepee Creek. Pebble counts were taken in 1993 at 3 locations and % fines ranged from 4% to 19% in riffles. As a whole, the % of fines does not appear to be limiting bull trout spawning in Teepee Creek. The post fire cumulative sediment yield in the Teepee Creek watershed is expected to be 15,540 tons, with a dramatic decrease every year after this (see the Hydrology section).
Chemical contamination/nutrient	FA	FA	No change.
Habitat access (physical barriers)	FA	FA	No man-made barriers in this watershed. As mentioned above, adult bull trout do not have access to upstream reaches.
Substrate embeddedness	FA	FA	FNF does not measure embeddedness.
LWD	FA	FA	Recruitment of LWD is expected to increase after the fire.
Pool frequency and quality	FAR	FAR	Expected to increase with LWD.
Large pools	FAR	FAR	No change.
Off-channel habitat	FA	FA	No change.
Refugia	FAR	FAR	No change.
Wetted Width/Max. Depth ratio	FA	FA	No change.
Streambank stability	FA	FA	No change.
Floodplain connectivity	FA	FA	No change.
Peak flow	FAR	FUR	Expected 22% increase in water yield based on WATSED (see hydrology report).

Matrix Parameter	Pre-Fire Condition	Current Condition	Discussion
Drainage network increase	FAR	FAR	No change.
Road density and location	FAR	FUR	Road density is currently 2.9 miles per square mile.
Disturbance history	FAR	FA	Most recent harvest activity involves the removal of hazard trees along main roads. No harvest in the RHCAs in the Wedge Canyon Fire Area in the last 20 years. ECA is 3%.
Riparian Conservation Areas	FAR	FAR	The BAER Team reported that buffalo grass and other shrubs were already beginning to sprout in the fall of 2003.
Disturbance regimes	FA	FAR	The ECA for Teepee Creek adjusted for the burn is 72%.
Integration of species & habitat concerns	FAR	FAR	Teepee Creek is not an important bull trout stream. Juveniles have entered this stream below Teepee Lake to rear. The migratory form is depressed due to changes in Flathead Lake.

FA = Functioning Appropriately, FAR = Functioning at Risk, FUR = Functioning at Unacceptable Risk

Recommended road densities in bull trout watersheds is 2.4 miles of road per square mile. The road density is presently 2.9 miles per square mile. Any watershed with densities greater than 2.4 miles per square mile is considered FUR. Thus the *Road density* rating for Teepee Creek has been lowered to FUR for consistency with the matrix criteria.

Most recent harvest activity in Teepee Creek involves the removal of hazard trees along main roads. There has been no harvest in the RHCAs in the Wedge Canyon Fire Area in the last 20 years. Thus, the ECA for Teepee Creek Watershed is 3% when adjusted for watershed harvest (see Hydrology section for details). The criteria in the bull trout matrix for FA for the *Disturbance History* rating is a ECA of less than 15%. Therefore, for this analysis the *Disturbance History* rating for this stream system will be upgraded to FA.

Topography in the upper portion of the Teepee watershed is steep. The majority of south facing slopes in the upper reaches of Wedge Canyon are >30% and burned with moderate to low severity. Upper portions of two unnamed tributaries, one in the northwest corner of section 14 and the other in the northeast corner of section 16, burned with high severity and have slopes greater than 30%. Lower portions of these slopes burned with moderate to low severity. Several north facing slopes with gradients less than 30% burned with moderate to low severity. In general, floodplain areas burned with low severity and are expected to recover quickly. All of the Teepee Watershed burned to some degree. The ECA for Teepee Creek adjusted for the burn is 72%. Thus, 72% of the watershed was consumed by fire. This percentage moves the *Disturbance regime* rating from FA to FAR.

Teepee Creek is not an important bull trout stream but juveniles have been known to enter this stream below Teepee Lake to rear. The migratory form is depressed due to changes in Flathead Lake. The *Integration of Species and Habitat Condition* rating for this drainage is listed as FAR.

Westslope Cutthroat Trout (Sensitive Species, Management Indicator Species)

Westslope cutthroat trout is considered a sensitive species on the Flathead NF. The species has also been identified as a “management indicator species” in the Flathead NF Forest Plan.

Whale Creek (including Shorty Creek) and Trail Creek

Whale and Trail creeks have high cutthroat densities in tributaries such as Tuchuck and Ketchikan creeks (EPA 1983). Densities are low in the main stem with the exception of Trail above the dry reach.

Teepee Creek

Teepee Creek is inhabited by a potentially isolated population of westslope cutthroat trout. Habitat maps indicate a natural barrier exists near Teepee Lake that may inhibit upstream migration of non-native salmonids. A beaver dam complex near the falls may, however, provide fish passage. There is potentially eight miles of westslope cutthroat trout habitat above the natural barrier. However, after 2.5 miles of occupied habitat there is a road culvert further fragments the population. There is approximately 5.5 miles of suitable/unoccupied habitat upstream of the culvert.

The Teepee Creek westslope cutthroat trout population is currently being managed as a conservation population that is not threatened by introgression or competition with non-native salmonids. Although genetic status is unknown, phenotypic characteristics indicate that fish are pure below the culvert. The isolated nature of the population, however, decreases resiliency to localized disturbance and increases the risk for localized extinction.

One culvert in Teepee Creek was identified as a fish passage barrier that may influence population resiliency. The BAER Plan recommended modifying or removing the culvert to allow for fish passage. Another culvert barrier identified in the Flathead NF fish passage database in Hornet Creek was also reviewed by the BAER Team. However, extremely low streamflows limit fish habitat potential in that stream and removing the culvert was not warranted for fisheries purposes.

Other Species

In addition to bull trout and westslope cutthroat trout, mountain whitefish and sculpins are present in Whale, Trail and Teepee creeks. Several springs provide excellent water around 4-5° C that feed Trail Creek. This subterranean flow is a natural phenomenon given the cavernous geology of this area and is not believed to be man induced.

3.7.3 ENVIRONMENTAL CONSEQUENCES

Alternative 1 (No Action) - Robert and Wedge Canyon Fires

Direct effects as described in this report refer to fish mortality or disturbance. Indirect effects refer to modification of habitat, which could result in population effects.

Direct Effects

There were no fish mortalities reported by any sources for any stream within the fire. Direct fish mortality is generally associated with more intense and severe burned riparian areas (Minshall *et al.* 1989, McMahon and deCalesta 1990, Rieman *et al.* 1997), and may be due to toxic levels of ion from ash or increased pH rather than water temperatures. Minshall *et al.* (1989) speculated that chemical toxicity from smoke or ash would cause fish mortality in second and third order streams. Water temperature may also increase after riparian vegetation is burned, however, predicting the biological consequences is difficult (Beschta *et al.* 1987). Based on the literature, fish kills are more probable during post-fire high streamflow events with high bedload and suspended sediment discharge (Rinne 1996, Bozek and Young 1994).

Fire retardant can also result in acute toxic conditions if retardant is dropped in or near stream channels. There were no known or reported retardant drops into streams for the Robert or Wedge Canyon Fires.

Indirect Effects

It is important to recognize that wildfire, including large-scale, stand replacement fires are important mechanisms for creating and maintaining stream ecosystems and habitat. In western Montana, the two primary mechanisms responsible for initiating stream dynamics that ultimately increase habitat complexity and diversity are fire and flood. In the short-term, fires may cause dramatic changes in aquatic systems, including altered streamflow and sediment discharges, changes in channel geometry and stability, fish mortality and even localized extinctions. However, fires are the primary mechanisms for recruitment of LWD, which is critical in the formation of complex stream habitats, spatial diversity and long-term persistence of the population.

Midterm affects are those that exert their maximum impact within the first few years after the fire (Minshall *et al.* 1989, Greswell 1999). The most significant midterm effects of fire, as discussed in the hydrology section of this report, results from changes in water and sediment discharge and erosional processes including debris flows and mass wasting. These factors ultimately determine channel morphology and habitat quality for aquatic biota. The magnitude and scale of channel and habitat effects are related to burn severity, geology, topography, size of the stream system, pre-fire channel stability and amount, magnitude, and time of post-fire precipitation events (Swanson 1981, Meyer *et al.* 1992, Meyer *et al.* 1995). All streams within the fire will likely experience higher than normal amounts of sediment, which may result in short-term adverse impacts to spawning habitat quality and recruitment success.

Fires can also indirectly provide opportunities for restoration as a result of increased funding. As noted in the Effected Environment section, several culverts forming fish barriers are scheduled to be modified or replaced to expand the potential habitat for the westslope cutthroat trout. Removing these barriers will increase available habitat by 9 ½ miles of habitat, more than doubling the current amount of habitat available to this conservation population.

In general, habitat conditions will continue to improve in the watershed under the no action alternative through implementation of the BAER projects and natural re-vegetation of the landscape. For example, stream temperature data collected in Whale Creek and Teepee Creek by the Hunger Horse Ranger District did not show any significant increases to temperature after the fire (see Figure 39 and Figure 40). Thus the Stream temperature rating for this drainage has not and will not be changed from the environmental baseline conditions for the No Action alternative.

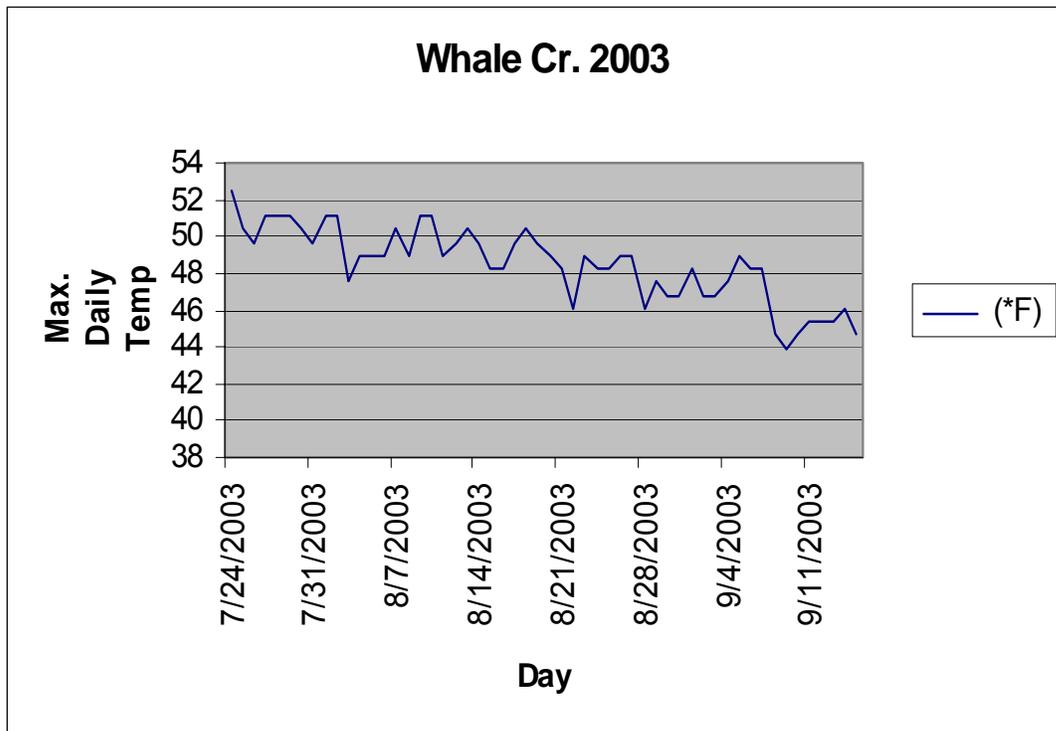


Figure 39. Post fire temperature data in Whale Creek.

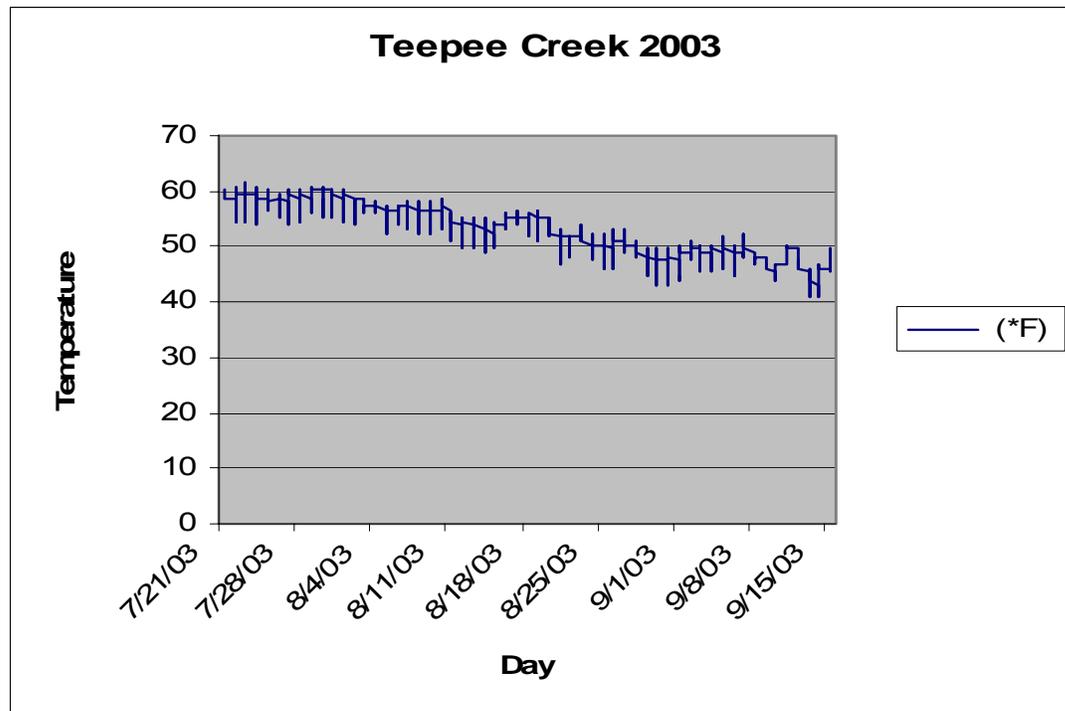


Figure 40. Post fire temperature data in Teepee Creek.

Environmental indicators and PCEs for proposed critical habitat updated to reflect current conditions in Canyon, Whale, Trail and Teepee drainages are not expected to change further as a result of the No Action Alternative.

Alternative 2 – Proposed Action

Direct Effects

The primary concern in these streamsheds, from a fisheries perspective, of the proposed timber salvage and associated road management is increased sedimentation that can directly affect bull trout by impairing respiration and feeding, and indirectly affect them by filling the interstitial spaces of spawning gravels with fine material that can impair embryo and fry survival. As noted above, the condition of the spawning gravels in the watershed has been improving for several years, and fines are currently below levels where bull trout spawning is considered threatened (Weaver and Fraley 1991). However, spawning is still considered the most sensitive bull trout life history component.

Increases in sediment, as shown in the Hydrology section, would be primarily a function of increased runoff and associated erosion. During monitoring for the Moose Fire Salvage, direct effects to bull trout respiration and feeding were not detected (Pat VanEimeren, personal communication).

Indirect Effects

The Flathead NF is proposing to salvage log dead trees and trees damaged by the fire in up to 5,822 acres within the two fire areas. This includes approximately 3,090 acres within the Robert Fire and roughly 2,732 acres within the Wedge Canyon Fire. These acres represent the upper limit of salvage that could occur within the fire boundary areas. Of the 5,822 acres proposed for salvage, approximately 2,685 acres (46%) will be helicopter logged, 963 acres (17%) cable logged, and 2,174 acres (37%) tractor logged. Approximately 2.3 miles of new temporary road will be constructed as well as the opening of approximately 2.5 miles of historic road templates to access certain units. No new permanent roads will be constructed for the project. All temporary roads constructed or opened for the project would be closed and rehabilitated after salvage activities.

The number of acres of vegetative treatment proposed in RHCAs in the Wedge Canyon Fire area is 24 acres (Table 142). These treatment areas are all above Teepee Creek Road. The distance between the road and the mapped locations of the streams ranges from 50 to 250 feet. The existing vegetation in the area proposed for thinning is generally cool/moist upland habitat types consisting of primarily subalpine fir/clintonia habitat. The overstory is composed of douglas fir, larch, spruce, and subalpine fir. No riparian characteristics are present within the unit. Only the portion of the riparian buffer uphill from the road would be treated in these units.

In the Robert Fire area 18 acres are proposed. A portion of Unit 332 is in the McGinnis Creek RHCA, however, preliminary analysis of the post fire mosaic image, suggests that the Unit is outside of the 300 foot buffer. The over-lap would be above the main McGinnis Creek road near the junction with the Dupuis Creek road. No new roads will be built to facilitate this harvest.

Table 142. Treatments Units that Overlap RHCAs in Robert and Wedge Canyon Fire Areas.

Wedge Canyon	Robert
--------------	--------

Unit	Acres	Logging System	Unit	Acre	Logging System
104	3	Helicopter	332	18	Tractor
105	4	Helicopter			
113	4	Helicopter			
114	4	Helicopter			
115	4	Helicopter			
141	5	Tractor			
Total	24			18	

Acres above include activities proposed in INFISH buffers and MA 12

No LWD would be removed from RHCA’s in the project area except the few specified above units above. Consequently, this project would not interfere with the distribution and function of LWD in the stream network. Riparian management objectives would be maintained in all units. The retention of LWD within the RHCA’s would allow natural recruitment processes to function over time and contribute to the development of the complex habitats essential to bull trout survival (Rieman and McIntyre 1993, Hauer *et al.* 1999). The minimum INFISH riparian buffer widths are listed below (Table 143).

Table 143. Minimum INFISH Riparian Buffer Widths (feet) (each side of bank-full channel).

Type of Waterbody	Minimum INFISH Buffer Width (feet)
Fish-bearing stream reaches	300'
Permanently flowing, non-fish stream reaches	150'
Seasonally flowing or intermittent streams	100'
Ponds, lakes, or wetlands > 1 acre	150'
Ponds, lakes, or wetlands < 1 acre	100'
Landslide prone areas	100'

In addition to salvage logging activity, some salvage units will be planted with native tree seedlings. Some non-salvage areas will be planted with native trees and shrubs to promote regeneration and species diversity as well. Approximately 2,840 acres within and outside of salvage units will be planted. Approximately 2,200 acres in the Wedge Canyon Fire area and 640 acres in the Robert Fire area will be planted with these trees and shrubs. Plantings will focus mainly on riparian areas that experienced a high severity burn.

The proposed action would also include activities to change access management within the Lower Whale and Canyon McGinnis grizzly bear subunits to reduce current open motorized access density and total motorized access density, and improve security core for grizzly bears.

Approximately five miles of open yearlong/seasonally open road would be closed yearlong to wheeled motorized vehicles within these two grizzly bear subunits. In addition to changes to open roads, approximately 16 miles of road would be decommissioned in both grizzly bear subunits. Road decommissioning would include actions to minimize the potential for future sedimentation of streams or noxious weed development. These actions would include placement of numerous waterbars, culvert removals, grass seeding, slash or debris placement on roads, planting shrubs, or spraying herbicides on existing noxious weed infestations.

Culvert removal and stream restoration would occur where roads to be decommissioned intersect streams. To reduce the amount of ground disturbance, cross drain culverts would typically not be removed but waterbars would be placed nearby. The amount of physical altering of the road template from culvert removal or water bar creation would vary according to the sites involved. A previously decommissioned road, RD 9827, located in the Teepee Creek, would be re-opened as a haul road for the duration of the project. Reconstruction of the road would entail installation of up to four culverts or temporary bridges.

3.7.4 Forest Plan Standards

Management standards for and related to fisheries habitat are contained in the Flathead Forest Plan (U.S. Department of Agriculture 1985), pages II-21 - II-22, and II-26 – II-35. In addition, a separate management area (MA12) was established for riparian areas where specific standards and guides apply (III-52-60). Lastly, Forest Plan Amendment #3 provides specific direction for important westslope cutthroat and bull trout streams.

The Inland Native Fish Strategy (INFISH) (U.S. Department of Agriculture 1995) amended the Flathead Forest Plan on August 30, 1995. INFISH is an aquatic conservation strategy developed by the Forest Service to protect habitat and populations of all native fish (U.S. Department of Agriculture 1995). This interim strategy was designed to provide additional protection for existing populations of native fish, outside the range of anadromous fish, on 22 National Forests in the Pacific Northwest, Northern and Intermountain Regions.

Implementing this strategy was deemed necessary as these species were at risk due to habitat degradation, introduction of exotic species, loss of migratory forms and over-fishing. As part of this strategy, the Regional Foresters designated a network of priority watersheds. Priority watersheds are drainages that still contain excellent habitat or assemblages of native fish, provide for metapopulation objectives, or have excellent potential for restoration. There are two priority watersheds within the project areas Trail and Whale Creeks.

INFISH designated RHCAs pertain to all bodies of water on forest-administered lands. The RHCAs are areas where specific management activities are subject to standards and guidelines in INFISH in addition to existing standards and guidelines in the Flathead Forest Plan. The RHCAs are defined for four categories of stream or water body dependent on flow conditions and presence of fish.

INFISH also established RMOs. RMOs are stream habitat parameters that describe good fish habitat. For this project, five default RMOs would apply. The RMOs are: 1) pool frequency; 2) LWD (LWD); 3) mean-maximum water temperature; 4) mean wetted width to depth ratio; and 5) bank stability. These default RMOs were intended to be interim standards designed to protect fish habitat until such time as the individual National Forests defined standards suitable to a particular area. In the absence of site-specific standards, the interim standards would apply. No site-specific standards have yet been defined on the Flathead National Forest.

Status of INFISH Riparian Management Objectives

Surveys aimed at INFISH RMO inventories have not been conducted in the two priority bull trout streams within the project areas. However, comparisons with inventoried streams on the Flathead National Forest allow some conclusions to be made with a reasonable degree of confidence. Both Whale and Trail Creek streams should satisfy the INFISH temperature standard; i.e., stream temperatures do not exceed recommended maximums in spawning and holding habitat.

The number of pools per mile likely does not meet the INFISH standard; particularly in the (Rosgen) B and C stream channel reaches. This pattern is commonly observed in streams on the Flathead National Forest including wilderness reference reaches, a reflection of differing geology between this region and the Cascade Mountains, where the standards were developed. LWD likely exceeds the INFISH standard by a substantial amount, and should increase as a result of the fires. Pool frequency should increase over time as the streams recruit LWD.

Width/depth ratios on the Flathead National Forest typically exceed the INFISH standard of 10, particularly in the lower gradient reaches where bull trout spawning occurs. Bank stability likely meets or exceeds the INFISH standard of >80% stable (USDA Forest Service 2004). This project would not affect the attainment status of any INFISH RMO.

Environmental Baseline - Species and Habitat Indicators

Similar to the Effected Environment section, the environmental indicators for Canyon, Whale, Trail, and Teepee Creeks drainages have been evaluated to identify changes that would occur to species and habitat indicators and proposed critical habitat and associated PCEs. The following indicators may change with project implementation: 1) Sediment; 2) Peak Flow; and 3) Road density and location.

According to the WEPP modeling, the additional amount of sediment delivered to streams due to project implementation is 373 tons in the Robert Fire and 159 tons in the Wedge Canyon Fire (see Hydrology Report). Individual streamsheds are given in Table 144 and Table 145. The amount of sediment generated from harvest in RHCAs is estimated to be 1.1 ton in McGinnis Creek and 0.16 tons in Teepee Creek. Canyon and Whale Creek drainages are particularly susceptible to additional inputs of sediment since both environmental baselines are already FUR.

Table 144. The Robert Post-fire Project Analysis Watersheds, Road Density, Percentage of each Watershed Harvested Based upon ECA, Potential Water Yield and Potential Sediment Yield.

Analysis Watershed	Road Density (mi./mi. ²) ¹ No Action/Action	ECA Adjusted Watershed Harvest (%) No Action/Action	1 st year Post-fire Water Yield (%) Increase No Action/Action	Potential Sediment Yield Increase (tons) Action	Potential Sediment Yield Increase (tons) Action – RHCAs only
Hell Roaring Creek	1.3/0.9	0	31.5/31.3	+47	0
Deep Creek	4.0/1.7	0	26.4/25.6	+168	0
Kimmerly Creek	2.4/2.4	13	NA	+14	0
Depuy Creek	3.5/1.4	0			
McGinnis Creek	4.0/3.7	0	NA	+520	+1.1

Analysis Watershed	Road Density (mi./mi. ²) ¹ No Action/Action	ECA Adjusted Watershed Harvest (%) No Action/Action	1 st year Post-fire Water Yield (%) Increase No Action/Action	Potential Sediment Yield Increase (tons) Action	Potential Sediment Yield Increase (tons) Action – RHCAs only
Canyon Creek	2.8/2.5	16	214.7/213.1	+173	0
Hell Roaring, Deep Creek, and North Face drainages	3.5/3.5	0	NA	+759	0

¹Road density represents condition after all approved projects are implemented.

The road decommissioning portion of this project has the highest risk of impacting fish habitat in the short-term because of the risk of sediment from culvert removals depositing in spawning reaches. The timber harvest proposed is much less likely to affect bull trout and westslope cutthroat trout habitat, because the low impact harvest systems, use of BMPs, and retention of INFISH riparian buffers are all proven effective at preventing sediment from being delivered to streams. The amount of sediment expected to result from project activities is not, by itself, expected to lead to extensive pool filling and channel instability.

- *Sediment*: Short-term Minor Degrade, Long-term Maintain: Sediment yield is expected to increase as a result harvest activity and culvert removal in the short-term. Over the long-term, sediment yield is expected to decrease as a result of lower road densities and riparian plantings.

Table 145. The Wedge Canyon Post-fire Project Analysis Watersheds, Road Density, Percentage of each Watershed Harvested Based upon ECA, Potential Water Yield and Potential Sediment Yield.

Analysis Watershed	Road Density (mi./mi. ²) ¹ No Action/Action	ECA Adjusted Watershed Harvest (%) No Action/Action	1 st year Post-fire Water Yield% Increase No Action/Action	Potential Sediment Yield Increase (tons) Action	Potential Sediment Yield Increase (tons) Action – RHCAs only
Tepee Creek	2.9/1.1	3	21.5/21.0	+0	+0.16
Whale Creek	1.3/0.7	14	81.3/77.3	+260	0
Hornet Creek	4.2/1.7	0	NA	+107	0
Trail/Yakini kaCreeks	0.6/0.5	2	50.8/50.5	+1	0

Analysis Watershed	Road Density (mi./mi. ²) ¹ No Action/Action	ECA Adjusted Watershed Harvest (%) No Action/Action	1 st year Post-fire Water Yield% Increase No Action/Action	Potential Sediment Yield Increase (tons) Action	Potential Sediment Yield Increase (tons) Action – RHCAs only
North Fork Face drainages	2.7/2.0	4	20.2/19.9	+0	0

¹Road density represents condition after all approved projects are implemented.

Peak flow would be expected to decrease as a result of the Proposed Action. Decommissioned roads would reduce the overall stream network in the system and allow water to infiltrate. According to data generated through WEPP modeling, peak flows decrease consistently in the project area where roads are planned for decommissioning (Table 144 and Table 145). In addition to the reduced road density, peak flows would also be reduced as a result of the riparian plantings. Please see the Hydrology Report for further details.

The reduction in peak flow would be particularly important in Teepee Creek where the environmental baseline is rated FUR. Peak flows in Teepee Creek are anticipated to be reduced by 0.5 acre/feet. The 26.8 miles of road decommissioning planned for this watershed should have a substantial effect over time.

- *Peak flow:* Improve. Data from WEPP modeling displayed a decrease in peak flow as a result of decreased roads. The proposed vegetation harvest did not change the existing ECA and resultant peak flows. Proposed riparian planting would also accelerate recovery of the watershed and decrease peak flows over time.

As mentioned above, implementation of the Proposed Action would reduce road densities in most of the watershed analysis areas (Table 144 and Table 145). Of particular importance to bull trout and proposed critical habitat and associated PCEs are road densities in Canyon, Whale, Trial and Teepee Creek drainages. These road densities are reduced to 2.5 (from 2.8); 0.7 (from 1.3); 0.5 (from 0.6); 1.1 (from 2.9), respectively, in each of these drainages. The Proposed Action would decommission approximately 16 miles of road, however, implementation of the project would also complete the decommissioning of roads analyzed under previous decisions.

For Canyon and Teepee Creek watershed, the decrease in road densities would move the watersheds towards the desired future condition of 2.4 miles per square mile on stable soils and outside of RHCAs. The environmental indicator for *Road density* for Teepee Creek would improve from FUR to FA.

Temporary roads scheduled to be used with project implementation would not require stream crossings, would be utilized for a short time, and would be reclaimed upon completion of the harvest within the affected units. Identified segments of temporary road would be located on stable soils downstream of spawning reaches. Stream buffers, as described in the INFISH plan, would be implemented around any stream channel in the vicinity of a temporary road.

The portion of the road decommissioning work located above bull trout spawning reaches would be conducted between May 15 and September 1 after bull trout emergence and prior to spawning. This time frame would allow some reestablishment of new vegetation on these sites that would help stabilize the soil before the next runoff cycle. Sediment resulting from

culvert removal typically arrives in two pulses. The first pulse of sediment is short-term, usually lasting less than four hours, and results from the release of material trapped under and immediately adjacent to the pipe. The second pulse of sediment consists of material entrained during subsequent periods of higher flow, when the stream encroaches upon disturbed banks that have not revegetated (see Hydrology Report).

- *Road density*: Short-term Minor Degrade, Long-term Improve. There would be slight short-term increase in road density as a result of reopening one road in Teepee Creek drainage. Road densities, however, would decrease over the long-term with the implementation of the proposed miles of road decommissioning (see Hydrology section).

There are no anticipated major effects associated with this project on any population or habitat parameter, including critical habitat and associated PCEs (Table 146). All project actions would comply with Flathead NF standards and guides, including INFISH requirements and maintenance of RMOs.

3.7.5 Cumulative Effects

As mentioned above there are influences other than habitat degradation that are affecting the Flathead Lake bull trout population. Bull trout populations have declined equally in wilderness streams, Glacier National Park streams, and managed streams. The rivers and the lake can not be separated, they function as one. If bull trout are to occur in the river system then measures must be first taken in Flathead Lake to restore bull trout. Monitoring of bull trout habitat by MDFWP indicates that bull trout habitat is as good as it has been since monitoring began in the early 1980's. The habitat is available to support bull trout.

The Flathead River Drainage Bull Trout Status Report indicates that the three highest risks to bull trout are legal introductions, fisheries management, and forestry. Rural residential development was listed as a lesser concern. Land ownership in the Middle and North Forks of the Flathead is very similar in that private land (34,000 acres) is concentrated along the main rivers but predominantly outside the Wild & Scenic River corridor. Therefore, activities on private land rarely influence spawning habitat and to a limited extent any rearing that would occur near the mouths of tributaries. The ownership pattern also influences the Forest's permitting process where few very permits are required for easements and access through NFS land as access is provided from county or state roads.

Table 146. Checklist for documenting minor effects to the environmental baseline and critical habitat.

Matrix Parameter	Canyon	Teepee	Trail	Whale	Minor Effect
Subpopulation size	FUR	FUR	FUR	FUR	Maintain
Growth and survival	FUR	FUR	FUR	FUR	Maintain
Life history diversity and isolation	FAR	FAR	FAR	FAR	Maintain
Persistence and genetic integrity	FAR	FAR	FAR	FAR	Maintain
Temperature	FA	FA	FA	FA	Maintain
Sediment	FUR	FA	FA	FUR	Short term degrade Long term improve

Matrix Parameter	Canyon	Teepee	Trail	Whale	Minor Effect
Chemical contamination/nutrients	FAR	FA	FA	FAR	Maintain
Physical barriers	FA	FA	FA	FA	Maintain
Substrate embeddedness	FA	FA	FA	FA	Maintain
LWD	FAR	FA	FAR	FAR	Maintain
Pool Frequency and quality	FAR	FAR	FAR	FAR	Maintain
Large pools	FAR	FAR	FAR	FAR	Maintain
Off-channel habitat	FA	FA	FA	FA	Maintain
Refugia	FAR	FAR	FA	FA	Maintain
Width to depth ratio	FAR	FA	FAR	FAR	Maintain
Bank stability	FUR	FA	FA	FA	Maintain
Floodplain connectivity	FAR	FA	FA	FA	Maintain
Change in peak/base flows	FAR	FUR	FA	FAR	Improve
Drainage network increase	FAR	FAR	FA	FAR	Maintain
Road density and location	FUR	FUR	FA	FAR	Short term degrade Long term improve
Disturbance history	FUR	FA	FAR	FAR	Maintain
Riparian Conservation Areas	FAR	FAR	FA	FAR	Maintain
Disturbance regime	FAR	FAR	FAR	FAR	Maintain
Integration of species and habitat concerns	FUR	FAR	FAR	FUR	Maintain

Minor effects – **action may result in an incremental or cumulative effect, but does not result in a functional change to the system (no change in functional level).**

Glacier National Park manages lands to the east of the North Fork Flathead River and to the north of the Middle Fork Flathead River and provides excellent habitat for bull trout in occupied streams. Many Park streams are limited in their importance for bull trout due to elevated water temperatures that flow from the outlet of lakes. The Department of Natural Resources and Conservation manages over 15,000 acres in the Coal Creek State Forest, including the majority of lands in the disjunct Cyclone Lake population. DNRC is planning activities including logging and road building in this area that may contribute to effects on this population.

There are several past and ongoing actions which may cumulatively affected fish and fish habitat including:

- Both the Robert and Wedge Canyon Fires (described above)
- Robert and Wedge Canyon BAER Projects (described above)

- Hazard Tree Felling
- Flathead National Forest BMP Project
- Personal Use Firewood Cutting on National Forest

Hazard tree felling occurred in several sections of RHCAs. Trees were left on site for future LWD recruitment and wildlife habitat except at some road/stream intersects and above roads where accumulations may have led to potential culvert failures or where removal would pose no threat to RHCAs. The effect of the fire and suppression efforts would have no effect on bull trout in the North Fork Flathead, because any sediment produced in either Canyon or Whale Creek drainages would not result in sediment levels above the normal range in the larger river, which has approximately a twenty-fold greater discharge.

The Flathead National Forest is planning a project of road improvements in the watersheds. This project has recently undergone Section 7 ESA consultation with the U.S. Fish and Wildlife Service. The 10.4 miles of project road in the Trail Creek watershed would be surface bladed, have culverts and ditches cleaned, and likely receive additional cross-drain culverts. One culvert on a perennial stream within the Trail Creek may be replaced. In addition to the one perennial crossing, four culverts on ephemeral streams may be replaced to comply with INFISH size standards.

Approximately 5.4 miles of Road 9805 in the Whale Creek watershed would receive BMP improvements. Short segments of this road are within the RHCA of Hornet Creek, a Whale Creek tributary. There are two culverts on ephemeral channels along this road that may require replacement. In addition, Road 318, the main Whale Creek road, will receive BMP treatments for approximately 8.5 miles from its junction with the North Fork Road. The first three miles of this road drain away from Whale Creek and any sediment produced would not pose a risk to bull trout within the stream. Two culverts are scheduled to be replaced on this road (USDA Forest Service 2004).

As in Trail Creek, sediment delivered to streams by project implementation would not, by itself, likely result in major impacts to bull trout in the watershed. However, sediment levels within the watershed are likely to rise as a result of the Wedge Canyon Fire, and the combined sediment increase may have a short-term negative effect on the species, primarily on spawning success and young-of-the-year survival. In subsequent years this project would result in less sediment delivery in the watershed and a gradual improvement in the quality of bull trout habitat. This project is not likely to affect other features of bull trout habitat, such as temperature, cover, or food supply. See the BMP Biological Assessment for more information concerning the effects of the BMP project.

The area of the fires will likely be heavily utilized in future years as a source of personal use firewood because of the proximity to the valley communities. Firewood cutting will be regulated by the existing permit system on the Flathead National Forest, which prohibits firewood cutting within 300 feet of any stream or lake. Compliance with firewood cutting regulations will be further encouraged by additional signage placed in the fire area. Firewood cutting is not expected to affect fish or other aquatic resources, largely because there will be limited areas where open roads allow access within RHCA's. Firewood cutting will not be allowed until the conclusion of any salvage harvest activity.

3.7.6 Regulatory Framework and Consistency

The forest plan is the primary document that codifies management standards and guidelines governing activity on national forest lands. Originally adopted in 1986, the Flathead Forest

Plan was amended in 1990 (Amendment No.3) to better define the standards for protection of fish populations. Implementation Note #10, adopted in 1992, established criteria for assessing the quality of spawning habitat relative to fine sediment concentrations in the gravel of the streambed. A stream would be considered “threatened” when the percentage of fine material exceeds 35% in any given year, while levels of 40% or greater would result in the stream being classed as “impaired”.

As discussed previously, priority watersheds are drainages that still contain excellent habitat or assemblages of native fish, provide for metapopulation objectives, or are watersheds that have excellent potential for restoration. Whale and Trail Creeks are priority watersheds. INFISH also established Riparian Management Objectives (RMOs) and Riparian Habitat Conservation Areas (RHCAs). RMOs are habitat parameters that describe good fish habitat. Where site-specific data is available, these RMOs can be adjusted to better describe local stream conditions. These RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of riparian goals is measured. RHCAs are portions of watersheds where riparian dependent resources receive primary emphasis. The RHCAs are defined for four categories of stream or water body dependent on flow conditions and presence of fish. The RHCAs are within specific management areas and are subject to standards and guidelines in INFISH in addition to existing standards and guidelines in the Flathead Forest Plan.

The Endangered Species Act (ESA) is responsible for the protection and recovery of listed species such as the bull trout. The bull trout was listed as threatened under ESA in 1998. The recovery plan for bull trout is currently being developed and a draft document is expected soon. Critical habitat delineation is also currently being determined. A stand-alone BA for bull trout will be prepared for the selected alternative in this project as required by section 7 of the ESA. Another native resident of the watershed is the westslope cutthroat trout. The westslope is on the Regional Forester’s “sensitive species” list. A Biological Evaluation has been prepared for westslope cutthroat trout that assesses the cumulative effects of all alternatives upon this sensitive species, as per Regional Directive 2670/1950 (August 17, 1995).

3.7.7 Sensitive Species Determinations

The Flathead Forest Plan provides specific guidance for the protection of fisheries and other aquatic resources, including the riparian zone around still and flowing water. The planned actions proposed under Alternatives 2-5 comply with all relevant Forest Plan requirements including INFISH. If one of these alternatives is implemented, the fisheries biologist will monitor the activity to insure proper implementation of planned actions.

The Endangered Species Act requires consultation between other federal agencies and the Fish and Wildlife Service when a proposed action is determined likely to affect a listed species. If an action alternative is selected for this proposal, a BA will be prepared to make an effects determination of the selected alternative upon bull trout. The initial determination for bull trout for all alternatives is “may affect, likely to adversely affect”. The no action alternative merits this determination primarily because the lack of road decommissioning will maintain a higher road density in the watershed, with its associated chronic sediment delivery and risk of catastrophic culvert failure. The action alternative warrants the adverse affect determination largely because of concerns with sedimentation resulting from road decommissioning and timber harvest. The action alternative will provide a long-term benefit to bull trout because of the road decommissioning.

The Flathead National Forest considers the westslope cutthroat trout a sensitive species and requires a similar effects determination when proposed management activity is likely to affect the species. The basis of the determination comes from the Biological Evaluation of the species status, a separate document located in the project file. The determination for westslope cutthroat trout for all alternatives is “may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species”

3.8 Threatened, Endangered and Sensitive Plants

3.8.1 Introduction

Analysis Area and Information Sources

The analysis areas for this threatened, endangered, and sensitive (TES) plant species analysis are the fire perimeters of the Robert and Wedge Canyon Fires within the North Fork Flathead River drainage, which encompass a total of 37,358 acres (13,270 acres in Robert and 24,088 acres in Wedge Canyon). The temporal bounds include the past and present actions (refer to Section 3.18: Robert-Wedge Post-Fire Project Past/Ongoing/Foreseeable Actions).

Information sources for this analysis include: the Montana Natural Heritage Program (MNHP) Element Occurrence Database; Flathead NF’s TES Survey Atlas; and the Flathead NF’s TES Plant Location Database. Other references are cited in the text.

3.8.2 Affected Environment

Threatened and Endangered Plant Species

There are no federally listed endangered plants in Montana. Two threatened plant species, Spalding’s catchfly (*Silene spaldingii*) and water howellia (*Howellia aquatilis*), have been identified by the US Fish and Wildlife Service (USFWS) as having potential to occur within the Flathead NF. There are no known occurrences of water howellia or Spalding’s catchfly within the analysis area.

Spalding’s Catchfly (*Silene spaldingii*)

Spalding’s catchfly is a Palouse Prairie endemic that is currently known from 52 populations across its range in Montana, Idaho, Oregon, Washington, and British Columbia. This species has suffered considerable habitat loss and fragmentation due to agricultural and urban development, grazing, herbicide treatment, and exotic weed invasion (Lichthardt 1997, Schassberger 1988). The National Heritage Program Network has ranked this species as G2, meaning that it is globally imperiled because of rarity, or because of other factors contributing to its vulnerability to extinction throughout its range. The MNHP has ranked the species as S1, meaning that it is critically imperiled in Montana because of extreme rarity, or because some factor of its biology makes it especially vulnerable to extinction (MNHP 2003). Spalding’s catchfly is currently listed as threatened by the USFWS.

There are nine known occurrences in Montana, all in grassland plant communities located in the northwestern portion of the state. Numbers of individuals at these nine occurrences are

very low. The population at the Nature Conservancy's Dancing Prairie Preserve in the Tobacco Valley is believed to be the largest remaining population of this species in the world, with thousands of plants. However, all other Montana locations have less than 150 plants each with some occurrences only have a few plants. No populations are known from the Flathead NF, yet there are several nearby occurrences, including a historic location in the vicinity of Columbia Falls, recorded from a herbarium specimen dated 1894. A search was conducted in the area, but the plants have not been relocated since the original report (Schassberger 1988). It is likely that the valley floor grassland where this collection was made has been converted to agriculture or developed. Four other occurrences are between 10 and 15 air miles from Flathead NF lands.

Plant communities that are suitable habitat for Spalding's catchfly in Montana do occur on the Flathead NF, although they are extremely scarce. These are grasslands dominated by rough fescue (*Festuca scabrella*), bluebunch wheatgrass (*Elymus spicatus* or *Agropyron spicatum*), and/or Idaho fescue (*Festuca idahoensis*). These grasslands may have scattered ponderosa pine (*Pinus ponderosa*) trees forming an open canopy. Although there are numerous mountain grasslands on the Flathead NF with similar species composition, it appears that Spalding's catchfly prefers mesic sites within a matrix of drier grassland communities in the foothill and valley floor zones.

On the Flathead NF, small isolated suitable habitats exist along the North Fork of the Flathead River floodplain from the Canadian border to Polebridge, in very small isolated grasslands in the Swan Valley, and in larger open fescue bunchgrass prairies in the South Fork Flathead and Danaher Creek drainages within the Bob Marshall Wilderness. There may be suitable grasslands in the Hog Heaven Range of the Swan Island Unit and on the south slopes near Ashley Lake as well. None of these areas are specifically mapped; however, they would not comprise more than 1 percent of the land base of the Flathead NF.

There are no known occurrences of Spalding's catchfly within the analysis area or within the Flathead NF, based on MNHP database and Flathead NF sensitive plants database.

In 2000, aerial photos of the entire Flathead NF were reviewed to locate large expanses of grassland with potential habitat for Spalding's catchfly. Grassland openings were delineated from aerial photos in areas along the North Fork of the Flathead River floodplain from the Canadian border to Polebridge and at Danaher, Horse Hill, and Bar Creek Meadows within the Bob Marshall Wilderness. Three of these areas along the North Fork Flathead River are within the Wedge Canyon Fire perimeter. All delineated grassland areas were surveyed specifically for Spalding's catchfly in 2000 and no plants were found (planning file). These grassland habitats were determined to be unsuitable for Spalding's catchfly.

Water howellia (*Howellia aquatilis*)

Water howellia is distributed throughout the Pacific Northwest in scattered clumps across Montana, Idaho, Washington, and California. There are 130 known occurrences known to Montana, all in the Swan Valley (planning file). Water howellia habitat has been subject to various management activities including dredging, draining, road construction, logging, and grazing (Shelly 1988, USDA 1997). Reed canarygrass (*Phalaris arundinacea*), an introduced species, also threatens populations across its range (Lesica 1997b). The National Heritage Program Network has ranked this species as G2, meaning that it is globally imperiled because of rarity, or because of other factors demonstrably making it vulnerable to extinction throughout its range. The MNHP has ranked the species similarly for the state as S2 (MNHP 2003). Water howellia is currently listed as threatened by the USFWS.

Water howellia is an aquatic plant restricted to small pothole ponds, or oxbows, long since isolated from the flowing surface waters of the adjacent river. These wetland habitats are generally shallow (~1 m deep), but the species has occasionally been observed in water up to approximately 2 m in depth. The ponds typically occur in a matrix of dense forest vegetation, and are nearly always surrounded in part by a small ring of deciduous vegetation. The bottom surfaces of the wetlands usually consist of firm consolidated silts and clays overlain by 0”-24” of organic sediments. These ponds are generally filled by snowmelt run-off and spring rains, later drying out to varying degrees by the end of the growing season, depending on annual patterns of temperature and precipitation. Water howellia occurs between elevations of 3m (10 feet) in Washington to 1,372m (4,500 feet) in Montana; all Montana occurrences lie between 945m (3,100 feet) and 1,372m (4,500 feet), and are found only in the Swan River Valley from just south of the community of Swan Lake, south to the Clearwater/Swan divide. On the Flathead NF, water howellia is only known to occur within the Swan Valley, over 50 miles from the Robert and Wedge Canyon Fire areas.

The USFWS has identified all areas below 5,000 feet on the Flathead NF within the range of water howellia. Consequently, all areas above that elevation are outside the range of the species. Therefore, all areas above 5,000 feet in the project area will no longer be addressed in this EIS with regards to current status of and effects to water howellia.

An aerial photo interpretation was conducted for all areas below 5,000 feet in the project area to locate potential sites for water howellia. No suitable habitats were located.

Regional Forester’s Sensitive Plants

Known Occurrences

The Regional Forester has recognized 53 species as sensitive for the Flathead NF (planning file). In addition, there are seven proposed sensitive plant species for the 2004 Regional Forester’s revision list. The MNHP database and Flathead NF plant location databases were queried to determine known occurrences within the Robert and Wedge Canyon fire action areas. Five Regional Forester’s sensitive plants (“sensitive plants”) occur within the Wedge Canyon Fire action area: great sundew (*Drosera anglica*), three-angled thread moss (*Meesia triquetra*), tufted clubrush (*Scirpus cespitosus*), water bulrush (*Scirpus subterminalis*), and scorpion feather moss (*Scorpidium scorpioides*) Table 147. Two sensitive plants occur within the Robert Fire action area: western moonwort (*Botrychium hesperium*) and Columbia crazyweed (*Oxytropis campestris* var. *columbiana*) Table 147. Several additional sensitive plants occur within a 5 mile buffer of the fire areas (planning file).

Table 147. Regional Forester's sensitive plants known occurrences within Wedge Canyon and Robert Fire action area.

	Species	Common Name	EO# *
Wedge Canyon	<i>Drosera anglica</i>	great sundew	24
	<i>Meesia triquetra</i>	three-angled thread moss	08
	<i>Scirpus cespitosus</i>	tufted clubrush	11
	<i>Scirpus subterminalis</i>	water bulrush	14
	<i>Scorpidium scorpioides</i>	scorpion feather moss	12
Robert	<i>Botrychium hesperium</i>	western moonwort	02, 06
	<i>Oxytropis campestris</i> var. <i>columbiana</i>	Columbia crazyweed	07

*EO = Element Occurrence numbers as assigned by the MNHP.

Known Occurrences within Fire Action Areas

Wedge Canyon Fire

Great sundew (*Drosera anglica*) is a carnivorous, herbaceous perennial. It is known from Alaska to California and Nevada, east to Idaho, Montana, Great Lake region, and eastern Canada (also in Eurasia). The MNHP Database reports 26 records in Montana with six occurrences on the Flathead NF. Plants are restricted to peatlands (fens) and are found in valleys and mid-elevations in the mountains from 945 to 2,750 meters (3,100 to 9,000 feet). Plants flower in July with fruit maturing from July to August.

Three-angled thread moss (*Meesia triquetra*) is a circumboreal moss and in North America occurs in Canada, Alaska, Oregon, Montana, California, Nevada, Michigan, New York and the New England area. Fifteen sites are known in Montana (Elliot and Spribille unpublished report), with three sites occurring within the Flathead NF. Plants are associated with rich fens, often indicating a well-preserved fen system. Plants also occur in other wetlands and wet woods that do not possess typical fen attributes from 1,150 to 1,525 meters (3,800 to 5,000 feet).

Tufted clubrush (*Scirpus cespitosus*) is an herbaceous perennial arising from short rhizomes. It is known from Alaska to Newfoundland, south to Georgia, Montana, Wyoming, Utah, Idaho, and Oregon. The MNHP database reports 14 occurrences in Montana with nine occurrences on the Flathead NF. Plants are found in shallow, fresh water and boggy pond margins, lakes, sloughs in the valley, foothill and montane zones between 976 to 1,402 meters (3,200 to 4,600 feet). Plants flower from late June through July with fruits maturing in August.

Water bulrush (*Scirpus subterminalis*) is an aquatic, rhizomatous perennial with stems that float along surface waters rather than emerge above the water line. It is known from Alaska to Newfoundland, south to Georgia, Montana, Wyoming, Utah, Idaho, and Oregon. The MNHP database reports 15 records in Montana with 4 occurrences on the Flathead National Forest. Plants also occur in shallow, fresh water and boggy margins of ponds, lakes, and sloughs in the valley, foothill, and montane zone from 880 to 1,830 meters (2,890 to 6,000 feet). Plants flower from late June through July, with fruits maturing in August.

Scorpion feather moss (*Scorpidium scorpioides*) is a moss occurring in British Columbia, Alberta, Alaska, Northwest Territories, Montana, Michigan, Ontario, Nova Scotia, New England and Ohio. There are 20 sites in Montana (Elliot and Spribille, unpublished report) with two recorded locations for the Flathead NF at Bent Flat Fen and Teepee Lake Fen. Plants occur in fens, seeps, with high mineral content, or sometimes submerged in lakes less than 20 feet deep at elevations ranging from 914 to 1,856 meters (3,000 to 6,090 feet).

Robert Fire

Western moonwort (*Botrychium hesperium*) is a perennial fern of primitive lineage. This species is known from Montana, Alberta, British Columbia, Ontario, Saskatchewan, Colorado, Idaho, Utah, Wyoming, and Michigan. The MNHP database reports 13 occurrences in Montana with seven on the Flathead NF. Plants are found in exposed, dry fields, gravelly floodplains, grassy mountain slopes, sand dunes, and roadsides from 975 to 2,500 meters (3,200 to 8,200 feet) in Montana. Leaves emerge in mid-spring with fronds maturing in June to July and dying back in early fall.

Columbia crazyweed (*Oxytropis campestris* var. *columbiana*) is an herbaceous perennial legume arising from a branched rootstock. This species is a regional endemic to northeast

Washington and the Flathead Lake area of Montana. The MNHP database reports six occurrences in Montana, with all but one location on the east shore of Flathead Lake. One occurrence along the North Fork Flathead River is reported for the Flathead NF. This occurrence's taxonomic identification is currently in question. Plants occur on lakeshores and gravelly bars along rivers, on rocky gravelly soil in open to partially shaded areas in valleys (i.e. dry meadows, talus slopes), and in areas with little soil and sparse vegetative cover between 884 to 1,888 meters (2,900 to 3,900 feet). Plants flower in late June through early August.

Potential Occurrences

A habitat suitability analysis was conducted to evaluate the potential for additional sensitive plants occurrences within the action areas. Sensitive plants species were grouped in nine different habitat guilds or groups: aquatic, fens and fen margins, other wetlands, riparian, moist cliffs, seeps and talus slopes, wet coniferous forest, upland coniferous forest, grasslands and forest openings, and alpine and subalpine. Sensitive species were assigned to one or more groups based on elevation, habitat descriptions from literature and element occurrence site forms, and associated species at known locations. These groups or guilds represent broad habitat associations occurring on the FNF and are used as a tool to evaluate potential habitat of sensitive plants within a project area.

Known vegetation types and elevation ranges of the action area were considered. Because the Robert and Wedge Canyon action areas contain all habitat guilds (aquatic, fens/fen margins, other wetlands, riparian, moist cliff/seeps/talus slopes, wet coniferous forest, upland coniferous forest grasslands and forest openings, and alpine/subalpine), there is potential for all sensitive plant species to occur within the action area. Although most of the areas proposed for activity have been burned, it is possible that some areas that escaped the fire within the project area will be affected by this action, therefore all species that can occur in both burned and unburned vegetation types are listed here. It is also important to note that some sensitive species may experience increased vigor as a result of fire due to increased nutrient availability (several plant nutrients such as phosphorus and nitrogen can become readily soluble in soil as a result of organic matter transformation from fire (Wright and Bailey 1982). This stimulating effect would only be the case for perennial plants with surviving perennating buds below the surface.

Table 148 displays the expected response to fire for species that have potential to occur within the action area.

Pale corydalis (*Corydalis sempervirens*) Pale corydalis is a showy herbaceous plant with basal rosettes appearing in early spring and flowering in July (pink and yellow flowers). It is known from Arkansas, British Columbia and northwest Montana, east to Newfoundland and Georgia. The MNHP database reports 6 occurrences in Montana where it is considered peripheral in its range distribution.

There is a high possibility that the sensitive plant, pale corydalis (*Corydalis sempervirens*), will emerge in the Robert and Wedge Canyon action areas in the growing seasons following these wildfires. This species is a fire dependent biennial/annual, occurring within one to two seasons (possibly three) following a fire. The species prefers disturbed sites, especially those with dry sunny exposures. Plants develop after recent burns, as seeds are dependent on heat treatments for germination. Plants grow and reproduce for a few years after a fire, and then live only as seeds in the soil awaiting the next fire event.

During the 2002 sensitive plant surveys following the Moose Fire in 2001 (also in the North Fork Flathead drainage), pale corydalis was located in several areas adjacent to roads and

stream crossings within the fire area both on the Flathead NF and in Glacier National Park. Specifically, the Flathead NF located five occurrences on the Flathead NF following the Moose 2001 Fire.

Within the Moose Fire some plants behaved as annuals, bolting and flowering in the first season of growth. Plants functioned as biennials, having basal rosettes with some plants producing flowers and setting seed in the first year. The majority of plants over-winter during the first year as basal rosettes and then flower and seed in year two (personal observations). The potential for plants to persist and emerge for a third post-fire season is unknown.

Table 148. Estimations of post-fire survivorship of Regional Forester's sensitive plant species with potential habitat in the project area based on root morphology.

Scientific name	Root System	Probability of surviving fire disturbance
<i>Amerorchis rotundifolia</i>	rhizomatous with fleshy rootstocks	good to poor depending on fire severity and soil saturation
<i>Astragalus lackschewitzii</i>	taproot	good, depending on severity. Grows on alpine, open, gravelly sites that are less likely to burn at high intensities (low fuels)
<i>Bidens beckii</i>	rhizomes	grows in aquatic habitat, survival likely high
<i>Botrychium ascendens</i>	unbranched fleshy roots	good to poor depending on fire severity and soil saturation
<i>Botrychium crenulatum</i>	unbranched fleshy roots	good to poor depending on fire severity and soil saturation
<i>Botrychium hesperium</i>	unbranched fleshy roots	good to poor depending on severity. Grows on gravelly sites that are less likely to burn (low fuels)
<i>Botrychium montanum</i>	unbranched fleshy roots	poor, these sites are typically dry during burning season and have high litter duff component
<i>Botrychium paradoxum</i>	unbranched fleshy roots	good to poor depending on fire severity and soil saturation
<i>Brasenia schreberi</i>	slender rootstocks with thick gelatinous sheath	grows in aquatic habitat, survival likely high
<i>Carex chordorrhiza</i>	rhizomes	grows in very wet sites, survival likely high
<i>Carex livida</i>	rhizomes	grows in very wet sites, survival likely high
<i>Carex paupercula</i>	short to long rhizomes	grows in very wet sites, survival likely high
<i>Carex rostrata</i>	rhizome	grows in very wet sites, survival likely high
<i>Cetraria subalpina</i>	lichen on ericaceous shrub stems and tree trunks	no survival if consumed

Scientific name	Root System	Probability of surviving fire disturbance
<i>Collema curtisporum</i>	trunk lichen	no survival if consumed
<i>Corydalis sempervirens</i>	annual/biennial with fibrous roots	excellent. This is a fire dependent species that only reproduces via on-site seed after fire.
<i>Cypripedium fasciculatum</i>	short rhizomes	low, main root system above mineral soil in duff
<i>Cypripedium parviflorum</i>	short rhizomes	good to poor depending on fire severity and soil saturation
<i>Cypripedium passerinum</i>	short rhizomes	good to poor depending on fire severity and soil saturation
<i>Diphasiastrum sitchense</i>	slender, above-ground or slightly buried, rooting, horizontal stems	low if consumed, but growing sites are usually rocky with low fuel levels
<i>Drosera anglica</i>	shallow taproot	good to poor depending on fire severity and soil saturation, root system shallow only used for support of plant not nutrient uptake)
<i>Drosera linearis</i>	shallow taproot	good to poor depending on fire severity and soil saturation, root system shallow only used for support of plant not nutrient uptake)
<i>Dryopteris cristata</i>	short rhizomes	grows in very wet sites, survival likely high
<i>Eleocharis rostellata</i>	rhizomes	grows in very wet sites, survival likely high
<i>Epipactis gigantean</i>	rhizomes	grows in very wet sites, survival likely high
<i>Erigeron lackschewitzii</i>	taproot	good, depending on severity. Grows on alpine, open, or gravelly sites that are less likely to burn at high intensities (low fuels)
<i>Eriophorum gracile</i>	slender rhizomes	grows in very wet sites, survival likely high
<i>Grimmia brittoniae</i>	moss	mortality high if moss desiccated
<i>Grindelia howellii</i>	taproot	high. this is a disturbance oriented species
<i>Heteranthera dubia</i>	perennial, root at nodes	grows in aquatic habitat, survival likely high
<i>Idahoia scapigera</i>	annual	plants desiccated and only seeds present during fire season. Survival unknown
<i>Kalmia polifoila</i>	short rhizomes	good to poor; plants grow in wet sites
<i>Lathyrus bijugatus</i>	rhizomes	high, unless severely burned
<i>Liparis loeselii</i>	bulb-like base	good to poor depending on fire severity and soil saturation
<i>Lycopodiella inundata</i>	shallow roots	plants desiccated and only seeds present during fire season. Survival unknown

Scientific name	Root System	Probability of surviving fire disturbance
<i>Lycopodium dendroideum</i>	deep underground rhizomes	good to poor depending on severity
<i>Meesia triquetra</i>	shallow root-like rhizoids	good to poor; plants grow in wet sites
<i>Mimulus patulus subsp. montanus</i>	annual	plants desiccated and only seeds present during fire season. Survival unknown
<i>Ophioglossum pusillum</i>	unbranched fleshy roots	good to poor; plants grow in w'et sites
<i>Oxytropis campestris var. columbiana</i>	woody rhizomes	good to poor depending on severity. Grows on gravelly sites that are less likely to burn (low fuels)
<i>Oxytropis podocarpa</i>	taproot	good, depending on severity. Grows on alpine, open, gravelly sites that are less likely to burn at high intensities (low fuels)
<i>Petasites fragilis var. nivalis</i>	rhizomes	good to poor depending on severity
<i>Phegopteris connectilis</i>	long rhizomes	good to poor depending on severity
<i>Polygonum douglasii ssp austinae</i>	annual	plants desiccated and only seeds present during fire season. Survival unknown
<i>Potamogeton obtusifolius</i>	rhizomes	grows in aquatic habitat, survival likely high
<i>Potentilla quinquefolia</i>	short rootstock	Good, depending on severity. Grows on alpine, open, gravelly sites that are less likely to burn at high intensities (low fuels)
<i>Salix barrattiana</i>	branching roots	good, depending on severity. Grows on alpine and wet sites that are less likely to burn at high intensities (low fuels)
<i>Scheuchzeria palustris</i>	rhizomes	good to poor; plants grows in wet sites
<i>Scirpus cespitosus</i>	tufted culms with fibrous roots	good to poor; plants grows in wet sites
<i>Scirpus subterminalis</i>	rhizomes	grows in aquatic habitat, survival likely high
<i>Scorpidium scorpioides</i>	shallow root-like rhizoids	good to poor; plants grow in wet sites
<i>Utricularia intermedia</i>	no true root system	good to poor depending on fire severity and soil saturation
<i>Viola renifolia</i>	rhizomes	grows in very wet sites, survival likely high
Proposed for additions to 2004 Regional Forester's sensitive list		
<i>Botrychium pedunculatum</i>	unbranched fleshy roots	good to poor depending on fire severity and soil saturation

Scientific name	Root System	Probability of surviving fire disturbance
<i>Carex lacustris</i>	rhizomes	grows in very wet sites, survival likely high
<i>Heterocodon rariflorum</i>	annual	plants desiccated and only seeds present during fire season. Survival unknown
<i>Castilleja cervina</i>	branched root crown	good to poor depending on fire severity and soil saturation
<i>Mimulus breviflous</i>	annual	plants desiccated and only seeds present during fire season. Survival unknown
<i>Rhizomnium nudum</i>	shallow root-like rhizoids	good to poor; plants grow in wet sites
<i>Viola selkirkii</i>	rhizomes	grows in very wet sites, survival likely high

3.8.3 Environmental Consequences: Robert and Wedge Fires

Alternative 1 – No Action

There would be no ground disturbance associated with this activity in the no action alternative, therefore no effects to federally threatened or Regional Forester’s sensitive plants would result.

Alternative 2 – Proposed Action

Threatened and Endangered plant species

There are no federally listed endangered plants in Montana. In addition, analysis of existing conditions determined that there are no known occurrences or suitable habitat for federally threatened water howellia (*Howellia aquatilis*) and Spalding’s catchfly (*Silene spaldingii*) within the project area. The proposed Robert-Wedge Post-Fire Project would have no effect on either of these species.

Regional Forester’s Sensitive Plants

Direct Effects and Indirect Effects

Known Occurrences

Wedge Fire

Known occurrences of great sundew (*Drosera anglica*), three-angled thread moss (*Meesia triquetra*), tufted club brush (*Scirpus cespitosus*), water bulrush (*Scirpus subterminalis*), and scorpion feather moss (*Scorpidium scorpioides*) are all wetland, riparian, or wet habitat associated plants occurring within the Wedge Canyon Fire perimeter. These occurrences are not located within treatment units. No activity is proposed from within 300 feet of the wetlands associated with these occurrences. Consequently, no direct effects to these occurrences are expected. These occurrences may experience indirect effects from potential noxious or invasive weed expansion. Indirect effects to these occurrences resulting from this proposed salvage would occur if weeds were established in a treatment site due to project activities and then expanded to these known occurrences. Noxious weeds could compete for light and nutrients and possibly alter vegetation composition in these wetlands. The noxious

weed with the greatest potential to alter wetland habitats is reed canary grass (*Phalaris arundinacea*). Other noxious weeds more commonly occupy disturbed habitats that favor weed expansion.

Robert Fire

Western moonwort (*Botrychium hesperium*) occurs along two locations on the North Fork Road (486) within the Robert Fire perimeter (Element Occurrence # 02, 06- Appendix D). No direct effects to this occurrence are expected, as no units are proposed for treatment at this sensitive species location. Increased traffic may occur near the western moonwort occurrence as a result of project implementation during non-winter months. Plants may experience indirect effects of increased dust accumulation, potentially clogging stomatal pores and inhibiting photosynthesis. However, several other western moonwort occurrences located along the North Fork Road, that currently receive regular recreation traffic use, have demonstrated continued existence at these disturbed sites. There are 13 occurrences in Montana and 7 on the FNF, with population numbers ranging from 1 to over 1000 plants. The western moonwort occurrence in the Robert Fire perimeter has over 1000 plants at EO# 02 and about 20 plants at EO# 06. The potential indirect effects to these occurrences are expected to contribute minimally to the continued existence of this sensitive on the FNF.

Columbia crazyweed (*Oxytropis campestris* var. *columbiana*) occurs on the east side of the North Fork Road (486) within the Robert Fire perimeter. This occurrence is over 1000 feet from a road and over 0.5 miles from the nearest treatment unit (314). Consequently, no direct or indirect effects to this occurrence are expected.

Potential occurrences

New locations for pale corydalis (*Corydalis sempervirens*) within the proposed project area are highly probable. Occurrences located during the upcoming 2004 field season will be flagged with a protection buffer to include the extent of the existing occurrence and the potential habitat for dispersal in the immediate vicinity, as determined by the Forest Botanist. Ground disturbance will be avoided at known locations during project implementation for those treatments occurring during the active growing period of plants (spring, summer, and fall months). Plants will be permitted to complete its life cycle (germinate, bolt, flower, and set seed) prior to ground disturbing activities. This life cycle process may require up to two to three years (see species account above), after which plants will die and the population will remain dormant as seeds, until the next fire event.

For those occurrences that are not located during surveys, the proposed project may directly affect new occurrences by trampling of plants and disturbing the surrounding soils. Occurrences located during project implementation will be reported to the Forest Botanist and Project Operations Leader and appropriate mitigation measures will be applied to the new location.

No direct effects are expected for those plants located in units proposed for winter treatments, as plants will be protected under compacted snow.

The proposed project will have indirect effects on pale corydalis if occurrences are disturbed and not permitted to flower and set seed. Failure for plants to set seed may result in decreased population viability following future fire events.

Other potentially occurring sensitive species

Because the Robert and Wedge Canyon action areas contain all habitat guilds (aquatic, fens/fen margins, other wetlands, riparian, moist cliff/seeps/talus slopes, wet coniferous

forest, upland coniferous forest grasslands and forest openings, and alpine/subalpine), there is potential for all sensitive plant species to occur within the action area. Occurrences located during 2004 project surveys will be flagged and appropriate mitigation measures will be applied for the occurrence; depending on site location, species life history requirements, and treatments proposed.

For those potentially occurring Regional Forester's sensitive plants and proposed sensitive plants listed for the FNF the direct, indirect, and cumulative effects for undetected occurrences are unknown and can only be speculative due to lack of known locations. In treatment units occurring during periods without snow compaction, undetected occurrences may experience mechanical compaction, noxious weed competition / displacement, roadside dusting, and hydrology alteration due to salvage activities. Undetected annual plants disturbed prior to seed set may experience decrease population viability in subsequent years, due to a reduction of the seed bank. Perennial plants may experience ground disturbance to rootstocks (rhizomes, taproots, bulbs, corymbs), potentially inhibiting the plants ability to resprout from rootstock.

Cumulative effects

Past activities such as road construction, timber extraction, dispersed recreation, and other development has occurred within the proposed Robert-Wedge Post-Fire Project. Past, present, and foreseeable actions within the action area (federal and nonfederal) include timber harvesting, land development, road construction and maintenance, dispersed recreation, noxious weed control, and fire suppression. These actions may have historically affected Regional Forester's sensitive plants and may continue to have effects.

Timber harvesting, fire suppression, and development

Timber harvesting, road construction, and development may alter the hydrologic processes for sensitive plants of wetland-associated habitat groups (See Table 149 - aquatic, fens and fen margins, riparian, and wet coniferous forest). Changes to the hydrologic processes at wetlands may result in both a decrease and increase of wetland water levels. Timber harvesting and development often decreases canopy cover and in consequence may decrease evapotranspiration rates of surrounding upland trees. This may result in increased inundation of wetlands from runoff. Also, increased canopy openings near ponds may increase evaporation of the wetlands, effectively reducing water levels earlier in the growing season.

For non-wetland associated sensitive plants, timber harvesting often increases light level to the understory. This may be a beneficial effect for some sensitive plants, but may have adverse effects for other rare plants requiring greater canopy cover (e.g. clustered lady's-slipper). In many cases, timber harvest creates stand changes not unlike that of naturally occurring fires; however, the pattern and distribution of forest size classes has drastically shifted from patterns that were created under natural disturbance regimes. Today forest stands are far more fragmented in the landscape in reference to forest structure and size class. Also, fire suppression has created a more dense understory condition in many un-harvested stands where historically, low intensity understory fires occurred regularly. These fires that have been eliminated from the understory played a role in reducing fuels and encroaching vegetation (USDA FS 1998). Fire suppression resulting in closed-canopy may have effects of reduced light levels to sensitive plants in the understory.

No effects to known occurrences resulted from fire suppression related activities from the 2003 wildfires (USDA FS 2003a, USDA FS 2003b). All known locations were avoided during suppression activities.

Table 149. Habitat groups for sensitive species on the Flathead National Forest.

AQUATIC	MOIST CLIFFS, SEEPS & TALUS SLOPES
<i>Bidens beckii</i>	<i>Grimmia brittoniae</i> (moss)
<i>Brasenia schreberi</i>	<i>Heterocodon rariflorum</i> **
<i>Heteranthera dubia</i>	<i>Idahoia scapigera</i>
<i>Potamogeton obtusifolius</i>	<i>Mimulus breviflous</i> **
<i>Scirpus subterminalis</i>	<i>Mimulus patulus</i>
<i>Utricularia intermedia</i>	<i>Phegopteris connectilis</i>
	<i>Rhizomnium nudum</i> **
FENS & FEN MARGINS*	
<i>Amerorchis rotundifolia</i>	WET CONIFEROUS FOREST*
<i>Carex lacustris</i> **	(not associated with surface water)
<i>Carex livida</i>	<i>Amerorchis rotundifolia</i>
<i>Carex paupercula</i>	<i>Botrychium crenulatum</i>
<i>Carex rostrata</i>	<i>Botrychium montanum</i>
<i>Collema curtisporum</i> (lichen)	<i>Botrychium pendunculolum</i> **
<i>Cypripedium parviflorum</i>	<i>Carex paupercula</i>
<i>Cypripedium passerinum</i>	<i>Collema curtisporum</i> (lichen)
<i>Drosera anglica</i>	<i>Cypripedium parviflorum</i>
<i>Drosera linearis</i>	<i>Cypripedium passerinum</i>
<i>Dryopteris cristata</i>	<i>Dryopteris cristata</i>
<i>Eleocharis rostellata</i>	<i>Epipactis gigantean</i>
<i>Epipactis gigantean</i>	<i>Petasites frigidus</i> var. <i>navalis</i>
<i>Eriophorum gracile</i>	<i>Viola selkirkii</i> **
<i>Kalmia polifolia</i>	<i>Viola renifolia</i>
<i>Liparis loeselii</i>	
<i>Lycopodiella inundata</i>	UPLAND CONIFEROUS FOREST
<i>Meesia triquetra</i> (moss)	<i>Botrychium crenulatum</i>
<i>Scirpus cespitosus</i>	<i>Botrychium hesperium</i>
<i>Scorpidium scorpoides</i> (moss)	<i>Botrychium montanum</i>
<i>Viola renifolia</i>	<i>Cetraria subalpina</i> (lichen)
	<i>Corydalis sempervirens</i>
OTHER WETLANDS	<i>Cypripedium fasciculatum</i>
(marshes/wet meadows)	<i>Diphasiastrum sitchense</i>
<i>Botrychium crenulatum</i>	<i>Lathyrus bijugatus</i>
<i>Botrychium pendunculolum</i> **	<i>Lycopodium dendroideum</i>
<i>Carex chordorrhiza</i>	<i>Polygonum douglasii</i> ssp. <i>austinae</i>
<i>Carex lacustris</i> **	
<i>Heterocodon rariflorum</i> **	GRASSLANDS & FOREST OPENINGS (non-wetland)
<i>Ophioglossum pusillum</i>	<i>Botrychium ascendens</i>
<i>Scheuchzeria palustris</i>	<i>Botrychium crenulatum</i>
	<i>Botrychium hesperium</i>
RIPARIAN	<i>Botrychium paradoxum</i>

(adjacent to flowing or stagnant surface water)	<i>Castilleja cervina</i> **
<i>Amerorchis rotundifolia</i>	<i>Corydalis sempervirens</i>
<i>Botrychium ascendens</i>	<i>Grindelia howellii</i>
<i>Botrychium crenulatum</i>	<i>Lathyrus bijugatus</i>
<i>Botrychium hesperium</i>	Mimulus breviflous**
<i>Botrychium pendunculosum</i> **	<i>Polygonum douglasii ssp. austinae</i>
<i>Carex paupercula</i>	
<i>Collema curtisporum</i> (lichen)	ALPINE & SUBALPINE
<i>Cypripedium parviflorum</i>	<i>Astragalus lackschewitzii</i>
<i>Cypripedium passerinum</i>	<i>Botrychium spp.</i>
<i>Dryopteris cristata</i>	<i>Cetraria subalpina</i> (lichen)
<i>Epipactis gigantean</i>	<i>Diphasiastrum sitchense</i>
<i>Heterocodon rariflorum</i> **	<i>Erigeron lackschewitzii</i>
<i>Mimulus patulus</i>	<i>Oxytropis podocarpa</i>
<i>Oxytropis campestris var. columbiana</i>	<i>Potentilla quinquefolia</i>
<i>Petasites frigidus var. nivalis</i>	<i>Salix barrattiana</i>
<i>Phegopteris connectilis</i>	
<i>Rhizomnium nudum</i> **	** Proposed for additions to 2004 Regional Forester's sensitive list
<i>Salix barrattiana</i>	
<i>Viola selkirkii</i> **	
<i>Viola renifolia</i>	

* Wet coniferous forests and fen margins are areas with an organic substrate and a very shallow water table. These forests are commonly found adjacent to fens and act as an ecotone between the fen and adjacent upland forest. The two main forest types representing this habitat are: *Picea engelmannii/Equisetum arvense*, *Picea engelmannii/Lysichiton americanus*.

Roads

Past, present, and future maintenance of the roads have both adverse and positive cumulative effects on documented and potentially occurring roadside sensitive plant populations. Disturbance of roadsides may benefit those sensitive species that have a competitive edge in disturbed environments (Howell's gumweed, pink corydalis, Austin's knotweed, and western moonwort) and temporarily adversely affect these populations until new seedlings establish in the openings. Maintenance of roads may increase traffic along these roads and thus increase potential for disturbance of plant populations adjacent to roads. Road construction and maintenance may also affect wetland habitats. It is possible that past (and future) road construction may have affected ground water and sediment flow in some wetlands. Increased siltation may result in shifts in the wetland vegetation composition, supporting emergent vegetation in place of submergent vegetation types (USDI 1996). Timber harvesting and development may also contribute to these same effects to wetland plants.

A Burned Areas Road Maintenance Project is proposed to occur within the fire areas over the next several years. A Sensitive Plant Biological Evaluation was completed for this project

and determined that sensitive plants may be affected from the road maintenance project, but these potential effects would not likely contribute to a trend towards federal listing or cause a loss of viability for all potentially occurring species on the FNF.

Recreation

Trails and other areas frequented by recreationists may contribute to the cumulative effects to sensitive plants. Trail construction/maintenance near wetlands may affect sensitive wetland plants by increased siltation into wetlands or the dispersal of noxious weed seeds from human vectors. However, most recreationists are reluctant to tread in the mucky waters of wetlands. Non-wetland plants may experience cumulative effects of trampling and collecting from dispersed recreation.

Commercial and personal use morel mushroom harvesting is expected to occur during the 2004 spring/summer season. Post-fire mushroom harvesting throughout the fire areas will be dispersed so that no significant trampling would occur at one site. Minor to moderate amounts of trampling may occur at sensitive plant locations. These effects are expected to be localized, and of low to moderate intensity and, depending on the intensity, of short to moderate duration.

Chemical control

Sensitive plants adjacent to areas of chemical weed control may be at risk of exposure to chemicals used in weed control. However on the FNF, sensitive plant surveys are conducted for each site (not previously treated) prior to all chemical control treatments as required by the FNF Noxious Weed and Invasive Weed Control Decision Notice and Finding of No Significant Impact (USDA Forest Service, 2001a). With the exception of some sensitive plants that occur in “disturbed” environments (Howell's gumweed, pink corydalis, Austin's knotweed, and western moonwort) noxious weeds do not persist with rare plants due to differing habitat requirements. Weed control on State and private lands may have adverse effects to plant viability for these plants that occupy disturbed habitats that may favor weed establishment.

Spread of noxious weeds resulting from suppression activities, recreation, and this proposed salvage project has the greatest potential for cumulative effects on known and potentially occurring sensitive plant populations. Areas within the fire perimeter will actively be monitored for invasive weeds and active management of weeds would occur in compliance with the FNF Noxious Weed and Invasive Weed Control Decision Notice and Finding of No Significant Impact (USDA Forest Service, 2001a). In addition, project design criteria for the Robert-Wedge Post-Fire project will mitigate this potential impact.

Summary of Effects

The proposed Robert-Wedge Post-Fire project is expected to have no direct effects on any known occurrences of Regional Forester's sensitive plants, and indirect effects are expected to be minimal (Table 150). All ground-disturbing activities from the on-set of the FNF Botany Program, since 1990, have been analyzed for effects to threatened, endangered, and sensitive plants. In addition, all foreseeable federal actions within the project area are required to be evaluated for impacts to threatened, endangered, and sensitive plant species. Foreseeable actions would be modified to mitigate anticipated impacts resulting from foreseeable action as required by Forest Service policy (FSM 2670). Due to the small scope of direct and indirect effects and the measures proposed to control noxious weeds, cumulative effects of the project on known occurrences are expected to contribute minimally to the total

effects. The cumulative effects on unknown occurrences can only be speculative due to lack of known locations.

The total of the direct and indirect effects from the proposed Robert-Wedge Post-Fire project and the contributing cumulative effects from past, present and reasonably foreseeable future actions would not likely reach thresholds where Regional Forester’s sensitive plants could not maintain their ability to survive in the North Fork Flathead drainage.

Table 150. Summary of direct and indirect effects on known occurrences of sensitive plants.

Known occurrences	Common Name	Direct effects	Indirect effects
Robert Fire – known occurrences within the action area			
<i>Drosera anglica</i>	great sundew	None	Invasive weed competition
<i>Meesia triquetra</i>	three-angled thread moss	None	Invasive weed competition
<i>Scirpus cespitosus</i>	tufted clubrush	None	Invasive weed competition
<i>Scirpus subterminalis</i>	water bulrush	None	Invasive weed competition
<i>Scorpidium scorpioides</i>	scorpion feather moss	None	Invasive weed competition
Wedge Fire – known occurrences within the action area			
<i>Botrychium hesperium</i>	western moonwort	None	Dust accumulation inhibiting photosynthesis Invasive weed competition
<i>Oxytropis campestris</i> var. <i>columbiana</i>	Columbia crazyweed	None	Invasive weed competition

The proposed Robert-Wedge Post-Fire Project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for great sundew (*Drosera anglica*), three-angled thread moss (*Meesia triquetra*), tufted clubrush (*Scirpus cespitosus*), water bulrush (*Scirpus subterminalis*), scorpion feather moss (*Scorpidium scorpioides*), western moonwort (*Botrychium hesperium*), Columbia crazyweed (*Oxytropis campestris* var. *columbiana*) and other potentially occurring Regional Forester’s sensitive plant species and proposed plant species. This is based on the, 1) lack of direct effects to known sensitive plant occurrences within the project area; 2) presence of habitat for potentially occurring sensitive plants within the project area; 3) the potential for indirect effects of noxious weed competition; 4) delineation and exclusion of riparian areas and wetlands from the proposed action areas; and 5) the delineation of new occurrences located prior to project implementation.

3.8.4 Regulatory Framework and Consistency

Threatened or endangered status affords a species and its habitat special protection from adverse effects resulting from federally authorized or funded projects. It is the responsibility of the Forest Service to design activities that contribute to the recovery of listed species in

accordance with recovery plans developed as directed by the Endangered Species Act (ESA) (50 CFR part 402). The Flathead National Forest's Amendment 20 to the Land Resource Management Plan (LRMP) provides for conservation measures to ensure the protection of water howellia. Amendment 21 to the LRMP has a goal to "provide sufficient habitat to promote the recovery of threatened and endangered species and conserve the ecosystems upon which they depend."

Federal laws and direction applicable to sensitive species include the National Forest Management Act (NFMA 1976) and Forest Service Manual 2670. Amendment 21 to the Forest Plan has standards to conduct analyses to review programs and activities, to determine their potential effect on sensitive species, and to prepare a Biological Evaluation (Project File). It also states "*adverse impacts to sensitive species or their habitats should be avoided. If impacts cannot be avoided, the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole will be analyzed. Project decisions will not result in loss of species viability or create significant trends towards federal listing.*" Future conservation strategies for each species will present direction on maintaining habitat diversity and managing for population viability, as required by the NFMA and Forest Plan Amendment 21. The Forest Service is bound by Federal statutes (ESA, NFMA Act), regulations (USDA 9500-4) and agency policy (FSM 2670) to conserve biological diversity on NFS lands. A goal in Forest Plan Amendment 21 is to "*ensure that Forest Service actions do not contribute to the loss of viability of native species.*"

The Robert-Wedge Post-Fire Project proposed action will meet the direction of Forest Service Manual 2670.3 (sensitive plant species) and is consistent with the Forest Plan direction for sensitive plants. In addition, the proposed project is also in compliance with ESA and FNF LRMP Amendments 20 and 21, with respect to federally listed plants.

3.9 Invasive Plant Species

3.9.1 Introduction

The fire perimeters for both the Robert and Wedge Canyon fires formed the analysis area for evaluating the effects from the Robert-Wedge Post-Fire Project on noxious weeds. All proposed actions that would measurably influence noxious or invasive weed species under all alternatives are within this analysis area, which totals 37,358 acres (13,270 acres in Robert and 24,088 acres in Wedge Canyon).

Noxious weeds and invasive plant species can pose serious threats to the composition, structure, and function of native plant communities (Olson 1999). Invasive plant species are non-native plants that can inhabit and negatively alter native plant communities. A number of these invasive species are legally recognized as noxious weeds, meaning laws have been developed to restrict their spread and effect on the environment.

A weed risk assessment project for the Western Montana Planning Zone of the U.S. Forest Service (USDA FS 2003) provided the methodology to analyze weed risk. The project record contains a draft of this assessment.

Other information sources are cited in the text and are listed in the reference section.

3.9.2 Affected Environment: Robert Fire and Wedge Canyon Fire

Invasive Species of Concern

The Robert-Wedge Post-Fire Project area is entirely within Flathead County. In accordance with the County Noxious Weed Control Act, Flathead County has adopted the Montana State Noxious Weed list and designated a county noxious weed list. In addition, a recent weed risk assessment (WRA) project in the Northern Region of the U.S. Forest Service (USDA FS 2003) identified additional species that pose a threat to native vegetation. After assessing those species recognized by Montana Department of Agriculture, Flathead County, and the USDA Forest Service, a list was compiled of species of greatest concern with regards to impacts on ecosystem integrity for the Robert-Wedge Post-Fire Project area (Table 151 and Table 152).

Table 151. Invasive plant species known and established in the project area prior to the fires.

Scientific Name ²	Common Name	WRA Species	State/County Listed Noxious Weed Category
<i>Artemisia absinthium</i>	wormwood		
<i>Bromus tectorum</i>	cheatgrass	x	
<i>Centaurea biebersteinii</i> (<i>C. maculosa</i>)	spotted knapweed	x	1
<i>Cirsium arvense</i>	Canada thistle	x	1
<i>Cirsium vulgare</i>	bull thistle		
<i>Cynoglossum officinale</i>	hound's-tongue	x	1
<i>Elymus repens</i>	quackgrass	x	
<i>Euphorbia esula</i>	leafy spurge	x	1
<i>Hieracium aurantiacum</i>	orange hawkweed	x	2
Meadow/Yellow Hawkweed Complex (<i>Hieracium caespitosum</i> , <i>H. pratense</i> , <i>H. floribundum</i> , <i>H. piloselloides</i>)	meadow hawkweed complex	x	2
<i>Hypericum perforatum</i>	common St. John's-wort	x	1
<i>Leucanthemum vulgare</i> (<i>C. leucanthemum</i>)	ox-eye daisy		1
<i>Linaria dalmatica</i>	Dalmation toadflax	x	1
<i>Linaria vulgaris</i>	yellow toadflax	x	
<i>Melilotus officinalis</i>	yellow sweetclover	x	
<i>Phalaris arundinacea</i>	reed canarygrass	x	
<i>Potentilla recta</i>	sulphur cinquefoil	x	1
<i>Ranunculus acris</i>	tall buttercup	x	2

² Nomenclature follows USDA NRCS 1999.

Scientific Name ²	Common Name	WRA Species	State/County Listed Noxious Weed Category
<i>Senecio jacobaea</i>	tansy ragwort		2
<i>Tanacetum vulgare</i>	common tansy	x	1

Weed risk assessment (WRA species are those that can cause major impacts to ecosystem integrity (USDA Forest Service 2003))

Montana Department of Agriculture Noxious weed categories

Category 1 is defined as noxious weeds that are currently established and generally widespread in many counties of the state. Management criteria include awareness and education, containment and suppression of existing infestations and prevention of new infestations. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses.

Category 2 is defined as noxious weeds that have recently been introduced into the state or are rapidly spreading from their current infestation sites. These weeds are capable of rapid spread and invasion of lands, rendering lands unfit for beneficial uses. Management criteria include awareness and education, monitoring and containment of known infestations and eradication where possible.

Category 3 is defined as noxious weeds that have not been detected in the state or may be found only in small, scattered, localized infestations. Management criteria include awareness and education, early detection and immediate action to eradicate infestations. These weeds are known pests in nearby states and are capable of rapid spread and render land unfit for beneficial uses.

Table 152. Invasive plant species with potential to become established as a result of the fires.

Scientific Name ³	Common Name	WRA Species	State/County Listed Noxious Weed Category
<i>Acroptilon repens</i> (<i>C. repens</i>)	Russian knapweed	x	1
<i>Campanula rapunculoides</i>	creeping bellflower		Flathead *
<i>Cardaria draba</i>	hoary cress	x	1
<i>Centaurea diffusa</i>	diffuse knapweed	x	1
<i>Centaurea solstitialis</i>	yellow starthistle	x	3
<i>Chondrilla juncea</i>	rush skeletonweed	x	3
<i>Convolvulus arvensis</i>	field bindweed		1
<i>Crupina vulgaris</i>	common crupina	x	3
<i>Isatis tinctoria</i>	dyer's woad	x	2
<i>Lythrum salicaria</i>	purple loosestrife	x	2
<i>Matricaria inodora</i>	scentless chamomile		Flathead *
<i>Myriophyllum spicatum</i>	Eurasian water milfoil	x	
<i>Sonchus spp.</i>	perennial sowthistle	x	

³ Nomenclature follows USDA NRCS 1999.

Scientific Name ³	Common Name	WRA Species	State/County Listed Noxious Weed Category
<i>Tamarix spp.</i>	salt cedar or tamarisk	x	2
<i>Veronica officinalis</i>	common speedwell	x	
<i>Lepidium latifolium</i>	perennial pepperweed		2

*** Flathead County additions to the Montana State Noxious Weed list**

WRA species are those that can cause major impacts to ecosystem integrity (USDA FS 2003)

Pre-Burn Conditions

Inventories for various projects (e.g., timber stand exams, grizzly bear habitat mapping, sensitive plant surveys, post-fire Burned Area Emergency Response assessments) within the project area have occurred through the years. These inventories provide us with the following observations regarding weed distribution in the analysis area.

The most abundant and widely distributed noxious weed species is spotted knapweed. This species occurs along most of the road systems, in gravel pits, and in other disturbed sites. Canada thistle is common as well in previously disturbed riparian areas and wet meadows. Common St. John’s wort (goatweed) can be found along most road systems in the Robert fire perimeter. Tall buttercup, a recently listed noxious weed, has been invading wet meadows in the vicinity of Polebridge, just south of the Wedge Canyon fire perimeter, and has caused substantial impacts to the mesic (moderately moist) native plant communities there. Not as abundant, but of great concern, are orange and meadow hawkweed. Orange hawkweed is a problem along road shoulders in scattered populations throughout the area.

Some roads, portions of roads, and other disturbed areas remain weed free in the analysis area.

In addition, some areas within the analysis area have received treatments to control noxious weed infestations (Table 153).

Table 153. On-going weed management within the Robert-Wedge Canyon fire areas.

Species Targeted	Year First Treated	Location(s) Treated
Robert Fire		
Spotted knapweed	1994	Glacier Institute**, All river access sites
ox-eye daisy	1994	Glacier Institute*, All river access sites
St. John’s wort	1994	Glacier Institute*, All river access sites
wormwood	1994	Glacier Institute*, All river access sites
Dalmation toadflax	1994	Glacier Institute*, All river access sites, Rd. 1690 gravel pit
tansy ragwort	2003	Moose Fire area*
Wedge Canyon Fire		
Spotted knapweed	1994	Moran meadows
ox-eye daisy	1994	Moran meadows
St. john’s-wort	1994	Moran meadows
hound’s-tongue	1994	Moran meadows

Dalmation toadflax	1994	Moran meadows
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***These areas are outside of but close to the fire perimeter.**

Post-Burn Conditions

To better understand the possible effects of fire on the future weed populations in the burn, we made some generalizations based on well-documented research (Fire Effects Information System 2004).

Plant response to fire depends on many factors. Each species must be assessed individually due to the great degree of variation in life history, morphology, phenology, ecology, and reproductive biology. Another key factor in assessing the weed response to fire is the severity of the burn, or how hot the soil gets during the fire, which influences plant root mortality of pre-existing plants and how well seeds sprout. Following are some summarized notes on response to fire for the key species (widespread invaders) in the burned area taken from the USDA Forest Service's Fire Effects Information Database and from The Nature Conservancy's Stewardship abstracts database.

Spotted knapweed – Often dense stands of knapweed have little surrounding vegetation, possibly because they release chemicals that inhibit the growth of competing plants, and they are less susceptible to fire. Litter from the previous year's stems often decays or scatters during the current season, but it may accumulate in very dense stands and create more favorable burning conditions. Spotted knapweed probably resists low-severity fire because of its stout taproot. It also most likely colonizes after fire from seeds buried in soil or from off-site sources. What we observed in the Robert-Wedge Post-Fire Project area was that knapweed often grew in disturbed areas where there was a high bare soil component and few fuels. This being the case, the fire often did not kill plants.

Canada thistle - Response to fire varies from positive to negative, depending on season of burn, soil moisture, and location. Dormant season burning stimulates growth of native herbaceous species that compete with Canada thistle. Growing season fire damages native species as well as Canada thistle. After top-kill, plants resume growth from buds located on the roots. Canada thistle grows in moist areas. Those areas that did not burn intensely in the Robert-Wedge Post-Fire Project area can expect vigorous sprouting of thistle in known infestations.

Orange and yellow hawkweed - Exotic hawkweeds (*Hieracium* spp.) are creeping perennial, stoloniferous and rhizomatous herbs with shallow fibrous roots. Exotic hawkweeds can rapidly colonize and dominate a site because they possess a wide range of highly successful reproductive strategies. Those reproductive strategies include seeds, rhizomes, stolons and adventitious buds. Most new infestations are started by seeds, while expansion of established populations is primarily through vegetative spread. Once established, hawkweeds quickly develop into a solid mat of rosettes that rapidly expand until they dominate the site. Within the Robert and Wedge Fires hawkweeds had set seed prior to the ignition of these fires. Dormant seeds will establish in moist, well-drained, acidic, coarse-textured soils that are low in organic materials, at an elevation between 2100 and 5400 feet. They are usually found in small, isolated pockets with highest densities are found in disturbed areas. Hawkweeds can grow in open woodlands, but does not tolerate heavy shade. Rapid colonization after fire was observed in the Little Wolf Fire, where orange hawkweed is currently one of the most dominant plants in the landscape (personal observation).

St. John’s wort - This species can survive prolonged drought and fire. Plants reproduce from numerous seeds and rhizomatous, often re-sprouting root crowns. Population explosions are common after fires due to the release of dormant seeds in soil or reduced competition in the burned areas. St. John’s wort will rapidly recover from root crown sprouting following a spring burn and are able to out-compete other natives that may not germinate until fall. In fall burns, natives are able to germinate quickly and with establishment can compete with St. John’s wort. The majority of St. John’s wort within the Robert and Wedge Fire areas most likely had set seed before the burns occurred. In addition, root crowns also are expected to survive fires.

These references indicate that for at least a few of the more common invader species in the burn perimeter, fire often stimulates growth and reproduction in pre-existing plants under certain conditions. This is true even in lower severity burns because there is less root mortality. Nearly 35 percent of the soils in the Robert-Wedge Post-Fire Project area burned at this low severity.

The vast majority of the Robert and Wedge Canyon fires either killed the large trees or mostly killed them, favoring the invasion of weed species that require a lot of light. In more severely burned areas, the heat has modified surface soil properties. Weeds may be killed, but the soil surface may become more favorable for germinating weed seeds. However, burn severity on the soil throughout the two fires was generally light to moderate (Table 154). This low to moderate burn severity coupled with the severely dry soil condition found throughout the fire perimeters indicate that fire probably has stimulated the response of the more common weed species.

Table 154. Soil burn severity acres for the Robert and Wedge Canyon fires.

Severity	Robert	Wedge Canyon
	Acres*	Acres*
High	3,067	3,079
Medium	4,297	12,734
Low	5,961	6,208

* Does not included unburned acres within the fire areas

Weed Surveys and Treatments

Access routes to treatment units will be surveyed for the presence of noxious and invasive weed species prior to any action. An inventory of these species will be used to determine needs for weed control prior to any activity. Surveys will be conducted following vegetation and road treatments to identify any spread of weeds caused by the fire or this action. Weed treatments will be prioritized and scheduled where appropriate. Goals are to prevent any new infestations and to control any existing infestations to the pre-fire level. Weed treatments fall under the authority and guidance of the Flathead National Forest Noxious and Invasive Weed Control EA (March 2001) and Decision Notice (May 2001).

3.9.3 Environmental Consequences: Robert Fire and Wedge Canyon Fire

Alternative 1 (No Action)

Direct and Indirect Effects

Alternative 1 provides the least opportunity for creating weed habitat. This alternative does, however, have the greatest miles of open roads, a serious consideration in the potential for weed seed spread.

Invasive species currently known to the analysis area (Table 151) will have potential for expansion in to the burned areas. As a disturbance process, fire has the potential to greatly exacerbate infestations of certain noxious weed species, depending on burn severity and habitat type (Fire Effects Information System 2004). Soil disturbance such as that resulting from low and moderate burn severities from a wildfire and fire suppression related disturbances (dozer lines, fire camps, drop spots, etc.) provide optimum conditions for noxious weed invasion. In addition, new invaders (Table 152) may also establish in the burned areas as a result of increased vehicle and personnel presence potentially depositing new invasive species from other regions during fire suppression efforts. Dry site vegetation types and road corridors are also extremely vulnerable. In the Robert-Wedge Post-Fire Project area, the existing condition of a post-burned environment creates a high level of risk of invasive plants spreading into burned areas, especially where optimum conditions exist.

Cumulative Effects

Past ground disturbing activities such as timber harvest, road construction, trail construction, road maintenance, and fire suppression activities (e.g. fireline, dozerline, safety zone construction) have contributed to the establishment and spread of noxious and invasive plants in the area. Recreational and economic land uses (hunting, hiking, fishing, logging, mushroom harvesting, firewood gathering, etc.) have also promoted the spread of weed seeds, because users and their vehicles become vectors for weed seed spread. All these activities are likely to continue into the future, however, the degree of effects from construction type activities, such as road and trail building, will be far less because of recent decreases in these actions which are expected to continue into the foreseeable future.

Wildlife have also likely contributed to weed spread in the past by transporting weed seeds across the landscape. The Robert and Wedge Fires itself has had a great impact on the susceptibility of the area to weed invasion for a few select species (i.e. orange and meadow hawkweeds). Ongoing activities that may contribute to weed spread are the road maintenance work as part of the Burned Areas Road Maintenance Project and commercial mushroom harvesting in the burned area.

A limited degree of noxious weed treatments has occurred in the past along the North Fork Flathead at the Big Creek Campground and Moran Meadow (Table 153). Weed treatments are likely to increase in the area if surveys detect new and growing infestations as a result of the fire or these proposed actions. Road closures have likely decreased the spread of weeds. Planned revegetation efforts in areas affected by fire suppression activities and a few other areas seriously affected by the fire will help to reduce opportunities for weed spread, as planted and seeded native and non-invasive exotic species are established and compete with weeds.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Vegetation treatments, road closures, road decommissioning, temporary road construction, beetle funnel trap treatments and weed control actions are proposed for this project. These general effects on weed risk and spread are discussed below by activity.

Salvage Logging and other Vegetation Treatments

The effects of salvage logging are variable depending on the amount of ground disturbed during the activity; the more bare soil exposed, the more germination substrate is available for colonizing weed seeds. Ground-based systems with wheeled machinery usually disturb more ground than do skyline cable systems. Helicopter extraction of logs is even less disturbing to the ground within the actual units; however, areas used for landings can be impacted.

Another consideration is time of year vegetation treatments will occur. Harvest and skidding logs on snow-free ground would disturb more soil than if activity occurred over frozen ground or compacted snow. The differences in these logging systems by alternative are displayed in Table 155.

Machinery can spread weed seeds if not washed prior to use; therefore design features include cleaning all off-road equipment prior to entering the area. Use of dedicated skid trails will also minimize spread across units.

Road decommissioning and temporary road construction

These activities will expose bare soil and parent material, creating suitable substrates for weed germination. Proposed weed control actions, revegetation, and closing these roads to vehicular use will lessen the impacts from weeds (see Chapter 2).

Road Closures

Use of roads facilitates weed establishment because roads serve as travel routes for the main vectors of weed spread, specifically, cars and trucks, along with mountain bikes and horses. Closing roads reduces the ability for weed seeds to spread.

Beetle funnel traps

There would be no ground disturbance associated with this activity; therefore no effects on weeds would result.

The following table displays a relative rating of ground disturbance anticipated within the fire areas. A rating of 1 indicates the greatest impacts and 5 the least, with respect to potential weed spread and invasion. Areas with more acres of ground disturbance or open roads are expected to have greater vulnerability to weed colonization due to rationale described above.

Table 155. Vulnerability of project area to weed spread and colonization based on potential impacts of activity (1=highest, 5=lowest).

Activity proposed	Robert acres / miles	Robert Vulnerability rating	Wedge acres / miles	Wedge Vulnerabil ity rating
Salvage				
helicopter treatment	1,576	4	1,108	4
cable treatment	720	2	243	3

Activity proposed	Robert acres / miles	Robert Vulnerability rating	Wedge acres / miles	Wedge Vulnerability rating
ground-based treatment (tractor) NON WINTER	794		740	
ground-based treatment (tractor) WINTER	0		640	
Recovery of Desired Vegetation and Site Condition				
planting	496	4	1,657	4
soil recovery	~50	4	~50	4
pheromone traps	unknown	5	unknown	5
Road Management				
temp road construction	0.8	2	1.2	
road decommissioning	15.0	3	7.0	
open roads (yearlong)	9.0	1	18.0	
open roads (seasonally)	14.0	4	2.0	

Cumulative Effects Common to All Action Alternatives

In addition to the, the following cumulative effect apply to the proposed action.

In addition to the cumulative effects described for the no action Alternative above, the proposed action will also contribute to cumulative effects to the degree described in the direct effects section above for each proposed activity (salvage, roads, beetle traps). The proposed action may potentially affect approximately 5,822 acres (treatment units). Approximately 70% of the proposed treatment units acres are already considered “disturbed” with regard to weed susceptibility due to the wildfires. That is, 70% of these acres experienced moderate to high soil burn intensities. Therefore the difference among the proposed actions in how they contribute to cumulative effects is minimal.

In summary, many past, present, and foreseeable actions have and will contribute to weed risk and spread in the Robert-Wedge Post-Fire Project area. Additional acres, outside and adjacent to the treatment units will become more susceptible to weed invasion from a number of weed species as a result of this action. Areas with greater miles of open roads will increase facilitation of weed spread. This contribution to cumulative effects will be greatly reduced, however, by design features that will lessen the impact of weed spread; specifically aggressive weed treatments, soil stabilization measures, revegetation of disturbed sites, and road closures.

3.9.4 Regulatory Framework and Consistency

Management direction for noxious and invasive weed control on the FNF is set at the national and forest levels. Forest Service policies were developed in response to federal laws guiding implementation of noxious weed control actions. These policies are set forth in Amendment 2000-95-5 of the Forest Service Manual, Chapter 2080, Noxious Weed Management, and

have been incorporated into the FNF Forest Plan. Treatment and monitoring of known weed populations in the Robert-Wedge Post-Fire Project area will be implemented under the authority and guidance of the Flathead National Forest Noxious and Invasive Weed Control Decision Notice (May 2001) and EA (March 2001). The FNF Noxious and Invasive Weed Control EA (March 2001) and Decision Notice (May 2001) were designed to meet legal requirements and Forest Service policies for noxious weed control. The Robert-Wedge Post-Fire Project incorporates and is consistent with the FNF Weed Control Decision. Design features and management requirements for actions proposed under the this project follow requirements documented in the Forest Service Manual Amendment for Noxious Weed Management, specifically for road decommissioning and timber management projects (project file).

3.10 Forest Heritage Resources

3.10.1 Introduction

This section discusses the existing condition of heritage resources on National Forest System lands in the project area. The information used for this analysis was collected during the post-fire Burned Area Emergency Response (BAER) undertaking for the Wedge and Robert Fires of 2003 which used previous project inventories and inventories for the BAER team. Additional inventories have been and will be conducted for the current analysis.

3.10.2 Field Surveys

To gather information on heritage resources contained within the boundaries of the Wedge and Robert Fires of 2003, the Forest Archaeologist and BAER team member conducted a files search and review of Flathead National Forest (FNF) site database and literature sources to identify the location of known, previously-recorded heritage resources on FNF-managed lands within the burned area. Within the Wedge Fire, eight historic-era and two prehistoric properties were identified.

Of the ten heritage resource sites determined to lie within or near the boundaries of the Wedge Fire; two sites are listed on the National Register of Historic Places; five are considered eligible for listing; and three sites are considered not eligible for listing. None of these properties are located in treatment units.

One cultural site was identified within the boundaries of the Robert Fire. This site is considered not eligible for listing on the National Register of Historic Places.

Results of Survey Methodology - A complete inventory to locate and identify significant heritage resources within the project area will be completed in July 2004. The pre-survey file search identified the location of one historic era heritage resource site within or near proposed project boundaries. This site has previously been determined not eligible for listing on the National Register through consultation with Montana State Historic Preservation Office (MtSHPO) in 1990. Because the site is not eligible for listing, the proposed treatments will have no effects. Additional inventory for the Robert-Wedge Post Fire Project will be conducted to locate other cultural resources in or near treatment units. Consultation with the Confederated Salish and Kootenai Tribes (CSKT) is continuing.

Any heritage resource sites discovered during the inventory are recorded and their National Register eligibility status evaluated in consultation with MtSHPO.

3.10.3 Affected Environment – Heritage Resources

The Robert-Wedge Post Fire Project analysis area includes portions of the drainage area of the North Fork of the Flathead River. The North Fork is the principle watershed in the analysis area with Trail Creek, Tepee Creek and Hornet Creek the primary tributary of the Wedge Fire and Canyon Creek the principle tributary for the Robert Fire area. Elevations range from a low of 3,000 feet along the North Fork to a high of 7,300 feet at Cleft Mt. Overall this is an area of steep forested mountains along the tributary streams and wide benches bordering the North Fork.

During prehistory, the watersheds were used by aboriginal groups as a travel routes between the Tobacco Plains to the northwest and the Great Plains to the east. Archaeological sites documenting Native American occupation and use of the North Fork are known but none are identified in the analysis area. Native American occupation of the North Fork probably dates to the end of the last glacial period approximately 10,000 years ago. Historically, the analysis area is part of the traditional homeland of the Kootenai people with additional use by the Salish and Blackfeet. The Hellgate Treaty of 1855 gives the Confederated Salish and Kootenai Tribes reserved treaty rights to hunt, fish, and collect native plants in the analysis area.

The post-contact history of the North Fork parallels that of the Fathead Valley. The first significant activity in the North Fork is the discovery in 1887 by Frank Emerson of coal in what became Coal Creek. It was, however, the coming of the Great Northern Railroad to the valley in 1890 that prompted the first serious attempt to exploit Emerson’s discovery. In 1892 Frank Talbot constructed the 75-foot sternwheeler *Oaks* to carry the coal from Coal Creek to the railroad at Columbia Falls. Unfortunately the *Oaks* was lost in the rapids at Canyon Creek and the coal was never developed. Although there was a very brief oil boom in 1901 with one drilling operation on Kintla Lake in the then Flathead Forest Reserve, tourism, homesteading, agriculture, and logging, through the Forest Service and Glacier National Park lands would steer the future of the North Fork.

The Flathead Forest Reserve was created Feb 22, 1897 and included lands in the North Fork (including all of what is now Glacier National Park) and portions of the Kootenai National Forest. Fred Herrig and Frank Liebig were the first rangers on the reserve. Herrig was based at Moran Creek and patrolled the west side of the valley while Liebig was headquartered at McDonald Lake and patrolled what is now the Park. What became the Big Creek Work Center was established in 1911 as a seasonal camp/living quarters until developed into the present facility in the late 1920s and early 30s. Glacier National Park was carved out of the east half of the forest reserve in 1910. Up until that point, most homesteading was taking place east of the North Fork around Sullivan Meadows. Bill Adair built the first store at the meadow in 1904. After the creation of the park, homesteading moved west of the river. Adair moved his store to what is now Polebridge in 1912 and the west side road was built to there between 1917 and 1919. The Forest Service completed the road to the Canadian border in 1921.

The first recorded commercial logging operations were in 1890 and 1910 but were limited by the poor roads and long distances to markets in the Flathead Valley and the railroad at Columbia Falls. Timber harvesting would expand in the 1930s with the new road but really take off in the 1960s with expanded Forest roads and improved access to the woods.

3.10.4 Environmental Consequences

Alternative 1 (No Action)

Direct and Indirect Effects

The no action alternative would have no effect on cultural properties listed on the National Register or eligible for listing on the National Register.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Field investigations have not been completed at this time. Currently there are no known, previously identified cultural resources located in or near treatment units that will be affected by this alternative. Field investigations will be completed by August of 2004 and at that time direct and indirect effects to cultural properties that are eligible for listing on the National Register of Historic Places will be evaluated in consultation with MtSHPO and the CSKT.

Cumulative Effects

Past, Present and Reasonably Foreseeable Future Actions

There are no past, present or reasonably foreseeable future actions that could effect heritage resources that are either listed on the National Register of Historic Places or eligible for listing on the National Register.

Summary of Cumulative Effects

There are no cumulative effects on heritage resources that are either listed on the National Register of Historic Places or eligible for listing on the National Register.

3.10.5 Regulatory Framework and Regulatory Consistency

The Forest Service has obligations under the American Indian Religious Freedom Act (AIRFA) of 1978 to "protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian" [Public Law 95-442]. The CSKT also have reserved treaty rights under the Hellgate Treaty of 1855, including hunting, gathering, and grazing rights.

The Confederated Salish and Kootenai Tribes of Montana have been identified as a tribal group concerned about the management of heritage resources on the Flathead National Forest. The tribes were contacted in the initial planning stages of the Robert-Wedge Post-Fire Project in order to establish lines of communication between the two parties, to advise them on the scope of the undertaking including potential effects, and to make their resource concerns (if any) an official part of the project file.

Besides AIRFA, the USDA Forest Service is also mandated to comply with the National Historic Preservation Act of 1966 (NHPA) [Public Law 89-665]. "Section 106 of the NHPA requires that Federal agencies with direct or indirect jurisdiction over Federal, federally assisted, or federally licensed undertakings afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity for comment on such undertakings that affect properties included in or eligible for inclusion in the National Register of Historic Places

(NRHP) prior to the agency's approval of any such undertaking" [36 CFR 800.1]. Historic properties are identified by a cultural resource inventory and are determined as either eligible or not eligible for the National Register. Eligibility is reviewed, and concurrence given, by the MtSHPO. Sites that are determined as eligible are then either protected in-place or adverse impacts must be mitigated. This process takes place prior to any decisions relative to the project. The Flathead NF participates in the Region One Programmatic Agreement (RIPA) with MtSHPO and the Advisory Council that provides for a more efficient process for conducting cultural resource inventories and meeting Section 106 compliance. Under the RIPA, if there are no eligible properties affected by the undertaking either through project redesign or because there are no properties located within the undertaking, then the undertaking is included in an annual report to MtSHPO and compliance is completed without project consultation. On the other hand, if an eligible property is affected by the proposed undertaking, then compliance is completed in the standard way with consultation with MtSHPO.

3.11 Economics

3.11.1 Introduction

This section describes the affected economic environment and estimates the effects associated with the no action and proposed action alternative. The focus of this section is the relationship of the Flathead National Forest to the economy within and around the Forest, emphasizing how Forest goods and services influence the local economy. Additionally, this section discusses the methodology and analytical basis for comparing alternatives. Economic effects, including direct, indirect and cumulative, have been disclosed. In some cases, effects have been quantified, but in most cases the effects are discussed qualitatively. Those components of the economy identified throughout the scoping process are discussed here. Specifically, economic issues identified through public comments are emphasized, such as employment and income in the local area; loss of raw materials to the wood products industry; and federal funds to communities. The values used in the analysis and presented in the report are approximate and discounted to 2004 dollars. When applied consistently throughout the analysis, they give a relative value to compare both alternatives. These values are not intended to be a precise measure of an alternative's economic effect.

3.11.2 FOREST PLAN DIRECTION

The Flathead National Forest Plan includes Forest-wide management goals that relate to the economic characteristics of the proposed action (USDA FS 1986).

Provide for public benefits from National forest system lands – the planned allocation, development, and efficient distribution of selected natural resources (II. Goals.A.1).

Provide a sustained yield of timber products that is cost-effective, responsive to the needs of the local economy, and is consistent with other Forest management goals (II. Goals.B.3.).

Develop and implement a road management program, with road use restrictions and closures that is responsive to resource protection needs and public concerns (II. Goals.B.5.).

Provide a range of quality outdoor recreation opportunities within a forest environment that can be developed for visitor use and satisfaction (II. Goals.B.8.)

The Flathead National Forest Plan also includes forest-wide management objectives and standards, which relate to economic analysis portion of the proposed project.

Section II. Objectives 6.a and b provides specific output levels for timber management.

Maintain a mix of sale offerings for various logging systems needed to implement the Forest Plan and support local and regional logging systems capabilities (II. Objectives.6.b. (3)).

Maintain offerings of firewood and other miscellaneous forest products at least at current levels.

Timber sales would be designed to consider cost-effectiveness while maintaining the long-term sustained yield and protecting the soil and water resources (II. Standards.H.2.).

Amendments subsequent to the original Forest Plan have not added any economic analysis requirements. Forest Service policy for economic and financial analysis in respect to timber management projects is in FSH 1909.17 and FSH 2409.18.

3.11.3 Affected Environment

Analysis Area

Most of the anticipated economic effects for the proposed action alternative would be located within Flathead County, Montana. The adjacent counties would be affected to a substantially lesser degree. The designation of Flathead County as the short-term economic affected area was based on the multiple criteria suggested in the Forest Service Economic and Social Analysis Handbook (Forest Service Handbook 1901.17, USDA Forest Service 1988). Criteria include the location of the economic center, wood-processing facilities, residences of the forest products industry workforce, and the center of spending for retail and wholesale goods and services.

The Flathead National Forest is an important part of the Northern Continental Divide Ecosystem, which covers most of northwest Montana. This area is regionally, nationally, and internationally associated with recreation, tourism, wildlife, and aesthetic values as well as a substantial timber management program. However, it is beyond the scope of this analysis to evaluate markets for all these resources because they have not been identified as central economic issues in respect to the proposed action alternative. Because the proposed action alternative would primarily affect economics related to the timber industry, an emphasis is placed on describing the local economy from this perspective. A discussion of the reasoning used in selecting the economic affected area can be found in the project record.

The Economy

Industry Profile

The economic base for a local economy consists of those industries that provide the primary employment and income, which influence what goods and services are exported and imported. The economic profile for Flathead County is similar to the state of Montana for most industries (U.S. Department of Commerce 2002). However, there are a few exceptions. The manufacturing industry is more than twice the state percentage and is the highest of any county in the state. Manufacturing is currently dominated by the wood products industry, which will be discussed in more detail later in this analysis. Government, which includes federal, state, and local government, is significantly smaller in Flathead County compared to the rest of the state. Agriculture and mining are an insignificant part of the total income generated in both Flathead County and the state of Montana. However, agriculture varies greatly from year to year with weather and market conditions.

There are many different ways to present regional industry data. For example, the Bureau of Business and Economic Research (2004) at the University of Montana sector Bureau of

Economic Analysis data, about 25 percent of labor income in the basic economy was attributed to wood products for Flathead County (Figure 41), which represents a gradual decline over the past decade. Additional sectors of basic labor income in this analysis include: agriculture and related (5%), nonresident travel (11%), manufacturing (10%), federal government (14%), trade center (12%), and selected manufacturing (19%).

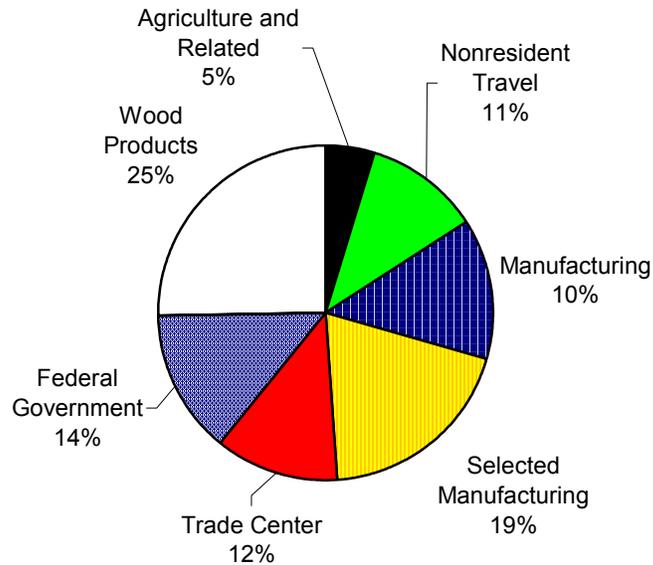


Figure 41. Basic Industry Sector Profile – Flathead County

(Source: Outlook Montana: Montana Business Quarterly. Spring 2004. Bureau of Business & Economic Research, The University of Montana).

However, when the entire economy is sectorized using the Sonoran Institute Economic Profile System, the distribution of labor among sectors markedly changes (Figure 42). Specifically, non-labor income (38%) and the services industry (36%) are dominant. Manufacturing, which includes woods products, is 10%, while agriculture (1%) is insignificant.

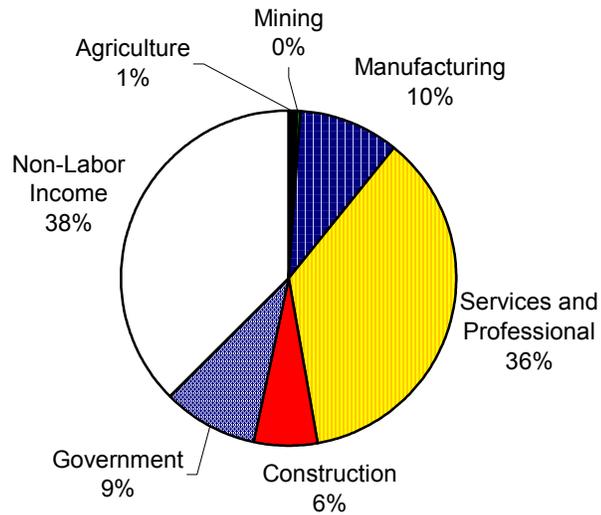


Figure 42. Total Industry Sector Profile – Flathead County

(Source: Sonoran Institute Economic Profile System, http://www.sonoran.org/programs/eps/si_se_epsindex.html)

Diversity/Dependency

Economic diversity refers to the number of different types of industries that form an economic base for a given community. Economic diversity increases as the number of industries increases. A diverse economy is often associated with stability because jobs are not concentrated in one or two areas. Accordingly, economic diversity protects communities against economic downturns (Haynes et al. 1999). Dependency refers to a community's dependence on a single or small group of industries for its survival. Communities that are highly dependent are not usually diverse and are frequently vulnerable to changes occurring in its major industries. Flathead County is thought to have a relatively diverse economy. A recent analysis of Montana counties using the Shannon-Weaver entropy indices reported that Flathead County is the most diverse county in Montana (USDA Forest Service 2001b). A study conducted by Colorado College reported a similar result, that Flathead County has the most balanced employment in the Rocky Mountain West (Colorado College 2010 The Presidents Action Agenda 2004). Diversity tends to be positively associated with population and Flathead County, which is the fourth most populous county in Montana. The number of industry sectors is also a common indicator of diversity. All of the above indicators suggest that the economy of Flathead County is very diverse and likely not vulnerable to external forces.

In the past it was thought that Flathead County was highly dependent upon the wood products industry, which at one time comprised over 40 percent of the basic economy. However, the most recent data shows that approximately 25 percent of the economy is attributable to the wood products industry (Figure 41). This decline is due primarily to the rapid growth of other sectors of the economy, while the wood products industry has declined slightly.

Employment and income

Employment

Flathead County has one of fastest-growing populations in Montana. The population increased 25.8 percent from 1900 to 2000 (Montana Department of Labor and Industry 2003). Accordingly, the civilian labor force in the Flathead Valley has been steadily increasing by an average of 791 additional workers each year over the last 20 years (Montana Department of Labor and Industry 2003).

In addition to a fast growing population, job growth has been substantial for Flathead County. During the period from 1991-2000, positive job growth occurred every year increasing by 42 percent or 15,000 jobs over the same time period. This type of job growth is considerably ahead of the State and nearly all other Montana counties (U.S. Department of Commerce 2002).

Flathead County has historically the highest unemployment rate among the larger counties of Montana. The unemployment rate for Flathead County varies quite closely with the State of Montana, but the rate during the winter months is relatively higher, suggesting a higher percentage of seasonal employment (Montana Department of Labor and Industry 2002). The annual unemployment rate for Flathead County for the year 2004 was 7.5 percent, which is higher than the state average of 5.1 percent (Northwest Area Indicator Website). Although this is still above the Montana rate of 5.1 percent, in general, the unemployment rate for Flathead County has been steadily decreasing since 1991 when it was over 9 percent. Along with a lower annual average rate, the monthly rates have shown increased stability, which suggests that seasonal employment is not as prevalent as has been in recent years.

Income

Total personal income includes: earnings (wages and salaries, other labor income, and proprietor's income); dividends, interest, and rent; and transfer payments received by the residents of Flathead County. Flathead County had a total personal income of \$1.9 billion in 2002, ranking 4th for the State and accounting for 8.7 percent of the State total. In 1992, the total personal income for Flathead County was \$1.1 billion and ranked 4th in the State. The average annual growth rate of total personal income over the past 10 years was 8.1 percent. The average annual growth rate for total personal income for Montana was 6.2 percent and for the U.S. was 6.6 percent (U.S. Department of Commerce 2002).

In 2002, Flathead County had a per capita personal income of \$25,583, which ranked 12th for Montana counties, and was 101 percent of the State average of \$21,997, and 79 percent of the national average of \$30,906. In 1992, the Flathead per capita personal income was \$17,403 and ranked 12th in the State. The average annual growth rate of per capita personal income over the past 10 years was 4.7 percent, which was similar for the state of Montana and the U.S. (U.S. Department of Commerce 2002). Over the past ten years per capita income has increased at the same rate as the State, while the total personal income has increased at a faster rate. This difference can be explained by the significantly higher population increase in Flathead County compared to the national rate (U.S. Department of Commerce 2002).

Department of Labor data from 1999 and 2000 indicates that Montana has the lowest average annual pay of any state in the U.S. In the year 2000, wages in Montana were 67 percent of the U.S. average. From 1999 to 2000 Montana wages increased by 4.4%, which was higher than approximately one-third of the states in the U.S. but was still below the U.S. average increase of 5.9 percent (U.S. Department of Labor 2002a). U.S. wage growth averages exceeded

Montana averages in every industry category except mining and government. Montana wage rates for the top employing industries in the Flathead County area (services, trade, and manufacturing) significantly lagged U.S. growth rates for wages. (U.S. Department of Labor 2002b). Although wage and income growth in Flathead County and Montana have been lagging, job growth has been significant. The total number of jobs has steadily increased (224 percent) from 1969 to 2001, which is significantly higher than the 90 percent increase in total jobs for the State of Montana for that same time period (Northwest Area Indicator Website).

Economic well-being can also be measured through cost of living (Power 1990). Flathead County has a cost of living composite index of 97.3, which is and has been slightly below the national average for the past several years (Kalispell Chamber News 2003). Public opinion surveys conducted in the past indicate that many people identify the “cost of living” as one of the reasons they relocated to the Flathead Valley. This has led many people to perceive the cost of living to be low. However, cost of living indices provided by the American Chamber of Commerce Researchers Association indicate the cost of living in the Flathead Valley in the fourth quarter of 2003 is approximately only 2 percent less than the national average (Kalispell Chamber News 2003).

Economic Trends

Flathead County has been one of the fastest growing counties in Montana. As would be expected, there has been substantial volatility as growth rates of economic indicators such as non-farm labor income, which have fluctuated from one year to the next. For example, recent instability between 1998 and 1999 likely reflects the Columbia Falls Aluminum Plant wage settlement. Growth is predicted to slow with the forecast calling for moderate growth in the future, presuming that aluminum production resumes and “high-tech” manufacturing stabilizes. Volatility is expected to continue and may cause yearly figures to be far above or below average (Bureau of Business and Economic Research 2004).

Bureau of Business and Economic Research (2004) data suggests that Montana’s economy has been impacted by the September 11th, 2001 attacks to a considerably lesser degree than the national average. Montana’s economy is concentrated in areas such as agriculture, mining, wood products, and the federal government and therefore, is not as vulnerable to terrorist attacks or recessions as many areas of the national economy. Consumer sentiment in Montana also remained much higher than the national average following the declaration of the most recent recession in the spring of 2001 and the terrorist attacks of September 11, 2001.

Wood products and aluminum refining have traditionally been the largest components of Flathead County’s economic base. Together these industries were primarily responsible for growth in the 1970s and the sharp decline between 1979 and 1982. During the early 1980s the wood processing industry in Flathead County expanded significantly to become the state’s largest timber-processing center, a position it still retains. Non-resident travel has generally been the Flathead’s most rapidly growing basic industry in the 1980s and 1990s and continues to grow. High technology manufacturing also grew at a significant pace. From 1970 to 2000, 74 percent of job growth in Flathead County is attributed to the Professional and Service sector. Construction, health care, and business services accounted for much of the income growth for the past decade.

The Timber Industry

Timber production from National Forest system land in Montana has declined since the 1960s. Since 2000, timber harvest has dropped to the general vicinity of 100 million board feet, which is slightly greater than 10 percent of the past peak level (USDA Forest Service

2003). Of the 293 million board feet of timber delivered to processing facilities in Flathead County in 1998, approximately 38 million board feet, or less than 13%, came from National Forest system land (Keegan et al. 2001).

Since 1976, Flathead County’s capacity to process saw timber has varied from a low of 265 million board feet (Scribner rule) at the present to a high of 395 million board feet in 1983. Actual saw timber processed since 1976 has varied from a low of 185 million board feet in 1982 to a high of 332 million board feet in 1988. Processing facilities utilization capacity has varied from a low of 51 percent in 1982 to a high of 97 percent in 1999. The year 2000, the last year for which there is data, was at 94 percent of capacity. The plywood industry in Montana is presently at 93 percent of plant capacity. County level information on the plywood industry is generally not available because of data disclosure constraints (Keegan et al. 2001).

One result of decreased timber production has been a gradual and steady decline in Montana wood products industry employment. For example, the number of wood product workers declined 12 percent from January 2000 to December 2001. This includes production workers at all timber processing and wood residue processing facilities. Production workers account for 40 to 50 percent of the total workers in Montana’s forest products industry (Bureau of Business and Economic Research 2002). Therefore, it is likely that the total reduction in workers in the total forest products industry, which also includes logging, transportation, reforestation etc., is more than twice the loss shown for just the wood products industry.

For the last half of 2003 wood product prices increased substantially, with plywood prices reaching an all time high and timber prices at their highest level since 2000 (Bureau of Business and Economic Research 2004). The increased prices were attributed to high number of housing starts domestically, a weaker U.S. dollar, increased demand from other countries, mill closures in British Columbia due to fires, and demand for timber by the Federal Government for Iraq and Afghanistan. Timber prices have remained high for the first quarter of 2004 and are expected to stay there for the remainder of the year, especially with the possibility of Canada setting quotas for softwood lumber imports (Bureau of Business and Economic Research 2004).

Flathead National Forest Timber Sale Program

The Flathead National Forest previously provided over 40% of the timber processed by the Flathead County wood products industry (USDA Forest Service 1985), a proportion that is markedly less than a decade ago. The proposed action would offer for sale approximately 31.5 million board feet of timber; perhaps in several separate timber sales to be sold in FY 2005-08.

Table 156 puts the proposed project in perspective with the recent timber sale program history. Since 1995 the Flathead NF has offered for sale a high of 40 million board feet of timber in 1996, and a low of 4 million board feet in 2000, with a mean of 21 million board feet from 1995 to 2003. The timber harvested from the Flathead NF has followed the same general pattern. The timber under contract for the Flathead NF reached a high of 44 million board feet in 1997 and a low of 7 million board feet in 2000. (USDA Forest Service 2003)

Table 156. Flathead National Forest Timber Sale Program Information (MMBF)

Year	Timber Offered	Timber Harvested	Timber Under Contract
1995	12.5	22.0	16.5
1996	40.0	18.0	35.0
1997	32.0	22.1	43.7

Year	Timber Offered	Timber Harvested	Timber Under Contract
1998	12.7	33.9	25.5
1999	6.2	13.9	11.1
2000	4.6	8.9	6.8
2001	17.0	6.0	17.9
2002	31.2	6.1	43.5
2003	32.8	29.7	47.2
Mean	21.0	17.8	27.5

3.11.4 Environmental Consequences

This section describes the economic consequences for the no action and proposed action alternatives. Emphasis is placed on those components of the economy identified throughout the scoping process, and include factors such as employment and income in the local area; the loss of raw materials to the wood products industry; federal funds to communities; and road management.

The following effects indicators were used to focus the economics analysis and disclose relevant environmental effects:

- Effects on Job Growth Rate
- Effects on Personal Income and Wages
- Effects on Economic Dependency and Diversity
- Effects on Economic Trends
- Effects on Revenue Sharing
- Effects on Local Economic Development Objectives
- Unemployment Growth.

Analysis Methods

Economic efficiency inputs were derived from costs and timber stumpage prices in the PLATA (Project Level Analysis of Treatment Alternatives) software databases that were constructed specifically for the Flathead National Forest using 4 sales for the Robert and Wedge fires.

The economic efficiency of each action alternative was analyzed using the present net value (PNV) of revenues and costs anticipated during the life of the project (until regeneration surveys are completed in 10 years). PNV can be viewed as the lump sum of money the decision maker would have in hand as a result of committing forest resources to a particular alternative.

The following assumptions were used in the PNV analysis: a) This analysis determines the net economic returns of various alternatives based on amenity resource costs and benefits which can easily be measured in dollar terms. Other resources that are more difficult to assign a dollar value (e.g., wildlife, water, air) were not considered. b) Net values were determined for the year 2004. Future monetary values were discounted four percent per year. The harvest

schedules for each alternative were distributed over the years 2004 through 2006. c) The only revenues and costs are those related to the sale of timber and timber sale preparation, implementation, administration, and post-sale treatments. A complete list of revenues and costs by alternative are presented in the project files. Revenue and cost data were developed specifically for this project and reflect current levels for this geographic area. d) Timber prices were estimated using a Forest Service computer model called PLATA (Jones et al. 2002) that uses sale data specific for the Flathead National Forest. These timber prices were then used in the same model for economic analysis to determine revenues, costs, PNV, and revenue/cost ratios. Documentation for the calculations of the values presented in the table are found in the project file.

The effects of the proposed action and its alternatives on income and employment from the harvesting and processing of timber were determined with the assistance of the Micro IMPLAN economic impact software package (Alward et al. 1989), which is a personal computer program that constructs regional input-output accounts and models and contains software modules for estimating direct, indirect, and induced effects of changes in final demand for commodities. The model uses technical coefficients (e.g., production functions) from the national input-output model developed by the U.S. Department of Commerce. County level data in the model are based on the 1993 Regional Economic Information System survey from the U.S. Department of Commerce (Alward 1994).

Direct, Indirect, and Cumulative Effects

Effects Common to All Alternatives

Alternative costs are broken into two categories, administrative and activity. Administrative costs include sale preparation and harvest administration. Activity costs include all costs of completing the project. These costs can be measured quantitatively, but many benefits can only be measured qualitatively. Road maintenance, environmental protection, adjustment of chips, and costs associated with the commercial timber harvest are included in the Transaction Evidence Appraisal within the PLATA analysis and have been subtracted from the gross sale value. Costs and revenues were discounted to present value at the rate of 4 percent.

Revenue Sharing from Flathead National Forest Programs

Revenues from National Forest programs were distributed to counties annually in accordance with several Federal acts. Historically, the Twenty-five Percent Fund Act has been the greatest source of funds. Under the Twenty-five Percent Fund Program, 25 percent of all funds generated from certain National Forest programs were paid to the state in which national forest system lands are located. The funds generated by each Forest were distributed to each county in which the Forest is located in proportion to the amount of Forest land in each county.

Due to declining Forest Service timber revenues in the west, Congress enacted the Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393) to supplement the Twenty-five Percent Fund Act. This allowed electing counties to base their Twenty-five Percent Fund payments on an average of the highest three year's payments from 1986 to 1999. If elected, counties would receive the newly calculated payment instead of what would have been normally received under the Twenty-five Percent Fund Act. This would provide level payments over the election period regardless of what the Forest revenues were for the present period. All counties receiving payments based on Flathead National

Forest programs have elected the new option. This election will remain in effect through 2006, which will make a substantial difference in payments (Table 157).

Table 157. Yearly Distribution of Revenues from National Forest Programs (Thousand \$)

Year	Flathead	Lake	L and C	Lincoln	Missoula	Powell	Total
<i>USDA Forest Service 25% Fund</i>							
1997	636	48	380	3,388	545	318	5,315
1998	909	72	566	3,651	613	394	6,205
1999	506	39	216	4,008	297	186	5,252
2000	361	24	211	3,181	264	155	4,196
<i>Secure Rural Schools and Community Self-Determination Act of 2000</i>							
2001-6	1,481	118	417	5,586	695	450	8,747

PILT payments are made to local governments to supplement other receipt-sharing programs such as the Twenty-five Percent Fund. PILT payments may be used for any government purpose. Generally, the more 25 percent funds received, the lesser the PILT payments. However, the formula is complex, and varies from county to county, and will not be explained in the document. A complete explanation of the PILT provisions and revenue sharing can be found in Schuster, 1995 and 1996.

Since all counties have made the election for even-payments under Public Law 106-393, changes in Forest Service revenues would have no effect through 2006 on payments-to-counties. Payments-to-counties, including PILT payments, would not change. For the purposes of the proposed action alternative, it is assumed that fixed payments would continue past 2006. Therefore, the proposed action alternative would have no effect on payments to counties.

Economic Summary

The quantifiable costs for each treatment type by alternative are summarized in Table 158 .

Table 158. Summary of Project Activities Costs and Revenues.

Costs / Revenues (2004)	No Action Alternative	Proposed Action Alternative
Activity Revenues		
Commercial Harvest (Revenue)	\$0.00	\$3,039,920.00
Activity Revenues Subtotal	\$0.00	\$3,039,920.00
Administrative Costs		
Sale Preparation and Harvest Administration	\$0.00	\$275,000.00
Administrative Costs Subtotal	\$0.00	\$275,000.00
Activity Costs		
Road Decommissioning	\$0.00	\$112,000.00
Road BMP Activities	\$0.00	\$327,220.00
Reforestation	\$0.00	\$743,600.00
Planting Trees	\$0.00	\$1,076,500.00

Costs / Revenues (2004)	No Action Alternative	Proposed Action Alternative
Beetle Traps	\$0.00	\$59,550.00
Activity Costs Subtotal	\$0.00	\$2,318,870.00

Table 159 summarizes present value of costs, revenues, present net value, and benefit cost ratio of each alternative.

Table 159. Summary of Costs, Revenues, Present Net Value, and Benefit-Cost Ratio by Alternative

Alternative	Present Value Costs	Present Value Revenue	Net Present Value	Benefit -Cost Ratio
No Action Alternative	\$0	\$0	\$0	0.0
Robert Sale	\$1,019,480	\$1,313,840	\$294,360	1.29
Wedge Sale	\$1,318,640	\$1,726,080	\$407,420	1.31
Proposed Action Alternative	\$2,338,120	\$3,039,920	\$701,800	1.30

Economic impacts for each alternative are summarized in Table 160. These numbers were generated using the National Fire Plan Employment and Income Effects for the Flathead National Forest with IMPLAN model data.

Table 160. Summary of Project Economic Impacts by Alternative.

Alternative	Job-Years	Income Effects
No Action Alternative	0	\$0
Proposed Action Alternative	626	\$10,991,811

Alternative 1: No Action

The no action alternative proposes no activities and produces no economic outputs, employment, or income. There is no return on this investment. No commercial thinning, non-commercial thinning, prescribed fire, road management, or vegetation treatments would occur. No benefits (direct, indirect or non-quantifiable) can be attributed to this alternative.

Alternative 2: Proposed Action

The proposed action alternative includes activities to aid in the recovery of desired vegetation and site conditions, timber harvesting, and road management actions to provide secure habitat for grizzly bears. The total direct costs for the proposed action alternative are shown in Table 158 and are estimated at \$2,318,870. Revenue generated from the sale of commercial timber is a direct benefit. Harvesting 64,199 CCF (31.5 MMBF) of timber indicated a total net sale value of \$3,039,920. Present Value (PV) of for the proposed action alternative is \$701,800 which include all costs plus the revenue generated from the sale and indicates that the revenue from the timber sale slightly exceeds the cost of the timber sale and non-timber sale related activities, such as the planting outside the management units and funnel traps (Table 159). Non-quantifiable benefits are discussed in other resource sections of the document.

Employment and Income Effects

The proposed action alternative has the potential to support substantial amount of employment and income associated with timber, reforestation, planting, and road activities. These include both direct and indirect effects. Direct effects include workers employed in the forest products industry and government. While indirect effects include jobs and income created from the local spending of the forest products industry and government and the spending by industry and government employees.

An important assumption in estimating the economic effects of the proposed project on the local timber industry and economy in general is what the timber harvest would be if the proposed project was not implemented. Most of the timber to be sold in FY 2005 from the proposed project could be substituted from other sources (Gary Dahlgren pers. comm.). These effects could be minimal in the short-run as it is possible that alternative sources of Forest Service or other timber could find its way to processing facilities and not disrupt planned production. Therefore, there is a chance there could be little or no economic effect in the short-run from not harvesting timber from the proposed action alternative. However, the proposed action alternative would contribute long-term economic effects.

Approximately 626 total jobs-years (Table 160) would be supported from timber harvesting and processing, reforestation, planting and road activities associated with the proposed action alternative. However, the short term effects on the job growth rate would likely be minimal if there is a labor shortage and labor is drawn from one industry to another, and / or the project is spread out over the entire contract period. Also, there would be little difference between the no action alternative and the proposed action alternative if the substitute timber volume was harvested. The personal income or wage income effects could be extremely variable depending on the outcomes, but is not expected to be significant. Per capita income would increase only if the income comes from the new jobs. Additional jobs and income should not have a measurable effect on consumer goods as they are also priced in a regional market and the increase in jobs and wages is insignificant.

An addition of approximately 626 job-years is expected to have only a slight measurable effect on the unemployment rate. Historically, the unemployed workforce in Flathead County has remained a relatively constant percentage of the total workforce, compared to surrounding counties. New jobs tend to be filled from new arrivals or by people with different jobs etc., who are eventually replaced by recent immigrants. If all of the new jobs-years were filled from the present workforce, which is highly unlikely, and the new jobs are spread over 5 years (125 jobs per year), the unemployment rate would decline by less than 4 percent. However, the most likely effect would be much smaller.

The proposed action alternative is not likely to increase dependency or diversity for the local economy. The maximum potential increase is relatively small and should not have any negative effects on the overall health of the economy in terms of both dependency and diversity. The proposed action alternative is consistent with the County economic development strategy, while the no action alternative generally would not contribute toward implementing the County economic development strategy.

There should be no measurable effects to the cost of living resulting from the proposed action alternative. An increase in wood products manufacturing would not affect the price of wood products whose prices are determined in a regional or national market. The maximum increase in wood products from the proposed action alternative is insignificant when compared to the regional or national market.

The proposed action alternative would likely increase the wood products industry and manufacturing sector more than other sectors, thereby increasing their proportion of the total economy. The increase would depend largely on how much substitute timber volume would be milled if the proposed action alternative was not implemented. Regardless of which alternative is implemented, the change would be minimal. Additionally, the proposed project action should have very little effect on economic trends because of the small increase in income and employment resulting from the proposed project. There are so many other economic factors effecting the local economy that minor changes in timber harvest would likely be masked by these other changes, and therefore, probably be unmeasurable.

Cumulative Effects

Ongoing or foreseeable future actions within or near the project area that could add to the effects of the proposed actions include past, ongoing, and proposed USDA Forest Service and Montana Department of Natural Resources projects. There are currently two federal timber sales and three state timber sales occurring in the same region. Economic impacts associated with the USDA Forest Service Logan Creek harvest are distributed from 2004-2006. The Logan Creek project supported approximately 878 job-years for both direct and indirect jobs, resulting in 16.3 million dollars in wage income. The total discounted present net value cost associated with the selected alternative was \$2,518,020 and the present net value was \$5,328,160. Jobs and income associated with the second federal timber sale, the Moose timber harvest, are spread over 4-year period from 2002-2005. The Moose project would generate 247 job-years related to timber harvesting, tree planting, and road management activities. These jobs would result in \$5,298,000 in income. The total discounted present net value cost associated with the selected alternative is \$1,024,450 and the present net value is -\$211,700. The state of Montana has two timber sales associated with the 2001 Moose wildfire. Phase I of the Moose fire salvage and restoration project would generated 69 jobs related to timber harvesting, resulting in \$2,402,000 in wage income. The project cost \$398,196 and would generate approximately \$939,607 in stumpage revenue. Phase II of the Moose was estimated to generate 89 jobs related to timber harvesting, processing and planting, resulting in \$3,106,900 in wage income. However, because of a delay, these estimates for Phase II are probably high. The project would cost \$473,900 and would generate \$935,900 in stumpage revenue. Because the Hornet Sale MEPA analysis was accomplished using a "Modified Checklist Environmental Analysis", this analysis did not include an estimate of project revenue, employment, or income projections. Combined, these four projects, would support approximately 1283 job-years and generate approximately \$27.1 million for income. However, because of the ability for timber processing facilities to postpone current contracts when other timber becomes available from state or federal land, the cumulative effects of these five sales on employment and income are not likely to be as high as the sum of the employment and income effects for each project in the short term. However, they still would contribute in the long-term to employment and income effects.

3.11.5 Regulatory Framework and Consistency

Environmental Justice and civil rights

The proposed action alternative was assessed to determine whether it would disproportionately impact minority or low-income populations, in accordance with Executive Order 12898. No local minority or low-income populations were identified during scoping or effects assessment. No minority or low-income populations would be impacted by implementation of any of the alternatives. Additionally, the proposed action alternative is not expected to negatively affect the civil rights of consumers, minority groups, low-income

groups, women, or Indian tribes. Subsistence activities would not be disproportionately reduced for any of the identified group. No environmental health hazards are expected to result from implementation of any alternative.

Forest Plan Consistency

The Forest Plan direction is to provide sustained yield of timber products that is cost effective and responsive to the needs of the local economy (USDA Forest Service 1985). The proposed action alternative is consistent with Forest Plan direction while, the no action alternative is not consistent with the Forest Plan.

3.12 Recreation

3.12.1 Introduction

The Robert and Wedge Canyon project areas provide important recreational resources on the Glacier View RD. Some of the popular uses within the project areas are rafting, fishing, hiking, horseback riding, hunting, mountain biking, driving for pleasure, huckleberry picking, skiing and snowmobiling. The North Fork Flathead Wild and Scenic River is a major draw for rafters, kayakers, and anglers. The Glacier View RD has many other recreational opportunities including hiking trails, lakes, developed campgrounds, dispersed recreation areas, fishing, huckleberry picking, and driving for pleasure on many forest roads. The trail system for the most part is closed to summer motorized travel. Winter motorized use occurs on designated routes within the project areas.

Analysis Area and Information Sources

The analysis area for the recreation environmental effects of the Robert-Wedge Canyon project includes the Robert and Wedge Canyon fire areas, as well as the North Fork Flathead River corridor between the two fire areas. Information sources include data provided by District recreation resource staff, Forest GIS data layers and post-burn aerial photography verified with ground reconnaissance.

3.12.2 Affected Environment

Robert Fire

The Robert post-fire project area parallels the west bank of the North Fork Flathead River between Glacier Rim River Access north to the Big Creek Campground. There are two primary recreation activities in the project area. The first is use of the North Fork Flathead River for floating and fishing. This section of the North Fork is designated as a Recreational river under the Wild and Scenic Rivers Act (refer to the Wild and Scenic Rivers section in this chapter for further information). The second is the Canyon Creek groomed snowmobile trail system adjacent to the project area. Recreation sites are identified in Figure 43.

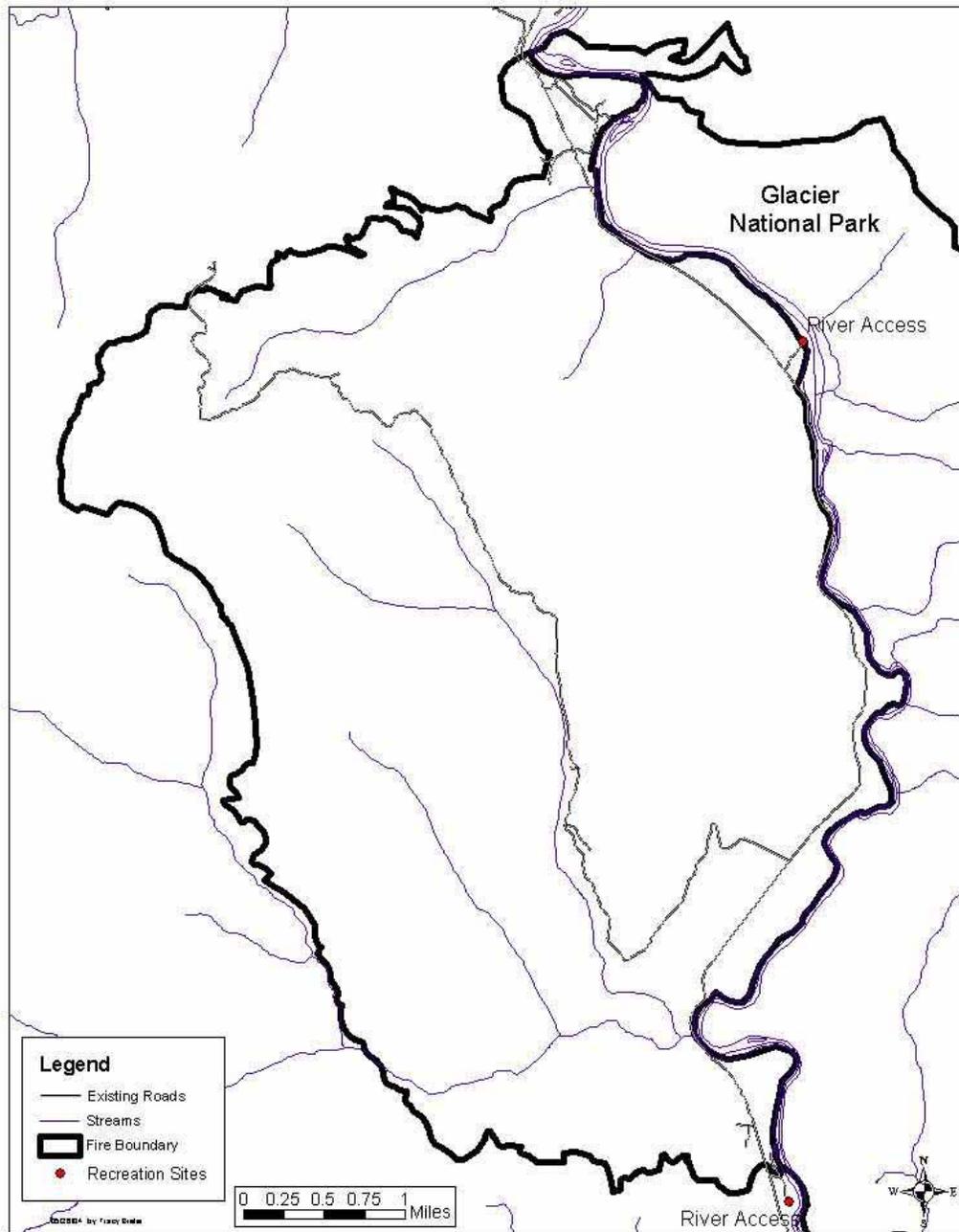


Figure 43. Robert Fire Recreation Analysis Area

Developed Recreation: Before the fire, the Great Northern Flats River Access site offered camping, a picnic area, and a rustic river launch site for portable craft. The fire burned through the river access point at a high intensity. Hazard trees were cleared in the fall of 2003, allowing the continued use of the river access site. The Glacier Rim River Access site, just south of the Robert post-fire project area, offers the same amenities with a developed boat ramp. To the north of the project area, the popular Big Creek Campground, adjacent to

the North Fork Flathead River, is a highly developed recreation fee site that offers camping, group use site, day use, and river launch facilities. (The 2001 Moose Fire affected the Big Creek Campground.) The Robert fire did not burn the 1967 Huckleberry Fireburn Overlook interpretive site, located along the North Fork Flathead River road, although surrounding vegetation was consumed.

Dispersed Recreation: Dispersed campsites within the project area are located along the McGinnis road # 803. Additional dispersed campsites are located outside the project area along the Canyon Creek road #316. Summer recreationists and fall hunters use these sites.

The Smoky Range National Recreation trail #270 begins on the McGinnis road #803 within the project area. The undeveloped trailhead can accommodate two to three vehicles and has no other amenities. The trail is closed to summer motorized use and before the fire, it was used by hikers, horseback riders and hunters. The portion of the trail affected by fire suppression activities was rehabilitated in the fall of 2003. Approximately 1/4 mile of trail was moderately burned by the fire, and during the summer of 2004 the trail will be cleared of snags.

The Kimmerly Creek trail #565 is located on the western boundary of the Robert post-fire project area, and the trailhead is located outside the project area at the end of road #316B. The undeveloped trailhead can accommodate two to three vehicles. The trail is closed to motorized use year-round and before the fire, it was used by hikers, horseback riders and hunters. Approximately 1/2 mile of the trail was burned by the fire, and during the summer of 2004 the trail will be cleared of snags.

Road #9898 (located between Great Northern Flats and the Big Creek Campground) along the North Fork of the Flathead River has been used for personal post and pole harvesting as well as dispersed recreation.

After the fire, hazard trees were removed along open roads. In addition, the Robert fire area is currently restricted to firewood cutting, although some slash piles have been made available for users. This restriction will be rescinded following completion of the salvage operations, should they be approved.

Summer Motorized Use: The following roads are open either yearlong or seasonally to motorized travel: Canyon Creek road #316, Kimmerly Creek road #316B, Handicapped Hunter area loop road #316D, McGinnis Creek road #803, Road #9898, and the Handicapped Hunter Area roads #1679 and 1679A. These popular travel routes receive moderate use for driving for pleasure, huckleberry picking, hunting, and access to Smokey Range and Kimmerly trails. The portion of Road 316 across Whitefish Divide (outside the project area) is currently restricted yearlong to wheeled motorized use, but expected to open in 2006 for seasonal travel per the Moose Post-Fire Record of Decision (2002). All other roads are closed to wheeled motorized use.

Winter Motorized Use: Snowmobiles operate on a designated route system in the project area (ref 2002 Snowmobile Access Map): Canyon Creek road #316 (groomed), Kimmerly Creek road #316B (groomed), Handicapped Hunter area loop road #316D, Depuy Creek road #5271, McGinnis Creek road #803, Handicapped Hunter Area road #1679 and roads #1688 and #1688A. Although some cross-country skiers use Canyon Creek road #316 and McGinnis road #803, the predominant use is by snowmobilers.

The Canyon Creek road #316 is part of a popular groomed snowmobile trail system and receives heavy use. Approximately two miles of the groomed trail system along the Canyon Creek road #316 and Kimmerly Creek road #316B burned at light to moderate severity. The roads were cleared of hazard trees and re-opened to public use in the fall of 2003. The

Flathead Snowmobile Association is authorized to groom portions of roads #316 and #316B (and other trails as shown on the 2002 Snowmobile Access Map) adjacent to the project area, using grant monies. The Association is also permitted for a groomers shed in the Canyon Snowpark parking lot approximately ½ mile up the Canyon Creek road #316 from its junction with the North Fork Flathead River road, as well as a warming hut facility. There is one outfitter guide authorized to guide snowmobile tours for 1000 service days on the groomed trail system.

Snowmobiling is restricted to the designated routes in the project area as a result of a lawsuit resulting in a settlement agreement in 2002. A separate analysis, the Winter Motorized Recreation Amendment 24, is currently ongoing to examine the effects of motorized winter recreation on the Flathead NF.

Although the precise number of snowmobile users on the Flathead NF is difficult to determine, the highest use occurs on the Canyon Creek groomed trail system just west of the Robert Fire project area. Based on data from trail counters, use numbers have steadily increased and it is estimated that 8,000 riders used the groomed trail system in Canyon Creek in 2002, with about 2500 to 3000 recreation visitor days on the remainder of the Glacier View RD. The general trend for snowmobile use is expected to follow the national trend and continue to increase as the Flathead Valley population continues to grow (Forest Service, 2003, pp 3-4).

Hunting: Before the Robert Fire, the project area received light to moderate hunting use by big game hunters. Special hunting areas have been designated off roads #1679 and #316D for physically challenged hunters. The area is open for approximately 30 days during general hunting season to accommodate handicapped hunting, and typically received light to moderate use. The fire burned these areas with moderate severity. The Glacier View RD will allow the areas to naturally regenerate, and these will remain the handicapped hunting areas for the District.

Recreation Special Use Permits: In addition to the snowmobile-related permits described above, the project area includes other special use permittees:

- Three commercial outfitters and one or two institutional outfitters are permitted to float the North Fork River, operating from spring until fall. They operate from spring until fall. The three commercial outfitters have priority use status and generate approximately 1500 service days annually. The institutional (nonprofit organization) outfitters may operate every other year using 100 temporary service days each.
- Glacier Institute is a private nonprofit entity that provides a broad range of outdoor education programs north of the project area to about 2000 people annually. Under special use permit, the Institute occupies the old Big Creek Ranger Station as its base of operations, and it also holds an outfitter guide permit for travel throughout the North Fork area to provide outdoor education classes.

Wedge Canyon Fire

The Wedge Canyon post-fire project area parallels the west bank of the North Fork Flathead River between Ford River Access north to the Trail Creek road #114. The primary recreation activity in the project area is use of the North Fork Flathead River for floating and fishing. This section of the North Fork is designated as a Scenic river under the Wild and Scenic Rivers Act (refer to the Wild and Scenic Rivers section in this chapter for further information). Other recreation opportunities include hiking, two rental cabins, dispersed

camping, huckleberry picking, hunting, and snowmobiling. Recreation sites are identified in Figure 44.

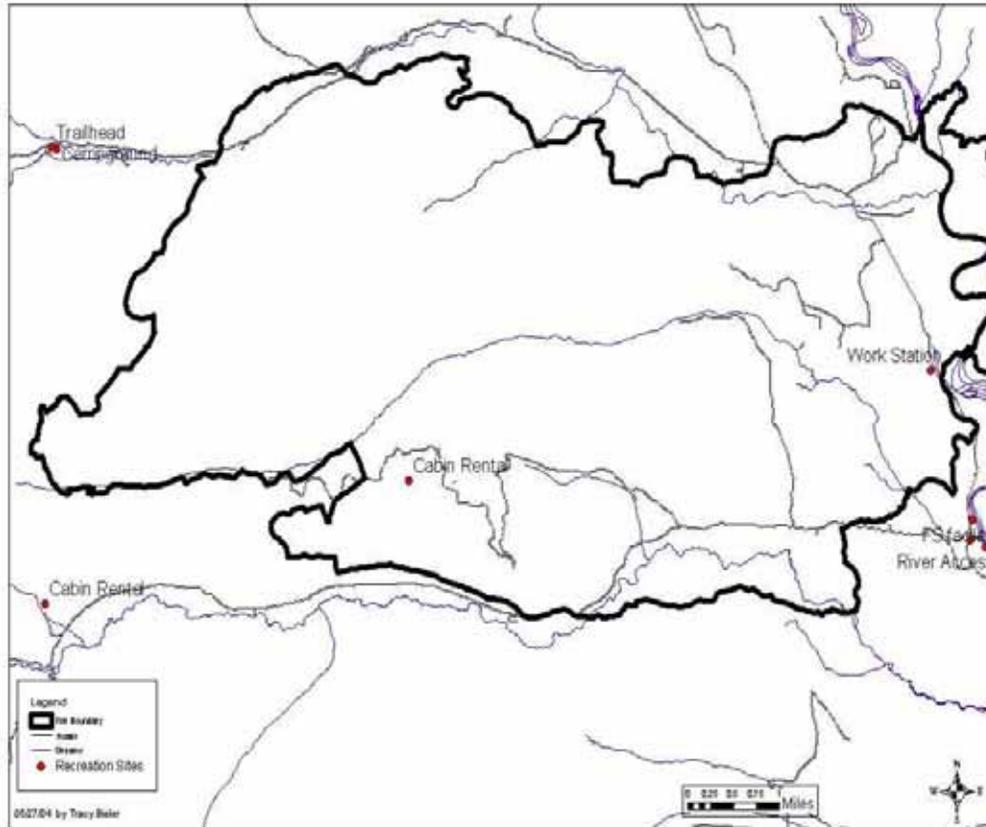


Figure 44. Wedge Canyon Fire Recreation Analysis Area

Developed Recreation: There are no developed campgrounds within the Wedge Canyon project area, but access to the nearby Tuchuck Campground is through the project area along the North Fork Flathead River road #486 to the Trail Creek road #114. Approximately 1 1/2 miles of the Trail Creek road #114 was burned in the fire. The no-fee campground offers seven campsites, vault toilet, a horse camp, and an information sign. Hiking, fishing, and horseback riding are the main activities that attract users to the area.

The Wurtz River Access site offers dispersed camping and a rustic launch site for portable river craft. The river access is located on road #10843 and is open from May 15-October 14. The fire burned through the site with a low severity burn creating a mosaic of vegetative patterns. The area is basically intact and still useable as previously intended. Road 10843 was closed to motorized use from May 3 until June 30 during the 2004 mushroom harvesting season as a mitigation to provide additional grizzly bear security.

There are currently three rental cabins in the vicinity of the Wedge Canyon project area, as described below:

- The fire burned around the Hornet Lookout rental cabin with varying degrees of intensity but did not affect the facility, which is on the National Register of Historic

Places. The cabin is available year-round but mainly attracts hikers and hunters during the summer and fall.

- Ninko Cabin, eligible for the National Register of Historic Places, is located west of the Wedge Canyon fire project area but is accessed through the project area via the Whale Creek road #318. This cabin is rented from December 1 to March 31 by snowmobilers and skiers.
- Ford Cabin is located on the North Fork Flathead River road #486 immediately south of the Wedge project area and is available to rent May 20 – March 10. Since the cabin can be accessed by vehicle most of the year, a wider variety of users are able to rent the cabin.
- The Wurtz Work Center, currently used as a Forest Service administrative site, is located within the project area. The cabin is on the National Register of Historic Places and is scheduled for reconditioning in the summer of 2004. The District intends on putting the work center on the rental cabin program in 2004.

Dispersed Recreation: A few dispersed campsites are located along the Whale Creek road #318 and Trail Creek road #114. Summer recreationists and fall hunters use the campsites.

The Cleft Rock trail #13 begins along Trail Creek road #114. There is no trailhead since the initial ¼ miles of the trail are on private land. Before the fire, the trail received light use by hikers and hunters and is closed to motorized uses year-round. The trail was moderately burned by the fire and is scheduled for snag clearance during the summer of 2004.

The Antley Tepee Creek trail #106 begins at the Antley trailhead on road #1665 off road #114. The undeveloped trailhead can accommodate four to five vehicles and is used as a dispersed camping area. Before the fire, the trail received light use by hikers and hunters and it is closed to motorized uses year-round. The trail had moderate damage from the fire and is scheduled for snag clearance during the summer of 2004. The beginning portion of the trail affected by fire suppression activities was rehabilitated in the fall of 2003.

The Hornet Lookout trail #349 begins at the trailhead on road #9805 off the Whale Creek road #318. The undeveloped trailhead is signed and can accommodate two to three vehicles. The trail is used by cabin renters and day hikers and is closed to motorized uses year-round. The trail received moderate damage from the fire and snags were cleared in the fall of 2003.

Summer Motorized Use: The following roads are open either yearlong or seasonally: Whale Creek road #318, Hornet Lookout road #9805, Wedge Canyon road #907, Teepee Lake road #9899, Trail Creek road #114, Thoma Creek road #114A, and Wurtz River Access Site road #10843. These roads receive light to moderate use for driving for pleasure, hiking, hunting, and river access. After the fire, hazard trees were cut and removed along open roads, and the fire area is currently restricted to firewood cutting. This restriction will be rescinded following completion of the salvage operations.

Winter Motorized Use: Snowmobiles operate on a designated route system in the project area (ref. 2002 Snowmobile Access Map). A portion of the Whale Creek road #318, Ninko Cabin road #10832, Hornet Lookout road #9805, Wedge Canyon road #907, Teepee Lake road #9899, Trail Creek road #114, and Thoma Creek road #114A. The Wedge Canyon fire project area does not receive as much winter snowmobiling use as the areas in and around the Robert fire area; use levels are light. There are no groomed snowmobile routes or any commercial outfitters authorized to operate in the Wedge Canyon fire area. The Ninko cabin is a popular destination in the winter and attracts approximately 100 snowmobile users per year. The Frozen Lake snowmobile route is accessed via the Trail Creek road #114. This

route links the Flathead NF to the Kootenai NF in the winter. Snowmobiling is restricted to the designated routes in the project area as a result of a lawsuit resulting in a settlement agreement in 2002. A separate analysis, the Winter Motorized Recreation Amendment 24, is currently ongoing to examine the effects of motorized winter recreation on the Flathead National Forest.

Hunting: Before the Wedge Canyon fire, the project area received light to moderate hunting use by big game hunters. There are no special hunting areas designated for the physically challenged in the Wedge Canyon project area.

Recreation Special Use Permits: The commercial river outfitters and institutional outfitters identified in the Robert project area are authorized to float the stretch of the North Fork Flathead River encompassed by the Robert-Wedge Canyon analysis area.

3.12.3 Environmental Consequences

Robert Fire

Developed Recreation: Multiple tree species planting would occur at the Great Northern Flats river access site. Planting trees at this site would accelerate the recovery of the area to a forested site and restore recreation values. The project activities would not impede recreation uses at Great Northern Flats. No other developed recreation sites would be affected by project activities.

Dispersed Recreation: One dispersed site access would no longer be available to motorized year-round access due to the seasonal restriction on Road #803. This site is at the northern junction of Roads #803 and #5224. The unnamed dispersed area accessed by road #9898 adjacent to the North Fork of the Flathead River in-between Great Northern Flats and the Big Creek Campground is currently open yearlong to motorized use. The access would be gated and closed to motorized access yearlong; the area would remain open to non-motorized uses.

Motorized use: Roads within the project area may be closed in the short-term during harvest activities to address safety concerns. These short-term access restrictions would be in place depending on the harvest units and haul routes needed. Existing county roads would not have any access restrictions. During harvest activities the county roads used would have dust abatement to reduce the safety hazards to visitors. After timber harvest activities were completed, the project area roads open to motorized use would again become available for public use.

The following segments describe the access management changes in respect to dispersed recreation activities:

McGinnis Creek

- Road # 803 would have a seasonal wheeled motorized closure (April 1-June 30) on approximately 3.5 miles of previously open road. This road would remain open to winter motorized use.
- Kimmerly Road 316B would be bermed and closed to wheeled motorized travel on approximately 1.6 miles above the Kimmerly Creek crossing. This section was previously open seasonally to wheeled motorized use. The road would remain open from December 1 to April 15 to winter motorized use.

- Road #9898 would be gated yearlong at the intersection with the North Fork Road . This previously open road accessed an unnamed flat along the North Fork of the Flathead River in between Great Northern Flats and Big Creek Campground.

In general, the access management changes would limit motorized access for dispersed activities such as hiking, huckleberry picking, camping, and hunting. However, the public may still access the areas via non-motorized means.

Hunting: Short-term restrictions would occur on hunting access in areas of harvest activities and timber haul routes. Hunting access would be unchanged except for the specific motorized road changes noted above.

Recreation Special Use Permits: There would be no effects on any special use permits for the project area.

Wedge Canyon Fire

Developed Recreation: No developed recreation sites would be affected by project activities in the Wedge Fire project area.

Dispersed Recreation: No known dispersed recreation sites would be affected by project activities and road access closures.

Motorized Use: Roads within the project area may be closed in the short-term during harvest activities to address safety. This would be necessary for the timber haul use and visitor safety issues. These short-term access restrictions would be in place depending on the harvest units and haul routes needed. Existing county roads would not have access restrictions. During harvest activities the county roads used would have dust abatement to reduce the safety hazards to visitors. After timber harvest activities were completed, the project area roads open to motorized use would again become available for public use.

The following segments describe the access management changes in respect to dispersed recreation activities:

- Road # 907 would have approximately 0.8 miles closed yearlong to motorized use, this includes snowmobiles.
- Road #9805 would be closed yearlong to motorized use past the Hornet Lookout trailhead with a berm. This road is currently closed to snowmobiles past this location.

In general, access management changes would limit motorized access for dispersed activities such as hiking, huckleberry picking, camping, and hunting. However, the public may still access the areas via non-motorized means.

To be in full compliance with the Forest Plan (Amendment 19), additional road management would have to take place. Over 20 miles of open yearlong/seasonally open roads would have to be closed to wheeled motorized vehicles; the Proposed Action closes about 5 miles. In addition, another 45 miles of roads would need to be decommissioned; the Proposed Action decommissions 16 miles of road. Because of the small size of Lower Whale subunit, and miles of main open roads (North Fork and roads in Glacier NP) it is impossible to meet the Open Road Density objective under Amendment 19 without restricting access to private and state lands.

Hunting: Short-term restrictions may occur on hunting access in areas of harvest activities and timber haul routes for public safety. Hunting access would be unchanged except for the specific motorized road changes noted above.

Recreation Special Use Permits: There would be no effects on any special use permits for the project area.

3.13 Scenery

3.13.1 Introduction

Scenery, as well as other natural resources, must be cared for and managed for future generations. Visual resources vary by location and existing natural features including vegetation, water features, landform and geology, and human-made elements. All activities that forest visitor's experience are performed in a scenic environment defined by the arrangement of the natural character of the landscape along with components of the built environment.

3.13.2 Management Direction

The National Environmental Policy Act of 1969 (NEPA) states that it is the "continuing responsibility of the Federal Government to use all practicable means to assure for all Americans, aesthetically and culturally pleasing surroundings." NEPA also requires "a systematic and interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts into planning and decision-making which may have an impact on man's environment.

Management direction regarding scenic resources is derived from the Forest Plan and several USDA handbooks including but not limited to: Landscape Aesthetics: A handbook for Scenery Management, Agriculture Handbook No. 701 and National Forest Landscape Management, Volume 2, Chapter 6 Fire; Agriculture Handbook No. 608.

Forest Plan Direction/Other Direction

The Forest Plan Direction described below is not all-inclusive to the issues and resources of the project; however, the direction displayed is the most pertinent to the visual resources being analyzed.

Standards & Guidelines (Forest Plan Page II-22 thru II-23)

- In each management area, meet or exceed the recommended Visual Quality Objective (VQO). Where management area goals and objectives can be fully achieved and a higher VQO met without increased costs or reduced future options, the higher VQO should be achieved.
- Visual resource analysis will normally be part of all project planning in the following areas of the Forest.
- Wild and Scenic River Corridors (Recreation and Scenic portions) of the Flathead River.
- Achieving the long-term visual quality goal on the Forest will work in direct proportion to how well the cumulative effects of time and space are addressed.
- Special concerns due to catastrophic events will be handled on a case-by-case basis.

Management Area Direction

The Forest is divided into Management Areas. These areas were based on geography, the pattern and intensity of use, and the sensitivity to potential management conflicts. The Robert-Wedge Fire Salvage Project occurs in Management Areas 2A, 2B, 3, 7, 9, 11, 12, 15, and 18: The visual resource standards and guidelines for each MA is noted in Table 161 below.

Table 161. Visual Resource Standards and Guidelines for Management Areas

Management Area	Robert Fire	Wedge Fire	VQO ¹
MA 2A	X	X	R
MA 2B		X	R
MA 3	X	X	R
MA 7		X	PR
MA 9	X		PR
MA 11		X	M
MA 12	X	X	PR
MA 15	X	X	M/MM
MA 17	X		PR
MA 18 (Recreational)	X		PR
MA 18 (Scenic)		X	R

¹ **Visual Quality Objective (VQO): A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.**

- **Retention (R): Human activities are not evident to the casual Forest visitor.**
- **Partial Retention (PR): Human activities may be evident, but must remain subordinate to the characteristic landscape.**
- **Modification (M): Human activity may dominate the characteristic landscape but must at the same time utilize naturally established form, line, color and texture. It should appear as a natural occurrence when viewed in middle ground or background.**
- **Maximum Modification (MM): Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.**

Recreation Opportunity Spectrum (ROS): described in the Recreation report.

Management Area 2A & 2B

Management Area 2A emphasis is on unroaded lands that offer a variety of dispersed recreation opportunities that meet the ROS classification of semi-primitive non-motorized (SPNM). This management area often occurs on alpine ridges.

Management Area 2B emphasis is on unroaded lands suited for dispersed recreation that meet the ROS classification of semi-primitive motorized (SPM).

Visual Quality:

1. The VQO will be Retention.

Management Area 3

Emphasis is on maintaining or enhancing amenity values that include nongame wildlife species, visual quality, old growth, and water quality. Recreation opportunities will be provided where they won't interface with wildlife and fish values.

Visual Quality:

1. The VQO is retention.

Management Area 7

One of the primary management goals consists of maintaining a pleasing, natural-appearing landscape in which management activities are not dominant. The Forest Service will manage the timber resource with roads in a manner that compliments and protects high scenic values. Where possible, minimize insect, disease, and fuel buildups that reduce resource values.

Maintain or create natural-appearing, diverse patterns of vegetation, using various silvicultural systems. These goals will be accomplished by limiting application of even-age timber management practices. Treatment areas will be designed to reflect the form, line, color or texture common to the characteristic landscape in a particular viewing area.

All resources will be managed consistent with the Partial Retention VQO. Dispersed recreation activities in a roaded natural-appearing environment will be permitted.

Visual Quality:

1. The VQO is Partial Retention.

Facilities – roads:

1. Design and construct roads which are in harmony with the Partial Retention VQO. Road location and design consider the benefits to future recreation uses. The transportation system must be kept in the condition necessary to meet management direction and to protect the investment.

Insect & Disease:

1. The timber resource should be managed in such a manner as to prevent insect and disease buildups that reduce resource values. This will support the primary management emphasis of maintaining a pleasing, natural-appearing landscape in which management activities are not dominant.

Management Area 9

Provide the size, age, diversity, and distribution of habitat units (both cover and forage areas) suitable for white-tailed deer winter habitat.

All summer recreation activities in a roaded natural-appearing environment are compatible. Winter recreation activities will not be encouraged and may be restricted if conflicts between recreationists and whitetailed deer management occur.

Visual Quality:

1. The visual quality of the Management Areas generally will meet a partial retention PR visual quality objective.

Management Area 11

Non-motorized recreational opportunities will be provided at current levels, but will not be encouraged and may be restricted if conflicts between recreationists and grizzly bear management occur.

Visual Quality:

1. The visual quality of this Management Area will at least meet the modification VQO.

Management Area 12

Visual Quality:

1. Partial retention will be the minimum VQO. Because of the limited size of this MA, the overall VQO for a drainage will be largely determined by the adjacent MA.

Management Area 15

Other resources will be managed in a manner consistent with the timber management goals. The visual landscape may be altered. Roded natural-appearing recreation opportunities environment will be provided.

Visual Quality:

1. The VQO will generally be modification or maximum modification.

Management Area 17

Emphasis is to protect and enhance riparian zones throughout the Forest, including fish and wildlife habitat, while maintaining a sustained yield of timber. Timber harvest will be used to maintain age class diversity of overstory vegetation and enhance riparian values.

Visual Quality:

1. The overall visual quality will be influenced by adjacent Management Areas.

Management Area 18

Management emphasis consists of National Forest System lands designated for wild, scenic and recreation river management under the Wild and Scenic Rivers Act. Manage each segment of the Flathead Wild and Scenic River Unit in a manner consistent with the classification assigned to it by Public Law 94-486, the designating Act. Maintain the scenic, ecological, and recreation integrity of the resource through responsible management. Emphasize visitor contact and education. Protect private land rights within the designated corridor.

All Resource Elements:

1. The following is a summary of the management direction for the Wild and Scenic River system on the Flathead National Forest.

Forest Cover:

1. Recreation River Segment – Design approved vegetative manipulations to protect the values for which the river was classified.
2. Scenic River Segment – Manage the vegetative cover in this segment for visual quality, wildlife protection, and water quality.

Visual Quality:

1. Flathead National Forest lands within the Scenic segment have a VQO of Retention and the Recreation segments have a VQO of Partial Retention.

2. Private lands under scenic easements seen from the river have a recommended VQO of Retention. Unseen lands from the river have a recommended VQO of Partial Retention. Final VQO will be determined by the terms of the easements.

Scenic River Segment

1. Salvage/sanitation harvest can be accomplished to protect the river resource values.
2. No roads will be constructed that cannot be returned to their natural condition.

Structures and Improvements:

Recreation and Scenic River Segments

1. Screen or blend administrative facilities into the natural river setting.

Visual Management System

The USFS developed the Visual Management System (VMS) in 1974 to analyze the visual effects of resource management actions. The visual landscape is considered a basic resource to be treated as an essential part of and receive equal consideration with the other basic resources of the land. In 1995, the Scenery Management System (SMS) replaced the VMS. The Flathead National Forest will convert to the new SMS system during Forest Plan revision.

This analysis will be completed using Visual Quality Objectives (VQO) assigned during Forest Plan development as the basis of visual assessment. Other tools that will be used or created for the visual analysis are: VQO direction contained in management area descriptions, VQO map and a seen area simulation from the critical viewpoints along the North Fork Road and the North Fork Flathead River.

A key component of these VQOs is that they do not apply to natural disturbance events. The Forest Plan, on pages II-23 states that “special concerns due to catastrophic events will be handled on a case-by-case basis.”

3.13.3 Affected Environment

Scenery management is necessary because people are concerned with the quality of their environment, including aesthetic values of landscapes, particularly scenery and spiritual values. Scenery with natural-appearing landscapes enhances people’s lives and benefits society. Natural-appearing landscapes serve as psychological and physiological “safety valves” for increasing urban population pressures and the increasing complexity of life. In many towns, mountain forest landscapes are very important to resident’s lifestyles and visitor’s perceptions of the area. Wildfires, like the Robert-Wedge Fire, can drastically modify the forest setting, and in turn, people’s quality of life.

Landscape Character

Landscape character gives a geographic area its visual image and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Landscape character embodies distinct landscape attributes that exist throughout an area.

The North Fork of the Flathead River landscape offers a variety of viewing opportunities in the form of driving for pleasure, viewing scenery, hiking, floating the river, fishing, hunting, snowmobiling, snowshoeing and cross-country skiing, etc. In addition, the District offers cabin rentals which are booked year-round by recreationists.

Pre-Fire Visual Condition

The pre-fire landscape of the Project Areas were a mixed-coniferous forest types (subalpine fir, lodgepole pine, ponderosa pine, Douglas-fir, whitebark pine, western white pine, and Engelmann spruce) with patches of mature aspen and shrubs such as Sitka alder, red osier dogwood and some devil's club. Rocky bluffs and outcrops were, and still are, prominent throughout the area.

Before the Robert-Wedge Fire, tree harvesting occurred throughout the project areas. As a result there are some obvious alterations to the landscape and an assortment of vegetation patterns. Geometrical lines from past harvesting practices have created a contrast of form, line, color, and texture between the harvested and non-harvested areas. Roads used to access these harvest areas are also common within the project area. The stark contrast between vegetation patterns is apparent during the winter months, when snow highlights the contrast between harvested and non-harvested areas. Past fires have also created a change in the vegetation patterns. The landscape is rated as *common* (a landscape where landforms and features are not of unusual or outstanding scenic quality) and distinctive to the Flathead National Forest. Based upon review of the constituent information listed in the Forest Plan, the concern or sensitivity level for the scenery is rated as high (USDA Forest Service 2002).

Existing Visual Condition

The Robert-Wedge Fire burned trees and vegetation with high to moderate intensity along the North Fork Road and North Fork Flathead River corridor. In some places, opening views of the river corridor and the scenic features of Glacier National Park as compared to pre-fire conditions have enhanced scenery viewing and driving for pleasure. The post-fire landscape is a mosaic of black, gray, and green. Black burned tree trunks and thick black/gray ash contrast with lighter colored exposed mineral soils, green grass, and aspen. Scattered patches of unburned vegetation occur throughout the area, offering contrast from the burned areas. Post-fire vegetation would be mostly non-conifer species like aspen, oak, and grasses. Broad grasslands would tend to develop. Conifers may take 15 to 20 years to reach 15 to 20 feet tall. These species are important scenic and recreational assets and could be expected to rapidly soften the visual effect of the burn and set the stage for forest revegetation. Pine and mixed conifer trees would be slow to re-establish.

Emergency measures implemented in the burn area following the fire also have contributed to a less than natural landscape in those affected areas. Removal of hazard trees at the Great Northern Flats River access site resulted in a geometric line of cut trees (Figure 45).



Figure 45. Great North Flats River Access

The Robert-Wedge fires have created a number of viewpoints throughout the project area. Views from trails and roadsides have changed dramatically. Vistas now exist within the Wedge Fire along the Hornet Lookout Forest Development Trail (FDT) 349, Cleft Rock Trail (FDT 13), Hornet Lookout, Whale Creek Road (318), Teepee Creek Road (FDR 907) and the North Fork Road. Within the Robert Fire vistas have been created along the Smoky Range National Recreation Trail (FDT 270), Kimmerly Creek Road (FDR 316), McGinnis Creek Road (FDR 803) and the North Fork Road. From the North Fork Road a number of panoramic views of Glacier National Park have been created.

Landscape use patterns

Most of the project area has been actively managed for a long period of time. The area is used by local residents who cut trees for posts, poles, firewood, and berry picking in the Robert fire project area. Throughout this area driving for pleasure, photography, rafting, fishing, hunting, snowmobiling and cross-country skiing occurs. Management of this area includes evidence of timber harvests, recreational uses, and grazing. A number of large-scale, stand replacing wildfires burned much of the landscape prior to the 1930's, creating diversity in tree heights and textures.

“Fire plays a significant role in perpetuating a seral lodgepole forest. Without periodic disturbance, shade tolerant species replace Lodgepole pine. Fire interrupts the succession and increases the proportion of lodgepole with each burn.” USDA Forest Service, National Forest Landscape Management, volume 2 chapter 6.

Critical Viewpoints

The following describes the critical viewpoints used for analysis of the effects of proposed management activities on the scenery of the area.

Primary Travel Routes and Viewpoints – The main travel route into the Robert-Wedge Project Areas are along the North Fork Road that offers views of Glacier National Park immediately to the east. One of the main attractions is the North Fork of the Flathead River, which has been designated as a Wild and Scenic River. An addition primary viewpoint in the Robert Fire project area is the Great Northern Flats boat launch, which is a primary access to the recreational section of the river.

Secondary Travel Routes and Viewpoints - In the *Robert Fire* project area, secondary travel routes include the Kimmerly Creek Road (FDR 316 and 316B), the McGinnis Creek Road (FDR 803), and the Smoky Range National Recreation Trail and Trailhead (FTR 270). In the Wedge Fire project area, the secondary travel routes and viewpoints area the Whale Creek Road (FDR 318) and the Wedge Canyon Road (FDR 907).

Private Lands

Landscapes adjacent to private lands need not be managed as restrictively as travel corridors but there should be a blending from the managed forest to the private. Treatments around private lands should blend with both the current condition of the private and Forest Service lands. Attempts should be made to reduce the possible creation of the sometimes, strong line between the private and Forest Service boundaries. The zone width is dependent upon management and use of private lands, slope and variety of vegetation now occurring.

Seen Area Map

A seen area map (project file) was generated to determine which treatment units could be seen from the road and the river (Table 162, Figure 46, and Figure 47):

Table 162. Units seen from North Fork Road and North Fork Flathead River

Robert Fire Treatment Units	Prescription	Management Area	Seen from North Fork Road	Seen from North Fork Flathead River
348	16 AC/skyline	MA 15	X	Unlikely below road prism
Planting south of 301 and 306	Planting	MA 12 & 18	X	Unlikely below road prism
301	16 AC/helicopter	MA 3A	X	X – looking back upstream
366	AC/skyline	MA 15	X	X – looking back upstream
328	24 AC/tractor adj. pvt. lands	MA 15	X – Brief views	X – looking back upstream
367	50 AC/skyline	MA 15	X	X – looking back

Robert Fire Treatment Units	Prescription	Management Area	Seen from North Fork Road	Seen from North Fork Flathead River
				upstream
364	19 AC/skyline adj. pvt. lands	MA 15	No - green veg screening	No – green veg screening
365	1 AC/skyline	MA 15	No – green veg screening	No – green veg. screening
329	45 AC/tractor	MA 15	No – green veg screening	No - green veg screening
330	75 AC/tractor	MA 15	No – green veg screening	No – green veg screening
372	28 AC/skyline	MA 15	X	X - likely
373	31 AC/skyline	MA 15	X	X - likely
314	36 AC/helicopter	MA 15	X	X
315	110 AC/helicopter	MA 15	X	X
316	22 AC/helicopter	MA 15	X – brief green veg screening	No – green veg screening
Great Northern Flats	Planting	MA 18	X	X
FR 9898	Planting	MA 18	X	X – brief, veg & topo screening
Wedge Fire Treatment Units	Prescription	Management Area	Seen from North Fork Road	Seen from North Fork Flathead River
129	25 ac/skyline	MA 7	X	X – brief view, veg screen
128 East half	417 ac/tractor	MA 15	X – brief view, veg screen	Unlikely
127	53 ac/tractor	MA 7 & 15	X	Unlikely
Wurtz Hill	Planting	MA 7 & 15	X	Some planting

Robert Fire Treatment Units	Prescription	Management Area	Seen from North Fork Road	Seen from North Fork Flathead River
				may occur in W&S corridor
126	16 ac/tractor	MA 7	X	Unlikely – veg, topo, & distance
Planting between units 125 & 126	Planting	MA 7	X	Some planting may occur in W&S corridor
125	65 ac/tractor	MA 7	X	Unlikely – veg, topo, & distance

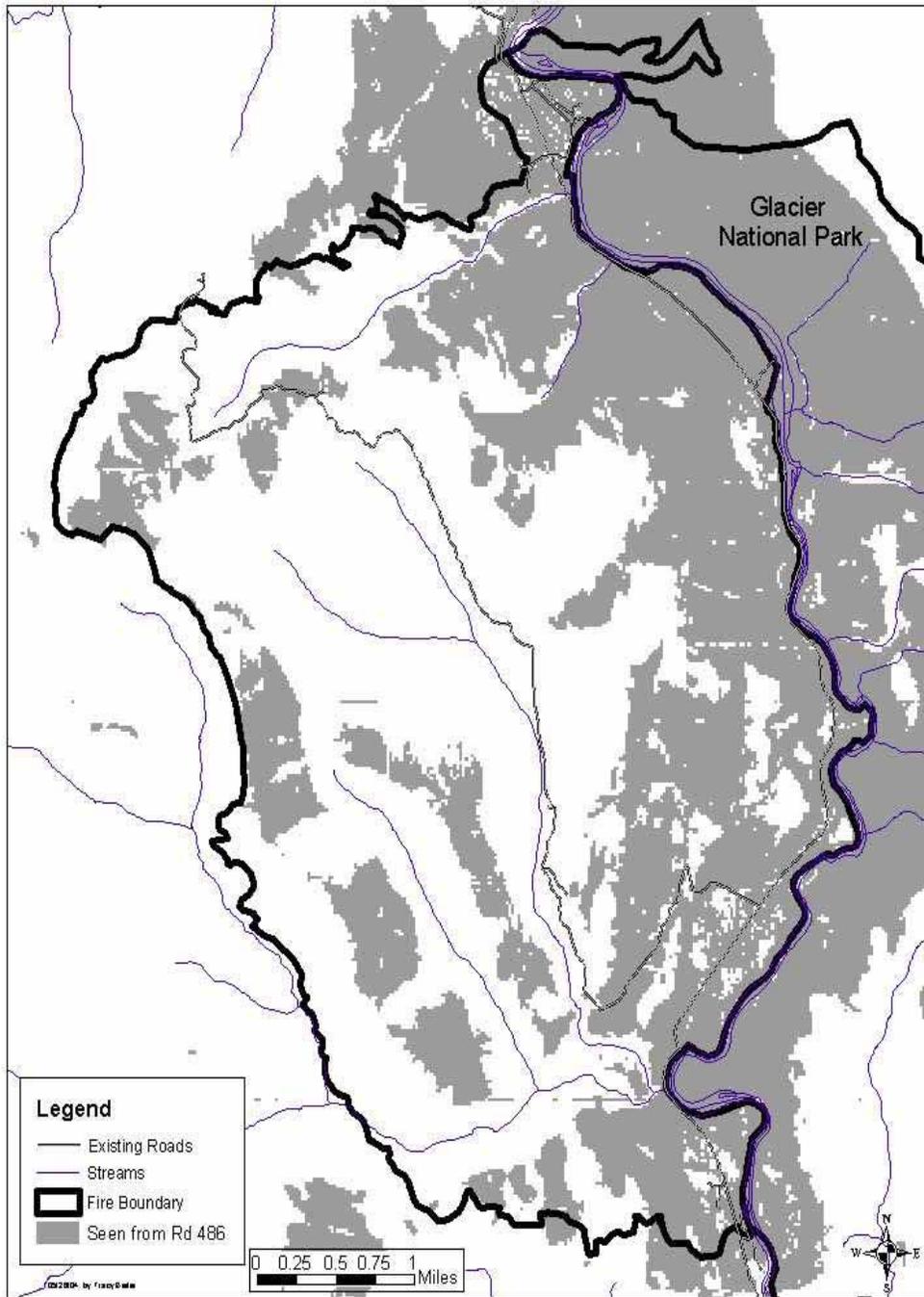


Figure 46. Seen Area Map of Robert Fire Area

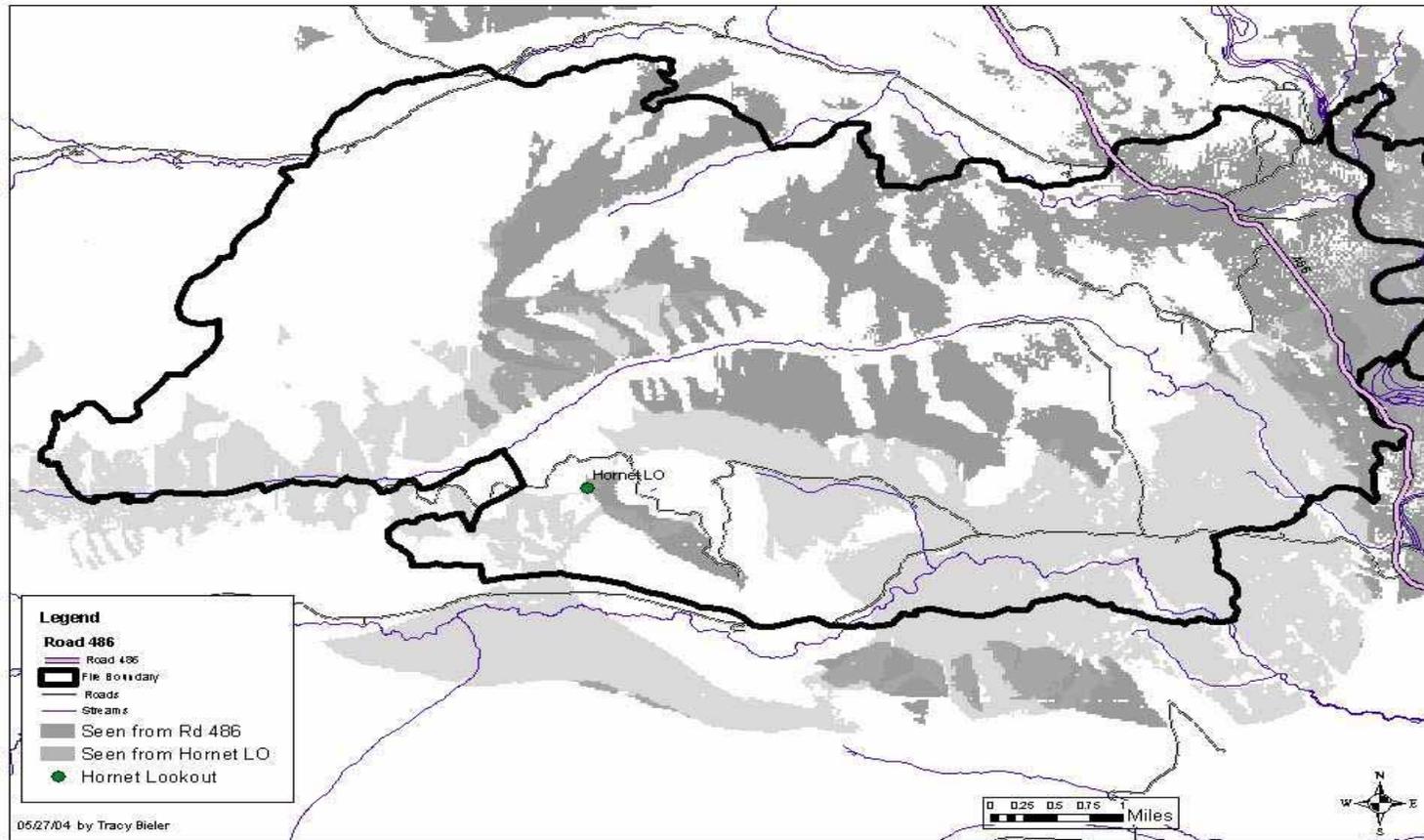


Figure 47. Seen Area Map of Wedge Canyon Fire Area

3.13.4 Environmental Consequences

The Forest Plan calls for the application of knowledge of native succession and the use of disturbance regimes in developing future desired landscape patterns (Flathead National Forest Land & Resource Management Plan II-5). It is also stated that in each management area VQOs (Visual Quality Objective) will meet or exceed the recommended VQO. It further states that if the management area goals can be fully achieved and a higher VQO can be met without increase costs or reduce future options, the higher VQO should be achieved (Flathead National Forest Land & Resource Management Plan II-22). Also, it is stated in the Forest Plan that visual resource will normally be part of all planning in Wild and Scenic River Corridors within the Recreation and Scenic portions and also within the North Fork of the Flathead River. In addition the Forest Plan calls for the use of proper design and scheduling of activities to reduce the potential impacts on the visual resources by allowing for disperse and non-concentrated resource allocation within an area or travel corridor. However, the Forest Plans does make exception for the implementation of visual quality objectives in the event of a catastrophe like the Robert Wedge Fire. Because of this unique situation, units will be handled on a case by case base with emphasis on adhering to present VQO direction by the Forest Plan per Management Area. The following effects indicator was used to focus the scenery analysis and disclose relevant environmental effects while meeting the Retention and Partial Retention objectives: a qualitative assessment of change in scenic quality using Stand, Seen Area, and Management Area maps.

The action alternative involves prescriptions and management activities that would result in a change from the existing character of the project area. It is anticipated that the activities of the proposed action alternative would meet the visual quality objectives allocated in the Forest Plan. The following information describes the effects or changes the proposed action and the no-action alternatives will have on scenery in the project area.

Alternative 1 (No Action)

Direct and indirerct Effects:

Under this alternative, due to the effects from both the Robert and the Wedge fires the existing visual condition would persist. Burned areas would regenerate grass and various shrubs into green spaces. After many years a mature forest will exist.

In the short term the landscape will be dominated by a landscape mosaic of black, gray, and dispersed green trees in color. Due to the high tree mortality rate by fire in the area, the dominant tree color is black. This landscape has become saturated with dead and dying trees. In many instances the charred landscape provides no tree canopy, or no mid level layer vegetation i.e. shrubs through the majority of the landscape. The overwhelming color of the ground is gray. There are few dispersed green areas with trees, shrubs, and grass which give the green color to the landscape that were untouched by the fire. This action will not allow the Forest to achieve its management objectives of Retention, Partial Retention, or Modification in a reasonable amount of time considering that it would take the landscape many years to recover to its previous forested character

In the long term visual quality as it pertains to the foreground from the roads, trails, Wild and Scenic River, and disperse campsites throughout the project area would not meet the Retention or Partial Retention objectives of the Forest Plan due to extensive amount of snags and trees falling to the ground. In addition the landscape would continue to be altered with the existence of the dying trees throughout the project area.

Alternative 2

This alternative was designed to move the project area from the current existing visual condition towards the desired future condition in the Forest Plan. Under this alternative, due to the visual resource changes from both the Robert and the Wedge Canyon fires the existing visual condition would not persist. Burned areas would regenerate grass and various shrubs into green spaces on their own. The planting of various units would assist in a faster recovery of the various VQOs set fourth by the Forest Plan. After many years a mature forest will come into existence. The plantings of various species of trees, the planting of shrubs, and the salvage of the burnt trees in the project area would all assist in obtaining the VQOs of Retention, Partial Retention, and Modification in the management areas.

Direct and indirect Effects:

In the short term the landscape will be dominated by a landscape of seedlings and shrubs that are green in color. Due to the plantings and the salvage, the dominant tree color would be green. In many instances the charred landscape which provided no tree canopy, or no mid level layer vegetation i.e. shrubs would now have green vegetation growing in the various planted units. The overwhelming color of the ground would be green. The dispersed green areas with trees, shrubs, and grass which give the green color to the landscape, that were untouched by the fire, would provide focal points for the forest visitor. Although this reforestation is not a natural occurrence, the positive effects to the scenic resources will help maintained an attractive setting. The scenic quality of the backdrop would dramatically change to move the landscape to achieve the various VQOs set forth in the Forest Plan. This action alternative would allow for a faster acceptable change of scenic quality. This alternative leads to a desired setting for forest visitors. This action will allow the Forest to achieve its management objectives of Retention, Partial Retention, or Modification in a reasonable amount of time considering that it would have taken the landscape many more years to recover from the burned existing landscape.

In the long term visual quality as it pertains to the foreground from the roads, trails, Wild and Scenic River, and disperse campsites throughout the project area would meet the Retention or Partial Retention objectives of the Forest Plan due to removal of extensive amounts of snags and black trees.

In the long term visual quality as it pertains to the foreground from roads, trails, Wild and Scenic River, and disperse campsites throughout the project area would meet the Retention or Partial Retention objectives of the Forest Plan due to extensive removal of the black trees, removal of slash build up in piles due to proper disposal, and the use of lop and scatter method of slash where necessary, reforestation and planting of the forest. In addition the landscape would not be continued to be altered with the existence of the dying trees throughout the project area.

Cumulative Effects

The cumulative effects analysis area for this resource is the project area, including both National Forest Systems lands and those under other ownerships. Past harvests, road building, and other management activities have placed unnatural shapes and textures on the landscape, both on the National Forest System lands and on private lands. Past fire activity, especially the Robert and Wedge Canyon fires have also changed the look of the landscape.

Foreseeable actions affecting scenery include timber harvest on state and private lands within the fire parameter but outside the project area.

Alternative 2 proposes to remove trees within the fire parameter. Where tree removal would occur, patches of live and dead trees would remain on site to help soften the effects of salvage activities. In addition reforestation and plantings of various tree species would speed up regeneration of new trees, and screen out stumps and debris in the years to come.

Road and landing constructions would be placed out of the immediate foreground (300') of the Flathead Wild and Scenic River corridor, Hornet Lookout, and Forest Road 486. This would decrease the amount of activity seen by the Forest visitor traveling by river or by river. After time has passed allowing for the trees to fall, new trees to begin growth, and shrubs growth recovery, there would be little visual difference between areas that recovered naturally and salvaged areas.

3.13.5 Regulatory Framework and Consistency

The current Forest Plan pages 11 (1,19 and 23), pages III (2-117) where applicable to this project, and pages VI (6) establish standards and visual quality objectives. Alternative 2 has undergone a visual resource analysis guided by the Forest Plan guidelines and were found to be in compliance with the management goals and VQOs established by the Forest Plan.

3.13.6 Irreversible and Irretrievable Commitments of Resources

No irreversible or irretrievable commitments of Scenic resources would occur with implementation of this action alternative.

3.13.7 Design Criteria for Scenic Resources applicable to Alternative 2

Unit Design and Layout

Salvage units should be shaped to mimic natural patterns found in the landscape. Minimize straight lines or geometric shapes for unit design.

Do not locate the access road for the landings perpendicular to the haul road. Landings should be located so the forest visitor cannot look up a road and see right into the landing. The landing needs to be set off from the main road. Minimize the amount of slash on the landings by cutting and leaving un-merchantable sections in woods.

Tree marking will be visually sensitive along North Fork Road and the Flathead Wild and Scenic River Corridor. Paint will be on the side away from roads and trails for a reasonable distance. Butt marks may be on the visible side. Mark cut trees instead of leave trees where reasonable. The objective is to reduce marking paint visibility to the casual observer.

Stumps will be no more than 6 inches high. Stumps that are pulled up as a part of road work will be buried, scattered or removed unless needed for other purposes.

The following design criteria will apply to areas in the immediate foreground (300 feet or sight distance, whichever is less) of areas adjacent to residential developments on private land and units within primary travel corridors i.e. units 126,125,127, and 129. The objective of these measures is to reduce negative visual effects of logging, slash, and other salvage-related disturbances.

- Whole-tree salvaging will be used where possible.

- Slash piles, skid trails and landing areas will be minimized where possible.
- Skid trails will be returned to as near natural condition as possible.

Revegetation/Planting

Disturbed areas, including but not limited to exposed soil from timber salvaging, road, and landing construction, log skidding, etc. will be revegetated after the site has been satisfactorily prepared. Planting should be dispersed to mimic existing patterns of the vegetative mosaic.

Slash Treatment

Stockpiled slash, consisting of trees and limbs, will be randomly lopped and scattered over the disturbed areas to a depth no higher than 18". The effect of scattering the slash should mimic the adjacent environment.

Remove slash within 300' buffer when timber harvesting activities are within sensitivity level one corridors (primary travel corridors) Hornet lookout cabin, Hornet lookout trail, units in management area 7 (126,125,127, and 129) within the seen foreground area of the Flathead Wild and Scenic River.

Roads

New road construction will be designed to meet the scenic integrity objective. The location of the road should fit the landscape with a minimum degree of landform alteration limiting the amount of earthwork. Planning the design of alignments and reseeding of cut and fill slopes needs to consider minimizing impacts to scenic resources. Avoid excessive cut and fill slopes for road construction.

Amount and size of cut and fill slopes from along road beds shall be reduced and graded to conform to adjacent terrain. This can be accomplished by the use of slope rounding and warping slopes. Disturbed sites will be prepared to provide a seedbed for reestablishment of desirable vegetation. Practices may include contouring, terracing, ripping, and scarifying.

When possible avoid new road construction on lightly colored soils that would heavily contrast with the natural

Do not allow use of logging roads when it is wet enough to cause severe rutting.

Excess slash from roadwork will be piled and burned or buried.

Cut the ends of culverts to conform to the terrain, or bury the culverts to blend with the adjacent environment in order to minimize visual impact.

Skid Trails

Use the same design criteria measures above for roads and to reduce the effects of skid trails on scenic resources. Identify "buffer" trees along the skid trails to decrease the potential damage to the remaining trees. Remove the buffer trees that are severely damaged after hauling on the skid trail is completed.

General

All equipment and construction debris will be removed from the site.

In order to move the project area towards the various VQOs, additional field verification needs to be conducted to determine if some units are within the foreground and immediate foreground of the Flathead Wild and Scenic River which fall within Management Area 7.

Paying special attention to increase the removal of additional slash, within the confines of wildlife and watershed needs, would bring that management area towards its desired futures condition while accomplishing the pertinent VQO goals for that area. The units of interest to apply special design criteria measures include 126, 125, 127 and 129.

In order to reduce the short-term visual impacts of slash residue in units in close proximity to “foreground viewing areas” or “middle-ground viewing areas”, the following actions should be taken:

- Dispose of burn piles along open roads within two years.
- Where appropriate, low cut or angle cut stumps (maximum stump height 6”) in the immediate foreground (100’) along the following road and private lands with homes. The North Fork and the open portions of the McGinnis Creek Road (FDR 803), Kimmerly Creek Road (FDR 316B), Whale Creek Road (FDR 318), and the Teepee Creek Road (FDR 907).
- Rehabilitate landing areas next to open roads. Dispose of slash and scarify as necessary to establish new vegetation.
- In units along the North Fork road, slash should not exceed 1.5 feet deep.
- Landings and skid trails should not be located along the North Fork Road where practical. This will reduce the probability of recreational users utilizing corridors as recreational trails. Skid trails, log landings, skyline corridors, and temporary roads will be closed and rehabbed upon project completion.
- Any line skidding visible from key viewpoints should be considered for skidding over snow. This will minimize soil color contrasts created by disturbing soils resulting in lighter colored soils to appear.
- Planting within the Wild and Scenic River corridor should protect the values for which the river was classified.

3.14 Air Quality

3.14.1 Introduction

The primary air quality concerns associated with forest management activities include road dust, and smoke from wildfires and prescribed burning. The main air quality concern associated with this specific project is the amount and concentration of particulate matter (PM) produced by proposed prescribed burning. Wood smoke produces particles too small to be seen by the human eye, measuring 10 microns (one micron equals a millionth of a meter) and smaller. Larger particles tend to settle out of the air quickly, and are less likely to affect public health. Particles 10 microns and smaller may be inhaled deep in the lungs, posing a threat to public health and visibility. Particles 2.5 microns and smaller are of the highest concern for potential health effects.

The basic framework for controlling air pollutants in the United States is the 1970 Clean Air Act (CAA), as amended in 1990 and 1999 (42 U.S.C. 7401 et seq.). The CAA was designed to protect and enhance the quality of the Nation’s air resources. The CAA encourages reasonable federal, state, and local government actions for pollution prevention. State

Implementation Plans (SIPs) are developed to implement the provisions of the Clean Air Act. The SIPs describe the actions the state takes to achieve and maintain the “national ambient air quality standards” (NAAQS). Under the CAA, the Environmental Protection Agency (EPA) sets standards for air quality to provide both health and visibility protection. The state of Montana has also set standards to help protect air quality.

The EPA has established NAAQS for six criteria pollutants that have been determined harmful to the public and environment, including carbon monoxide, lead, nitrogen dioxide, sulfur dioxide, ozone, PM_{2.5} and PM₁₀. Prescribed burning produces very little to none of the first four of these pollutants. However, smoke from prescribed fire must meet the ambient air quality standards for PM₁₀ and PM_{2.5}. For Montana, the state standard for PM₁₀ is the same as the federal NAAQ: 50 µg/m³ (micrograms per cubic meter, which is 1/1,000,000 of a gram per cubic meter) for the annual arithmetic mean, and 150 µg/m³ for the 24-hour average. For PM_{2.5}, no state standard has been established, and the federal NAAQ is 15 µg/m³ for the annual arithmetic mean and 65 µg/m³ for the 24-hour average. Fine particulate matter, generally less than 2.5 microns in diameter (PM_{2.5}), is the primary cause of visibility impairment although gases also contribute. Emissions from wildland burning include both gases and particulate matter ranging in size from 0.1 to 2.5 microns which greatly impacts visibility. More information on air quality guidelines can be found at www.fs.fed.us/clean/air/airquality.html.

3.14.2 Analysis Area and Information Sources

The State of Montana is divided into ten airsheds by the Montana Air Quality Bureau. Typically, these airsheds are delineated by a county or combination of counties, unless there are overriding circumstances, such as non-attainment areas within its boundaries. Airshed 2 is the primary analysis area for assessing the influence of Robert-Wedge project activities on air quality because it encompasses the effects of any activities undertaken in the project area (as defined by the Montana/Idaho Airshed Group). Airshed 2 comprises Flathead, Lake, Sanders and the northern portions of Missoula and Powell counties.

3.14.3 Affected Environment

Meteorology

Smoke dispersion is primarily determined by transport winds and mixing height. Transport winds determine the direction of a smoke plume and the speed at which it travels, while mixing height controls the ability of smoke to mix into an air mass. In the spring and summer, solar heating of the earth surface is much more intense, increasing the amount of warm air contributing to an unstable atmospheric condition. The more unstable the atmosphere, the higher the likely mixing height, and the greater the dispersion. During the fall and winter, stable atmospheric conditions prevail as cooler air pools in the valley bottoms. Solar heating is not enough to heat this pooled air, so the stable conditions remain, reducing dispersion until a frontal passage “scours” out the valley air.

Forest Service management prescribed and wildland fire use contribute smoke that may cause short-term deterioration of air quality in the area. Management prescribed fires contribute smoke to the airshed, though these tend to produce less smoke than wildfires of equal size since fuel consumption is typically lower in prescribed burns. On the Flathead NF, prescribed burning is generally accomplished when dilution, dispersal, and mixing conditions are generally fair to excellent. Prescribed burning requires a permit from the Montana/Idaho Airshed Group and the burn must be implemented within the regulatory framework. More

information on the Montana/Idaho Airshed Group can be found online at www.smokemu.org

Airshed Characteristics

Fire has historically been a part of the vegetative dynamics in the Northern Rockies as evidenced by the burn mosaics of the surrounding forested lands. Fires continue to be a part of the natural forest ecosystem and produce local short-term impairment of air quality. The 2001 fire season is an extreme example of the wildland fire smoke effects on air quality. Although historical reports indicate that smoke was common and often thick in western Montana prior to the advent of fire suppression, most people are now accustomed to good air quality and are less likely to tolerate poor air quality.

The air quality of the Flathead River Valley is considered good to excellent throughout most of the year and meets Montana air quality laws and the CAA.

Air quality may be affected and various amounts of pollutants may occur from:

- Prescribed burning in the spring and fall by the Flathead NF, Montana Department of Natural Resources, and timber and land development companies.
- Prescribed burning to the west and south by other National Forests, other agencies and private companies or citizens.
- Wildland fire use for resource benefit occurring in the summer months in the Bob Marshall Wilderness, Great Bear Wilderness, and Glacier National Park.
- Wildland fires burning upwind to a distance of two hundred miles depending on the size of the fire.
- Agricultural field burning in the Flathead Valley and Idaho.
- Weather patterns, which help cause degradation when low pressure systems over Idaho pull suspended pollutants (dust and smoke) from large metropolitan airsheds and farms in Oregon, Washington and Idaho.

Wildland Fires

The risk of large wildfire outside the Robert Wedge project area remains high based on the continuous fuels surrounding the project area. Smoke produced by a large wildland fire could have an adverse effect on the air quality of the Flathead Valley.

Sensitive Areas

The EPA designates communities that do not meet air quality standards (NAAQs) over a period of time as “non-attainment areas.” States are then required to develop a plan to control source emissions and ensure future attainment of the standards. The emissions from prescribed fire may be considered as contributing emissions. Three cities in the Flathead Valley are considered sensitive areas because they are non-attainment areas for PM₁₀: Kalispell, Columbia Falls, and Whitefish. Kalispell is considered an area of concern, though not formally designated a non-attainment area for carbon monoxide.

The CAA provides for additional measures “to preserve, protect, and enhance the air quality” in larger National Parks, Wilderness Areas and other areas of special national significance. These areas are designated Class I airsheds. Of particular concern under this requirement is visibility or haze. The Prevention of Significant Deterioration (PSD) provisions of the CAA

require measures “to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreation, scenic, or historic value.” Stringent requirements are therefore established for areas designated as “Class I” areas (42 U.S.C. 7475 (d)(2)(B)). Designation as a Class I area permits only very small increments of new pollution above existing air pollution levels. There are several Class I airsheds in the vicinity. Glacier National Park is located directly east of the project area, and is the Class I airshed most vulnerable to project activities affecting air quality since prevailing winds often blow from west to east.

A requirement of PSD is that new major stationary sources, or major modifications of existing stationary sources, must first receive a PSD permit from the appropriate air regulatory agency before implementing construction or modification. A stationary source is one that is well defined, such as the smokestack of a coal-fired power plant or smelter. The Robert and Wedge Fire areas are not considered a major stationary source and therefore are not subject to the PSD permitting process.

3.14.4 Environmental Consequences

The indicator used to evaluate the effects of the alternatives on smoke production is particulate matter measured in tons/acre. Each of the action alternatives would produce particulate matter at various levels. While more than 90 percent of the mass of particulate matter produced by wildland fires is less than 10 microns in diameter, 80-90 percent is less than 2.5 microns in diameter (NWCG 2001). For this reason, some models only predict PM_{2.5} emissions.

Analysis Methods

The Smoke Impacts Spreadsheet (SIS) was used to estimate PM_{2.5} emissions and airborne concentrations downwind of prescribed burning. SIS utilizes existing accepted models in a spreadsheet format. SIS utilizes Consume 2.1 for pile burning emissions and CALPUFF 5.5 to model smoke dispersion.

SIS runs included assumptions that 20 landing piles per 100 acres would be burned, and that poor smoke dispersion would be experienced. These assumptions, combined with the tendency of SIS to model emissions at the high end of the expected range, means that smoke predictions likely represent worse case for pile burning. Modeling also assumed that transport winds would blow from the south or southwest, and that burning would occur over several days in the fall over a period of three years. Although the entire burning project could occur more quickly if conditions allow (i.e., without exceeding allowable emissions), it is more likely that completion of the project would take more than one calendar year. Pile burning allows management to control both the number of piles burned in a day and ignition patterns, as both have an affect on short term and long term maximum allowable emissions.

Table 163 contains the acres of treatment by alternative, and estimates of the total particulate matter (2.5), PM_{2.5} per acre, and the annual PM_{2.5} related to prescribed burning of piles.

Table 163. Particulate matter PM_{2.5} generated by pile burning by alternative.

Alternative	Salvage Unit acres*- (pile burn landings)	Total PM _{2.5} Emissions Estimate (Tons)	Total PM _{2.5} Emissions Annual Est. (Tons)*	PM _{2.5} Emissions (tons per acre)
1	0.0	0.0	0.0	0.0

Alternative	Salvage Unit acres*-(pile burn landings)	Total PM _{2.5} Emissions Estimate (Tons)	Total PM _{2.5} Emissions Annual Est. (Tons)*	PM _{2.5} Emissions (tons per acre)
2	2174.0	52.17	17.4	0.024

*** Calculated for a 3 year implementation schedule**

SIS- CALPUFF was used to model smoke dispersion and concentrations for the action alternative. Predicted ground level concentrations of 2.5 emissions dispersed almost completely 2 hours after ignition. Predicted ground level concentrations were less than 65 µg/m³, the 24-hour average. Burning eight piles directly adjacent to each other at one time results in a near violation of the standard on site at (64 µg/m³), but five miles downwind, the concentration drops to less than 20 µg/m³. Managers are unlikely to burn that many piles so close together in one day, especially when smoke dispersion conditions are poor. However, if they did, the 24 hour concentration average would not be violated.

Alternative 1 (no action)

Direct and Indirect Effects

No prescribed burning would occur in this alternative, therefore no prescribed burning smoke emissions would be produced by this project. As described above, the likelihood of a large wildfire within the Robert Wedge project area would increase over time as vegetation continues to fill in the burned area. The risk of large wildfire outside the Robert Wedge project area would remain high based on the continuous fuels surrounding the project area. Smoke produced by a large wildland fire could have an adverse effect on the air quality of the Flathead Valley.

In the absence of fuel reduction, and in the event of future wildland fire, varying levels of smoke could persist in the North Fork for several weeks, depending on local climatic conditions, level of dispersion (poor, good, etc.) and amount of smoke/emissions produced. Health and visibility could be adversely affected. Alternative 1 does not propose conducting any harvest activities or fuel reduction treatments to mitigate current and future heavy fuel loadings. Therefore, it is the least effective in reducing potential smoke emissions and associated pollutants from future wildland fires.

Alternative 2

Direct and Indirect Effects

Pile burning, road dust, vehicle emissions, and wildfire could adversely affect the air quality in the analysis area and surrounding area temporarily. The Flathead Valley could be inconvenienced by smoky conditions for short periods during prescribed burning operations or during the summer wildland fire season. Road dust due to log hauling and normal public traffic would be common to this alternative. Dust abatement would be used if needed on haul roads to minimize the effects of road dust.

Alternative 2 would be the most effective in reducing potential smoke emissions and associated pollutants in the long term. Alternative 2 proposes to conduct prescribed fire (pile burning) and would produce varying levels of smoke in the short term.

Pile burning would be used in this alternative to treat fuels, producing direct smoke emissions. Salvage harvest would generate landing piles under this alternative. Some units

would be whole tree yarded, leaving treetops at the landing, and then machine piled. Some excess slash produced by treatment activities may be piled and burned in the units, and some areas could be jackpot burned (accumulations burned in place). Smoke emissions vary with combustion efficiency and quantity of fuel burned. Machine piles and hand piles tend to produce more smoke than other burns because much of the consumption occurs during the inefficient smoldering phase of combustion. Potentially, pile burning would be conducted over the course of 1-3 years after salvage activities, so impact would not be concentrated. Areas where fuels have been treated under conditions selected to minimize effects on air quality should be less vulnerable to future intense wildfires where smoke effects are unpredictable. The risk of large wildfire within the Robert Wedge project area would increase over time as vegetation continues to fill in the burned area.

All burning would occur under conditions designed to ensure adequate smoke dispersal. The cumulative impacts of all private and agency burning are assessed daily during the burning season, thru the coordination of the MT/ID Air Quality Bureau. This prescribed burning would produce some smoke emissions. The NAAQS for PM₁₀ and PM_{2.5} would be met with all action alternatives provided pile burning is conducted over several days, months or years. Smoke from prescribed burning could cause short-term impacts on recreation and transportation in and near the project area. The size and location of a prescribed burn and weather conditions determine how much and in what direction smoke travels. Weather and smoke dispersion conditions outlined in the prescribed burn plan should alleviate any adverse smoke effects. Air quality in the Flathead valley would not be adversely affected by the pile burning proposed in this project.

Cumulative Effects

The cumulative effects area is Airshed 2. Smoke emissions produced by the implementation of an action alternative, road dust, and vehicle emissions could combine with air pollutants from other projects in the area such as other prescribed burning and particulates produced west of the project area. Action alternative effects would contribute to the cumulative impact of air pollutants within the Flathead Valley. Prescribed burning would be implemented during good smoke transport and dispersion conditions and would be accomplished over time, which should minimize any adverse effects from prescribed burning smoke emissions.

If no fuel treatment is accomplished in this project area, the potential for smoke from a large wildland fire is increased. The 2000 fire season displayed the adverse effects large wildfires can have on air quality. The size, duration, timing and air quality conditions of wildland fires cannot be predicted.

Wildland fires locally, or anywhere in the northwest and Canada, can affect regional haze in the Flathead Valley. Wildland fires would continue to produce smoke, primarily during the summer months. All alternatives have wildland fire smoke potential.

The 1990 air quality rules relate to fine particulates (PM_{2.5}), and visibility (regional haze). Additionally, EPA has issued the Interim Air Quality Policy on Wildland Fire and Prescribed Fire. The Interim Policy encourages states to develop and certify to EPA smoke management programs to address emissions from prescribed fire and prescribed natural fire. The operations of the Montana/Idaho State Airshed Group are critical to minimize cumulative air quality impacts within Idaho and Montana. The daily operations of the Airshed Group considers and tries to minimize impacts from prescribed fire, wildland fire, and wildland fire use.

3.15 SPECIAL DESIGNATIONS

3.15.1 INVENTORIED ROADLESS AREAS

No proposed activities will occur in Inventoried Roadless Areas

3.15.2 AFFECTED ENVIRONMENT

3.15.3 ENVIRONMENTAL CONSEQUENCES

3.16 Unroaded Areas

3.16.1 Introduction

National Forest Management Act regulations define unroaded areas as any area without the presence of classified roads, and of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas do not overlap with Inventoried Roadless Areas. For this analysis an unroaded area is defined as 1000 acres or more.

The Sierra Club uses a definition of unroaded that generally includes any parcel greater than 1000 acres that does not have road development in it and that serves to "block-up" large areas of unroaded ground (letter dated March 9, 2004)

Management Direction

The Flathead National Forest Plan provides no direct standards specific to unroaded areas. Management direction is dependent upon Management Area allocations originally designated within the forest plan.

The Transportation Rule (Roads Rule) Forest Service Handbook 7700 provides direction that road construction or reconstruction in inventoried roadless areas (IRAs) and contiguous unroaded areas may be authorized only if the Regional Forester determines a compelling need, until a comprehensive roads inventory and analysis is completed and incorporated into the forest plan. The direction is that roads will not be constructed in:

- Unroaded areas of more than 1,000 acres that are contiguous to Roadless Area Review and Evaluation (RARE II) IRAs, or;
- Unroaded areas of more than 1,000 acres that are contiguous to areas inventoried in land and resource land management plans that are contiguous to Congressionally designated wilderness areas or federally administered components of National Wild and Scenic River Systems classified as "Wild", or;
- Unroaded areas of 1,000 acres or more that is contiguous to unroaded areas of 5,000 acres or more on other federal lands.

These areas of 1,000 acres or more; must have a common boundary of considerable length, be at least ¼ mile in width, and provide important corridors for wildlife movement or extend a unique ecological value of the established inventoried area.

Analysis Area

The analysis area for the unroaded area discussion was the Robert and Wedge project area boundaries and also included any adjacent Inventoried Roadless Area.

Identification Process

Unroaded parcels of 1000 acres or more were identified through public scoping. The Sierra Club submitted information during public scoping and a map showing two areas they identified in the Wedge Fire project area as potential unroaded areas of 1000 acres for consideration (project files). No unroaded areas were identified within the Robert Fire project area by the public or by internal analysis.

3.16.2 Affected Environment

Robert Fire

There are no unroaded areas identified within the Robert Fire project area. One existing Inventoried Roadless Area is adjacent to the Robert Fire project area (Standard Peak IRA 1129) with a very small portion within the project area (less than 500 acres) but no activities are proposed in the Standard Peak IRA.

Wedge Fire

During public scoping the Sierra Club submitted information and a map that identified two potential unroaded areas. Although the potential unroaded areas were not named, the closest landmark will be used to refer to these two areas. One unroaded area includes Hornet Mt and the other includes Wedge Mt. The Hornet Mt and the Wedge Mt unroaded areas identified in the Wedge Fire project area are surrounded by existing roads and are not adjacent or contiguous with existing IRAs. Adjacent Inventoried Roadless Areas (IRAs) include Thompson-Seton RA 1483, Tuchuck RA 1482, and Mt Hefty RA 1481. No project activities are proposed for any IRA.

3.16.3 Environmental Consequences

Robert Fire

Alternative 1 (No Action)

There are no unroaded areas identified within the Robert Fire project area and there would be no effects on unroaded areas from implementation of Alternative 1.

Alternative 2 (Proposed Action)

There are no unroaded areas identified within the Robert Fire project area; therefore, there would be no effects on unroaded areas from implementation of Alternative 2.

Cumulative Effects

No direct or indirect effects would occur on any unroaded area for any alternative; therefore, there would be no cumulative effects.

Wedge Fire

Alternative 1 (No Action)

Alternative 1 would not impact the Hornet Mt or Wedge Mt unroaded areas.

Alternative 2 (Proposed Action)

Table 164 lists estimated acres of management activities proposed within the the Hornet Mt and Wedge Mt unroaded areas. Precise acres of timber harvest and tree planting were not available as the map shapefile used by the Sierra Club to identify unroaded areas was not available. Management activities include helicopter harvest and planting. No new classified or new temporary roads would impact either unroaded area.

Table 164. Estimated Acres of Management Activities (Hornet and Wedge Mt. Unroaded Areas)

Unroaded Area Name	Acres of Timber Harvest	Acres of Tree Planting
Hornet Mt	Est 600 acres (heli)	Est. 300 acres
Wedge Mt.	Est 200 acres (heli) Est 80acres (skyline) Est 60acres (tractor)	Est. 500 acres

The following characteristics will be used to analysis the effects of proposed treatments on the unroaded areas in the Wedge Fire project area.

Hornet Mt Unroaded Area

- **Natural Integrity, Apparent Naturalness, and Remoteness** – This unroaded area has had previous vegetation management including clearcuts, shelterwood cuts and tree plantations. The entire area is surrounded by existing roads and is not adjacent to any existing IRA or Wilderness area
- **Solitude** – Opportunities for solitude are limited due to limited size and the surrounding roads. Much larger IRAs are available within 2-3 miles and would provide much higher quality solitude values.
- **Primitive Recreation Opportunities** – Opportunities for primitive recreation are limited due to small size of the unroaded area and the surrounding roads. Much larger IRAs are available within 2-3 miles and would provide much higher quality primitive recreation opportunities. Hornet Mt Lookout is available for recreation use.
- **Other Features** –Hornet Mountain Lookout is available to the public as a rental cabin. There is a trail from a road trailhead to the lookout.
- **Manageability and Boundaries** – This unroaded area is completely surrounded by existing roads, is small in size and has been affected by past vegetation

management activities. The likelihood of this unroaded area being considered for Wilderness would be considered very low.

Wedge Mt Unroaded Area

- **Natural Integrity, Apparent Naturalness, and Remoteness** – This unroaded area has had previous vegetation management including clearcuts, shelterwood cuts and tree plantations. The entire area is surrounded by existing roads and is not adjacent to any existing IRA or Wilderness area
- **Solitude** – Opportunities for solitude are limited due to the small size and the surrounding roads. Much larger IRAs are available within 2-3 miles and would provide much higher quality solitude values.
- **Primitive Recreation Opportunities** – Opportunities for primitive recreation are limited due to small size of the unroaded area and the surrounding roads. Much larger IRAs are available within 2-3 miles and would provide much higher quality primitive recreation opportunities.
- **Other Features** –Wedge Mt has scenic views but does not have any lookout structure.
- **Manageability and Boundaries** – This unroaded area is completely surrounded by existing roads, is small in size and has been affected by past vegetation management activities. The likelihood of this unroaded area being considered for Wilderness would be considered very low.

Cumulative Effects

Proposed management activities (timber harvest and tree planting) would impact both unroaded areas. However, due to the low manageability and limited wilderness values these unroaded areas would likely have been very low probability for inclusion into the wilderness system. Therefore, no cumulative effects would occur on the unroaded area resource by management activities proposed for the Robert and Wedge fire project area.

3.17 Wild and Scenic Rivers

3.17.1 Introduction

The North Fork Flathead River (North Fork) forms the eastern boundary of the Robert-Wedge Canyon post-fire project areas. On October 12, 1976, Congress designated 219 miles of the Flathead River as a part of the National Wild and Scenic River System. Within the Wedge Canyon project area, the North Fork is designated as a Scenic river, while within the Robert Fire project area, the river is designated as a Recreational river.

Under the Wild and Scenic River Act, Scenic River areas are “free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.” Recreational River areas are “readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.”

Analysis Area and Information Sources

The analysis area for the environmental effects to Wild and Scenic Rivers is the actual segments either adjacent to the project or segments that are visible from the project areas.

Information sources include the Wild and Scenic River Act, the Flathead Forest Plan, and the Flathead Wild and Scenic River Recreation Management Direction, which amends Management Area 18 direction in the Forest Plan. The Flathead Forest Plan designates all portions of the Flathead Wild and Scenic River as Management Area 18, Wild and Scenic River. Goals for this Management Area are to manage the river in a manner consistent with the classifications assigned under the Wild and Scenic River Act.

In 1986, the Forest Plan was amended to incorporate more specific recreation management direction for the Wild and Scenic River into Management Area 18. In this amendment, the North Fork was divided into two management units, the Upper North Fork and the Lower North Fork. The boundary between the two units was set at Big Creek rather than Camas Bridge since this better reflected long established use patterns. From a recreation perspective, the Upper North Fork unit is managed as a Scenic River while the Lower North Fork unit is managed as a Recreational River.

Management Direction

Relevant recreation management direction for the Upper North Fork Management Unit above Big Creek and the Lower North Fork below Big Creek:

- Maintain and enhance for viewing the existing characteristic natural landscape within the designated corridor.
- Require any human modification of the corridor to harmonize with the natural landscape.
- Relevant management direction for the Scenic River Segment above Camas Bridge includes:
 - Forest Cover – Permit timber harvest and vegetative manipulation where such activity can be accomplished without substantial adverse impact on the natural appearance of the classified corridor. Trees, brush and other vegetation can be removed: 1) in connection with appropriate development, 2) to reduce or eliminate safety hazards, 3) to prevent deterioration of river values, 4) to improve wildlife habitat, and 5) where economic values can be removed without significant degradation of river values.
 - Plan and manage timber harvest operations in a manner that meets the visual quality objectives established in this plan. Evaluate each timber sale proposal to determine that each sale follows this management plan.
 - Design approved vegetative manipulation projects to protect the values for which the river was classified. Where possible, they would be screened from the river or designed to blend with natural lines, forms, textures, and colors. Management activities outside the river corridor would be coordinated with river management objectives to minimize impacts on views from the river.
- Give special emphasis to protecting streamside vegetation.

Relevant management direction for the Recreational River Segment below Camas Bridge includes:

- Forest Cover – Manage timber and other vegetation in the corridor primarily for visual and wildlife purposes.
- Allow vegetative manipulation in the river corridor: 1) in connection with the construction and maintenance of appropriate developments, 2) to reduce a safety hazard, 3) when determined necessary to prevent deterioration of river values, 4) to improve wildlife habitat, and 5) to maintain a healthy, vigorous timber stand.
- Where possible, management activities would be screened from the river or designed to blend in with natural lines, forms, textures, and colors. Management activities outside the river corridor would be coordinated with river management objectives to minimize impacts to views from the river.
- Management direction for other resources within Management Area 18 is in accordance with the congressionally designated segments and is found in Appendix BB of the Forest Plan.

3.17.2 Affected Environment

Robert (Lower North Fork Unit - Recreational River)

The Lower North Fork Unit (Recreational River corridor) within the Robert project area is characterized by a generally undeveloped shoreline, with the exception of the Great North Flats river access site. The river flows through a much narrower valley and lacks the spectacular scenic views found in the Wedge Canyon project area. The North Fork Flathead River road traverses through or forms the western boundary of the river corridor. Before the Wedge Canyon fire, this heavily used route was not visible from the river, but now portions of this heavily traveled route can now be seen from the river. Recreational use is similar to that described for the Upper North Fork unit. The Great Northern Flats river access is used as a take out point for those exiting the Scenic river as well as a launch site for those beginning a trip on the Recreational river. The fire burned at high intensity between the road and the river, killing many trees. Post-fire hazard tree removal cut most of trees in the vicinity of Great Northern Flats river access area, creating an unnatural geometrical line.

Wedge Canyon (Upper North Fork Unit - Scenic River)

The Upper North Fork unit (Scenic River corridor) within the Wedge Canyon project area is characterized by a generally undeveloped shoreline and spectacular scenic views into Glacier National Park and the surrounding National Forest land. The North Fork Flathead River road adjoins the river corridor at the south end of the fire but deviates west of the river corridor through most of the project area. Therefore the road within the project area is not readily visible from the river.

The fire severity within the river access was low and only a few trees were singed. Burnt ridges may be seen as background views from the river in this section. River floating occurs from early May through October with the heaviest use occurring in July and August. Most trips begin at the Ford river access just south of the project area, although some access the river at Wurtz River Access and north of the project area at the Border River Access sites. Exit points occur south of the project area at Polebridge, Coal Creek and Big Creek river access sites. Three commercial outfitters and one or two institutional outfitters are permitted to float the river. The area between the North Fork Road and the North Fork River is closed to motorized use from October 15 to May 14.

3.17.3 Environmental Consequences

Direct and Indirect Effects

Alternative 1 (No Action)

No activities as proposed would occur. Other ongoing activities would continue. The No Action alternative would not affect the Wild and Scenic values for either the recreational segment or the scenic segment. The existing viewshed conditions with a mix of black snags and live green trees would continue for many decades.

Alternative 2 (Proposed Action)

Robert (Lower North Fork Unit - Recreational River)

No salvage harvest would occur within the MA 18 for this recreational segment of the river. However, approximately 197 acres would be planted in two units within MA 18; one is at Great Northern Flats (117 acres) and the other is at an unnamed flat north of Great Northern Flat (80 acres.). The planting of lodgepole pine at these two areas would reduce the recovery time for reforestation and the return the area sooner to a green, forested condition.

Wedge Canyon (Upper North Fork Unit - Scenic River)

No salvage harvest or planting would occur within the scenic segment of the river. Therefore, the scenic river segment would not be affected by project activities.

Cumulative Effects

There would be no adverse cumulative effects caused by the activities in the recreational segment of the river.

3.17.4 Regulatory Framework and consistency

All management activities and proposals are within management guidelines and direction for the recreational and scenic segments of the North Fork of the Flathead River.

3.18 ROBERT-WEDGE POST-FIRE PROJECT PAST/ONGOING/FORESEEABLE ACTIONS

Wedge Canyon Fire Affected Area

Past Actions

Timber harvest has taken place in the Wedge Canyon fire area since 1951, including precommercial thinning and reforestation. Approximately 32% percent of the fire area on NFS lands has been harvested (includes the range of light partial cuts to clearcuts). The most recent timber sale analysis occurred in the Hornet Wedge Project (Decision Notice was signed in December 1996):

Decision Notice:

- Dead and live trees removed in 52 units - 588 acres (expected to yield 4339 MBF)
- miles of new temporary road rehabilitated after use
- 5.25 miles of reconstruction on existing roads
- 1.5 miles of road reconstruction
- 0.3 miles of road relocation
- 19.8 miles of road reclamation (decommissioning) (2 road systems left to be decommissioned this summer; 1 road system will be included in the decommissioning schedule for Rob/Wedge)
- Removed about 9 miles of roads off of the road system
- 18.2 miles of yearlong wheeled vehicle closures

Timber sales from the Hornet Wedge Project - Help Me Rhonda (T36N, R22W, Section 13-14, 23-24), Snap Crackle Pop (T36N, R22W, Section 2), Doogan Dog (T36N, R23W, Section 13-14; T36N, R22W, Sections 11-14, 23-26), Happy Trails (T36N, R22W, Sections 17-18; T36N, R23W, Sections 14-16, 21-22)

Help Me Rhonda

- 59 acres
- Harvesting began in 1999 and ended in 2002

Snap Crackle Pop

- 9 acres
- Harvesting began and ended in 2000

Doogan Dog

- 374 acres
- Harvesting began in 1998 and ended in 1999

Happy Trails

- 99 acres
- Harvesting began in 1999 and ended in 1999

Center Mountain Roads Reclamation Decision Memo (signed in August 1996 - most of analysis was tiered from the Hornet Wedge EA)

- 11 miles of road reclamation
- Removed about 2.5 miles of roads off of the road system
- Most decommissioning work is completed except for 1 road which is planned for this summer

Road construction/reconstruction/maintenance began with the construction of the North Fork Road. The northern stretches of the road was constructed in 1921. After World War II, the Forest Service began to maintain the North Fork Road for logging purposes.

Noxious weed spraying in river access sites over the last few years.

Personal use firewood cutting, Christmas tree harvesting, post and poles, and bough collection

Hunting, fishing, snowmobiling and dispersed recreation

Fire suppression since 1910.

Wedge Canyon fire suppression and rehabilitation: about 53 miles of fire line were constructed and rehabilitated. Of the fireline construction, approximately 19 miles were hand line and 34 miles were constructed with mechanized equipment. Fire retardant was deployed with air tankers between mid-August and late September.

Trees adjacent to roads within the Wedge Canyon area that were identified as a hazard to firefighters and the public were felled during fire suppression actions. Removal of these trees began in the winter following the fire (some will occur this summer).

Wedge Canyon Fire Burned Area Emergency Rehabilitation (BAER) projects occurred on NFS lands during September/October 2003: included grass seeding, straw mulching, protecting a heritage site, removing a few culverts, stabilizing inlets and outlets of culverts, cleaning culverts, installing drain dips on roads, repairing a bridge, and installing/maintaining waterbars on trails.

Private land development

Some extensive clearing/logging of private lands particularly in the Teepee Lake area occurred immediately after the fire.

Current and Reasonably Foreseeable Actions

Planting trees in burned-over plantations over the next few years.

Trail Creek Road Slump repair (BAER project) is expected to be worked on this summer.

BMP Project - Roads and culverts throughout the fire area require improvements to meet best management practices (BMPs) and accommodate elevated levels of run-off anticipated from the fire. Activities began in the summer 2004 and will likely continue for the next 2 years. This road maintenance work, which includes roads planned for timber hauling associated with proposed harvest activities, is addressed in the *Burned Areas Road Maintenance Project*. This project refers to a program of road maintenance activity to apply Best Management Practices on up to 328 miles of forest road in or near areas that were burned by wildfire during 2003. Approximately 54 miles of roads will be maintained in or adjacent to the Wedge Canyon Fire. Types of road maintenance work include:

- Maintenance of road drainage structures including cross drains
- Brushing
- Maintenance of fill slopes, cut slopes, and ditches
- Maintenance of roadway surfaces
- Maintenance of bridges and culverts

- Removal of culverts
- Replacement of undersized culverts
- Upgrading or removing structures to provide for fish passage
- Installation of additional road drainage features including rolling dips

Commercial Mushroom Harvest – A signed decision authorized commercial and personal mushroom harvesting within the Wedge Canyon Fire area. Mushroom harvest will begin in May 2004 and expected to be completed in August 2004.

Routine road maintenance – Routine road maintenance occurred in the summer of 2003 and is likely to occur as needed on existing roads within the project area. These actions include road blading, done on an annual basis, and culvert cleaning when needed.

Two roads (Road 1672 and 5234) will be decommissioned this summer (Hornet Wedge Decision Notice).

Road 1671 will be bermed this summer as per the Hornet Wedge Decision Notice

Recreational public uses such as sightseeing, hiking, camping and snowmobiling are expected to continue. Public use is anticipated to increase over the next 10 years.

Special forest product gathering for personal use is likely to occur, such as berry picking, firewood and Christmas tree cutting, evergreen bough and cone collection, particularly in those areas unaffected by the fire.

The closure order for firewood cutting in the fire area currently in effect will be rescinded after harvest activities. Additional signs will be placed in riparian areas prohibiting firewood cutting in these areas (which are also specified in all firewood cutting permits) once the closure order is lifted.

BAER monitoring in the fire affected area; bull trout habitat, seeding/revegetation, whitebark pine, weeds, and the heritage site.

Further private land development

The Montana Department of Natural Resources and Conservation (DNRC) is currently logging Section 16. They plan on being completed by 2004

Heartrot Study in Western Larch – Research study by University of Montana to study relationships between heart rot caused by fire killed western larch by different size and age classes. Study to be conducted in 2004 and 2005.

Robert Fire Affected Area

Past Actions

Timber harvest has taken place in the Robert Fire area since 1946, including precommercial thinning and reforestation. Approximately 50% percent of the fire area on NFS lands has been harvested (includes the range of light partial cuts to clearcuts). The most recent timber activity occurred in 1993.

Road construction/reconstruction/maintenance began with the construction of the North Fork Road. The northern stretches of the road was constructed in 1921. After World War II, the Forest Service began to maintain the North Fork Road for logging purposes.

Noxious weed spraying in river access sites over the last few years.

Personal use firewood cutting, Christmas tree harvesting, post and poles, and bough collection

Hunting, fishing, snowmobiling and dispersed recreation

Fire suppression since 1910.

Robert Fire suppression and rehabilitation: about 26 miles of fire line were constructed and rehabilitated. Of the fireline construction, approximately 2 miles were hand line and 24 miles were constructed with mechanized equipment. Fire retardant was deployed with air tankers between mid-August and late September.

Trees adjacent to roads within the Robert Fire area that were identified as a hazard to firefighters and the public were felled during fire suppression actions. Removal of these trees began in the winter following the fire (some removal will occur this summer).

Robert Fire Burned Area Emergency Rehabilitation (BAER) projects on NFS lands during September/October 2003: included grass seeding, hazard tree falling in the Great Northern Flats area, replacing several culverts, stabilizing inlets and outlets of culverts, cleaning culverts, installing drain dips on roads, and installing/maintaining waterbars on trails.

Private land development

Small amount of private land clearing/logging has occurred in areas adjacent to the North Fork Road. In addition, Stoltze Land and Lumber Company has logged their portions of land in the lower reaches of the McGinnis Creek drainage.

Current and Reasonably Foreseeable Actions

Planting trees in burned-over plantations

BMP Project - Roads and culverts throughout the fire area require improvements to meet best management practices (BMPs) and accommodate elevated levels of run-off anticipated from the fire. Activities began in the summer 2004 and will likely continue for the next 2 years. This road maintenance work, which includes roads planned for timber hauling associated with proposed harvest activities, is addressed in the *Burned Areas Road Maintenance Project*. This project refers to a program of road maintenance activity to apply Best Management Practices on up to 328 miles of forest road in or near areas that were burned by wildfire during 2003. Approximately 84 miles of roads will be maintained in or adjacent to the Robert Fire. Types of road maintenance work include:

- Maintenance of road drainage structures including cross drains
- Brushing
- Maintenance of fill slopes, cut slopes, and ditches
- Maintenance of roadway surfaces
- Maintenance of bridges and culverts
- Removal of culverts
- Replacement of undersized culverts

- Upgrading or removing structures to provide for fish passage
- Installation of additional road drainage features including rolling dips

Commercial Mushroom Harvest – A signed decision authorized commercial and personal mushroom harvesting within the Robert Fire area. Mushroom harvest began in May 2004 and ended in August 2004.

Routine road maintenance – Routine road maintenance occurred in the summer of 2003 and is likely to occur as needed on existing roads within the project area. These actions include road blading, done on an annual basis, and culvert cleaning when needed.

Recreational public uses such as sightseeing, hiking, camping and snowmobiling are expected to continue. Public use is anticipated to increase over the next 10 years.

Special forest product gathering for personal use is likely to occur, such as berry picking, firewood and Christmas tree cutting, evergreen bough and cone collection, particularly in those areas unaffected by the fire.

The closure order for firewood cutting in the fire area currently in effect will be rescinded after harvest activities. Additional signs will be placed in riparian areas prohibiting firewood cutting in these areas (which are also specified in all firewood cutting permits) once the closure order is lifted.

BAER monitoring in the fire affected area; revegetation, hillslopes, whitebark pine, and weeds.

Heartrot Study in Western Larch - Research study by University of Montana to study relationships between heart rot caused by fire killed western larch by different size and age classes. Study to be conducted in 2004 and 2005.

Further private land development