

Appendix 58

Flathead Forest Plan Amendment 21, Appendix IV

Subbasins and Geographic Unit Descriptions

As part of its planning process, the Flathead National Forest developed the following subbasin and geographic unit descriptions and priorities. The forest is divided into seven “subbasins”: Flathead Lake, lower Flathead, North Fork Flathead, Middle Fork Flathead, South Fork Flathead, Swm, and Stillwater.

SWAN SUBBASIN

469,278 acres (all ownerships)

282,462 acres (Flathead National Forest land only)

A. CHARACTERISTICS OF THE SUBBASIN

The Swan Subbasin is bounded by the Swan Range to the east, the Mission Mountains Range to the west, and the Clearwater Divide to the south. This subbasin encompasses the entire Swan River system including Swan Lake.

The main valley is roughly 65 miles long and 9 miles wide, narrowing to about one mile in width along Swan Lake. Elevations range from slightly under 3,000 feet to over 9,000 feet. Upper timberline is at approximately 7,000 feet. The subbasin is roughly bisected by the Swan River, which flows generally north to where it enters Flathead Lake.

Land ownership in the subbasin is mixed. Approximately 60 percent of the land is managed by the Flathead National Forest (a large part of this is designated or proposed wilderness), 20 percent by Plum Creek Timber Company, 10 by the Swan River State Forest, and 10 percent by other, mainly private, landowners. The communities of Bigfork, Ferndale, Swan Lake, Salmon Prairie, and Condon are located within the subbasin.

A large portion of the subbasin is covered with montane and subalpine conifer forests supporting over a dozen species of conifers. Lodgepole pine stands are quite common throughout the subbasin. On the Swan Range side of the subbasin, at lower elevations, Ponderosa pine and Douglas fir are more common to the south, with Grand fir and Douglas fir more common to the north. On the Mission Range side, at lower elevations, stands typically have a mixture of 4-7 tree species, with 2-3 overstory dominants, notably western larch, Douglas-fir, and Engelmann spruce. Higher timberline zones are partially forested with whitebark pine, subalpine fir, and subalpine larch. Mountain hemlock are also found at higher elevations in the southern part of the Mission Range.

Drier forest types often have beargrass/huckleberry understory. In moist forest types, there is typically a well developed shrub layer, e.g., menziesia, alder, mountain maple, huckleberry, etc. The wetland complexes, which were historically influenced by beavers, include sites that support many sensitive plant species and the threatened species, water howellia.

Unique values and characteristic features that are especially noteworthy:

Human Uses

- Extensive intermingled ownership pattern occurs in the lower elevations.
- Mission Mountains Wilderness is largely within this Subbasin.
- Western portal to Bob Marshall Wilderness complex.
- Jewel Basin-- a special designated hiking area.
- Diverse recreation uses including hiking, camping, firewood cutting, snowmobiling, fishing, and hunting.
- Extensive road network and logging in the valley bottom.

Terrestrial Ecosystems

- Ponderosa pine types are increasingly rare and isolated/fragmented, with increasing dominance of Douglas-fir on sites historically occupied by ponderosa pine.
- Whitebark pine communities are in decline.
- High concentration of rare plants, including the threatened species, water howellia.
- Conservation strategy to coordinate grizzly bear management between various land owners.
- Nesting bald eagles and peregrine falcons (threatened and endangered species).
- Full complement of terrestrial wildlife species historically found in valley.

Aquatic Ecosystems

- Presence of many fens, lakes and pothole ponds.
- Bull trout population is considered stable.
- Presence of native populations of westslope cutthroat trout.
- Introduced game fish include rainbow trout and brook trout.

B. SWAN SUBBASIN HISTORY

The following table displays the number of acres of timber harvest by decade on National Forest lands in the Swan Subbasin.

Timber harvest history on National Forest lands

<u>Decade</u>	<u>Regeneration Harvest (acres)</u>	<u>Intermediate Harvest (acres)</u>	<u>Selection Harvest (acres)</u>
1950s	3,440	45	8
1960s	12,925	2,351	222
1970s	8,338	4,048	710
1980s	5,830	5,870	377
1990s	884	528	0
Total	31,417	12,842	1,317

The following table displays the number of acres burned by wildland and prescribed fires across all ownerships in the Swan Subbasin.

Acres of wildland and prescribed fires in the Swan Subbasin

Decade	Wildland Fire (acres within perimeter)	Prescribed Fire ^{2/} (acres)
1910-1919	33,487	
1920-1929	6,255	
1930-1939	10,052	
1940-1949	0	
1950-1959	167	
1960-1969	1,616	
1970-1979	524	
1980-1989	759	751
1990-present	211	2,589
Total	53,071	3,470

^{2/}**Prescribed fire** includes fires intentionally ignited to meet planned objectives. Prescribed fires are analyzed in detail to determine the risks associated with their unique location and conditions at the time of the ignition. The acres of prescribed fire are on National Forest lands only; wildfire acres are across all ownerships. The objectives of prescribed burns were primarily for wildlife habitat enhancement or natural fuels reduction.

C. MANAGEMENT PRIORITIES FOR THE SWAN SUBBASIN

In the context of the Interior Columbia Basin, the Swan Subbasin was classified as cluster 3, indicating aquatic systems that are in relatively good condition, but forests that are highly altered and in poor condition.

Integrity Ratings for the Swan Subbasin (from Quigley and others 1996):

Forest	Aquatic	Hydrology	Composite
Low	Moderate	High	Moderate

Priorities for vegetation management include restoring large single-story and large multistory stand structures in ponderosa pine, western larch, and Douglas-fir cover types, on warm dry, warm moist, and cool moist potential vegetation groups, and prescribed burning of deer and elk winter ranges. The most extensive opportunities for these treatments are found in the Condon and Sixmile Geographic Units.

Western white pine and western larch restoration opportunities are found on warm moist sites at lower elevations, and whitebark pine restoration opportunities are found throughout the Subbasin at the higher elevations.

Bark beetle risk is currently considered *High* in portions of the Goat and Fatty Geographic Units. Risk is generally *Moderate* to *Low* in the Sixmile, Condon, and Lindbergh Geographic Units.

A management priority is to reduce the risk of severe fire in the urban-wildland interface. Fire hazard is considered *High* in portions of the Sixmile, Goat, East Shore, and Fatty

Geographic Units, and is generally *Moderate to Low* in the Condon and Lindbergh Geographic Units.

The highest priorities for watershed restoration in this subbasin are found in the Fatty and Lindbergh Geographic Units. All geographic units, except Sixmile, contain priority bull trout watersheds. All geographic units have opportunities for cutthroat restoration.

Within this subunit, access management and activity scheduling are coordinated across land ownerships by the Swan Valley Grizzly Bear Conservation Agreement.

Protection and management of the Mission Mountains Wilderness is a priority for this subbasin.

D. GEOGRAPHIC UNITS WITHIN THE SWAN SUBBASIN

Condon Geographic Unit - The Condon Geographic Unit is about 72,600 acres in size, of which 46,000 acres (63%) are managed by the Forest Service. Most of the non-Federal lands are owned by Plum Creek Timber Company, which manages its lands for long-term timber production.

The valley bottomlands make an abrupt transition to steep mountain slopes of the Swan Mountains. The higher elevation land is mostly unroaded and has been proposed for wilderness designation. The Condon Creek Botanical Special Interest Area, which includes numerous ponds containing water howellia populations or suitable habitat, is located in this unit.

Forests in the lower elevations developed under a frequent fire interval (non-lethal fire regime). There are numerous ponderosa pine, western larch, and Douglas-fir found at low-to-mid elevations, along with lodgepole pine stands. Upper elevations support mixtures of subalpine fir, Engelmann spruce, and the fire regimes are mixed or lethal.

There are two grizzly bear BMU subunits in the Condon Geographic Unit. The unit provides the majority of white-tailed deer winter range in the Swan Subbasin.

The Condon unit is relatively dry and the streams have lower volume than others in the subbasin. The unit contains a disjunct bull trout population (Holland Lake) and two priority bull trout watersheds. Lion Creek is considered to have very high integrity.

There is a large developed campground, resort, and private recreation residences under special-use permit at Holland Lake. The Owl Creek Packer Camp serves as a major trailhead, providing access to the Bob Marshall Wilderness Complex.

Lindbergh Geographic Unit - The Lindbergh Geographic Unit is the largest geographic unit in the Swan Subbasin. The total area is about 140,000 acres, of which 93,400 acres (67%) are managed by the Forest Service. The upper elevations make up the Mission Mountains Wilderness. Most of the non-Federal lands are owned by Plum Creek Timber Company, which manages its lands for long-term timber production. The western edge of the unit borders the Flathead Indian Reservation. There are management concerns about fire along this boundary.

The terrain is characterized by a broad valley floor, foothills, and the steep rugged terrain of the Mission Mountains. The lower elevation bottomlands contain extensive wetlands.

Streams are relatively stable and cold, due to areas of groundwater influence and high mountain lake runoff.

At lower elevations, ponderosa pine, Douglas-fir, subalpine fir, and spruce are common and the fire regime is typically mixed severity. At higher elevations, true fir and spruce are common, along with mountain hemlock and other tree species. Upper elevations fall within the mixed and lethal severity fire regimes.

The Lindbergh Geographic Unit contains a disjunct population of bull trout (Lindbergh Lake) and five priority bull trout watersheds. Elk Creek is considered to have very high integrity.

Lindbergh Lake and trailheads to the Mission Mountains Wilderness draw recreationists to the area. The unit receives a fair amount of fishing pressure in the mountain lakes. There are private homeowners around Lindbergh Lake and homes scattered throughout the lower elevation lands.

Forest fires burned over large portions of the unit in 1919 and created extensive lodgepole pine forests. The combination of thick lodgepole pine stands and intermingled private land sets up a future "urban interface" problem for control of wildland fires.

This unit contains the largest grizzly bear security core area in the Swan Subbasin and a large amount of low-elevation grizzly bear spring range. The Swan-Clearwater Divide, at the south end of the unit, is used as a travel corridor by grizzly bears. In the past, grizzly bear were relocated to the unit to augment the Mission Mountains sub-population, but that resulted in concerns from the local residents about "nuisance" bears.

The unit contains a sizable mountain goat population at higher elevations, primarily in the wilderness area. The unit contains productive white-tailed deer summer range.

Fatty Geographic Unit - The Fatty Unit is on the west side of the valley, south of Swan Lake. The geographic unit totals about 68,000 acres of land, of which the Forest Service manages 36,900 acres (54%). Plum Creek and the Swan River State Forest are the other major land managers in the unit. The lower elevations are typically managed for timber production. The western edge of the unit is designated wilderness and it borders a portion of the Flathead Indian Reservation. There are concerns about how to manage fires along this border.

The north end of the unit has characteristics of Pacific and Inland Empire forests - mesic/ moist/ warm habitat types capable of supporting western redcedar and grand fir. Whitebark pine communities are found at upper elevations. Fire regimes run from mixed to lethal severity.

The unit includes the 682-acre Swan River Research Natural Area, which was established to conserve unique forest habitat types - grand fir, subalpine fir, western redcedar, larch, and Engelmann spruce. The Nature Conservancy established the Swan Oxbow Preserve to conserve unique wetlands. The Swan River National Wildlife Refuge is located at the south end of Swan Lake, and is managed with a waterfowl production emphasis.

The Fatty geographic unit encompasses two grizzly bear BMU subunits.

The unit is heavily roaded and the Porcupine drainage is used extensively by snowmobilers.

Streams in this unit contain abundant brook trout and once supported cutthroat trout. There is one priority bull trout watershed in the unit.

Goat Geographic Unit - The Goat Unit is on the east side of the Swan Valley, south of Swan Lake. The unit totals about 103,000 acres, of which the Forest Service manages 56,800 acres (55%). Most of the remaining acreage is owned and managed by the State of Montana (Swan River State Forest), Plum Creek Timber Company, and small private landowners. The lower elevations are typically managed for timber production.

There are numerous avalanche chutes at the heads of drainages. Higher elevation areas are unroaded. The Bob Marshall Wilderness bounds the eastern side of the Goat unit.

Major tree species include ponderosa pine, western larch, and Douglas fir at low-to-mid elevations, along with lodgepole pine stands. Fire regimes are typically mixed severity. Upper elevations include mixtures of subalpine fir, Engelmann spruce, and typically have mixed or lethal fire regimes. The Swan Lake Ranger District recently used prescribed fire to restore whitebark pine in the Lion Creek drainage.

There are three grizzly bear BMU subunits within the Goat Geographic Unit. Portions of the lower elevation land provide winter range habitat for deer.

There are two priority bull trout watersheds within the geographic unit. Cutthroat and brook trout are also common.

Sixmile Geographic Unit - The Sixmile Geographic Unit is in the northern portion of the Swan Valley, which is much narrower than the southern portions of the valley. The unit totals about 85,000 acres, of which the Forest Service manages 49,600 acres (58%). The remaining acreage is owned by small private landowners, and included within the boundaries of the unit are the towns of Swan Lake, Ferndale, and part of Bigfork.

The ridge of the Swan Range bounds the unit on the east and the ridge along Crane Mountain bounds the unit on the west. The unit is bisected by the Swan River, which empties into Flathead Lake at Bigfork.

The unit supports a number of tree species, including: Douglas-fir, western larch, lodgepole pine, western white pine, subalpine fir, Engelmann spruce, whitebark pine, and western red cedar. Beetle infestations have led to recent salvage timber harvesting in the areas of Crane Mountain on the west side of the Sixmile Unit. A cold spell in the late 1980s led to mortality of a large number of western white pine in the unit. Fire regimes run from mixed to lethal severity.

The unit provides habitat to a number of wildlife species, including grizzly bear, deer, and elk. The mid-to-upper slopes of the Swan Range historically burned back brush fields, which provide winter range for deer and elk. The Swan Lake Ranger District uses prescribed fire as a tool to rejuvenate these areas.

There are no priority bull trout watersheds in this unit. Bull trout are found in Swan Lake. Tributary streams have high potential for cutthroat restoration. The dam at Bigfork prevents upstream migration from Flathead Lake and the rest of the Flathead river system.

Swan Lake attracts many summer tourists and there are numerous homes surrounding the lake, particularly along the north and east shores. Many of the homes have been recently built near National Forest lands and are in the "urban-wildland interface". There is a developed recreation site at the south end of the lake, which includes a recently reconstructed campground, picnic area, and boat launch. Fishing is very popular year-round. The unit has high visual significance and the Swan Highway provides views of both the Swan Range and Mission Mountains Range.

NORTH FORK FLATHEAD SUBBASIN
612,763 acres (all ownerships within the U.S.)
290,187 acres (Flathead National Forest land only)

A. CHARACTERISTICS OF THE SUBBASIN

The North Fork Flathead Subbasin is bounded by the Whitefish Range to the west and the Livingston Range to the east. The headwaters of the North Fork drainage lie within British Columbia, Canada.

In the United States, the western side of the river is predominantly National Forest land administered by the Flathead National Forest, while the eastern side lies within Glacier National Park. Other ownerships include the Coal Creek State Forest and tracts of private land. The communities of Polebridge and Moose City lie within the Subbasin, while Columbia Falls and Hungry Horse are located immediately to the south.

This Subbasin description focuses on the lands on the western side of the North Fork River. General characteristics of the lands within Glacier National Park are not included. Unique values and characteristic features that are especially noteworthy:

Human uses

- The North Fork River forms the boundary with Glacier National Park.
- Historic cabins and lookouts were established for administrative use and trapping.
- Early settlement (homesteading) occurred near Trail Creek, Polebridge and surrounding areas. This led to private ownership in the valley bottom along the North Fork River and continuing development.
- A small amount of mining has occurred within the Subbasin.
- Popular recreation uses including hiking, camping, driving, rafting, firewood cutting, berry picking, hunting, fishing, and snowmobiling.
- A groomed snowmobile trail system is in place within the Canyon Creek Drainage and along the Whitefish Divide.
- Long term research projects have been carried out within this Subbasin. The Subbasin is a desirable study area because of the intactness of terrestrial and aquatic ecosystems.

Terrestrial Ecosystems

- Forests are predominantly mixed species featuring Douglas-fir, western larch, lodgepole pine, subalpine fir, and spruce.
- Dry ponderosa pine communities are rare in the North Fork; some are found in a portion of lower Big Creek, Demers Ridge, and in the main Red Meadow valley.
- Cold moist habitats are dominated by lodgepole pine and spruce (frost-prone sites) in the northern and western portions of the Subbasin.
- Whitebark pine communities and western white pine communities are in decline.
- High populations of moose inhabit the Subbasin.
- Bald eagles nesting territories occur in the Subbasin.
- Presence of wolf packs.
- Relatively high density of grizzly bears are found in the North Fork.
- Rare presence of western redcedar in Canyon, Coal and Whale Creeks.
- Presence of fens supporting rare plants, especially on south end of the Subbasin.
- Presence of a wide range of forest carnivores.

Aquatic Ecosystems

- Large adfluvial migratory populations of bull trout that cross the international boundary.
- Population center for nesting harlequin ducks.
- North Fork of the Flathead River is designated under the Wild and Scenic Rivers Act as "Scenic" (northern portion) and "Recreational" (southern portion).
- Common loons nest on larger lakes.
- Broad, low gradient stream systems.
- Alluvial valleys with wet, cirque basins in the headwaters.
- International issues related to watersheds and water quality.

B. NORTH FORK FLATHEAD SUBBASIN HISTORY

Since the 1940s, commercial timber harvest has occurred in the North Fork Flathead Subbasin. During the 1950 - 1960's era, timber harvest was concentrated in mature spruce stands, and mixed species stands with spruce, in the mid to high upper reaches of many of the drainages where spruce bark beetle was epidemic. Primary harvest methods utilized during this period were clearcutting and overstory removal.

The purpose of commercial timber harvest since the 1960s has been a combination of white pine salvage, harvest of blowdown trees, fire/insect/disease salvage, harvest to reduce the risk of epidemic insect outbreaks, and general timber production. Major timber sales have also occurred throughout the past 50 years on private and State lands in the North Fork. Regeneration harvest methods have been a common practice on these lands.

White pine blister rust began having a major impact on western white pine in the North Fork in the 1960s. Salvage of white pine has occurred from that period throughout the 1980s, generally through regeneration harvest in mixed species stands of Douglas-fir, western larch, and western white pine.

Blowdown is a common occurrence in portions of the North Fork area, and salvage of these trees has occurred throughout the past 50 years of recorded data. A mountain pine beetle epidemic had a significant impact on lodgepole pine and whitebark pine stands from the mid-1970s to the early 1980s. Approximately 13,000 acres of commercial harvest during this period is largely attributable to that situation.

The following table displays by decade approximate harvest acreages within this Subbasin on **National Forest system lands**. Documentation of harvest levels prior to the 1950s is not readily available and is not included, although it is recognized that harvest did occur prior to 1950 on the National Forest lands. Harvest during this time period was generally individual tree or group selection.

Timber harvest history on National Forest lands.

<u>Decade</u>	<u>Regeneration Harvest (acres)</u>	<u>Salvage/ Intermediate Harvest (acres)</u>	<u>Selection Harvest (acres)</u>
1950s	9,030	2,884	
1960s	14,374	4,009	148

1970s	13,475	12,419	
1980s	4,402	9,532	
1990s	1,466	1,308	56
Total	42,747	30,152	204

The following table displays the approximate acres of wildland fire by decade on the west side of the North Fork River (does not include acres of wildland fire within Glacier National Park). Acreages were estimated either from aerial photos or on the ground. In most cases, the fires burned the areas in varying degrees over the landscape, and reburns of previously burned areas was common. Total acres within fire perimeters were reported, summed for the decade. Reburned areas would be counted each time they burned. The overall trend indicates a decrease in the acres burned per decade, probably as a result of fire suppression efforts.

Acres of wildland fire on National Forest lands.

Decade	Wildland Fire
1910-1919	72,000 acres
1920-1929	76,500 acres
1930-1939	200 acres
1940-1949	500 acres
1950-1959	200 acres
1960-1969	300 acres
1970-1979	2,000 acres
1980-1989	10,100 acres
1990-present	1,100 acres
Total	162,900 acres

The last large wildland fire in the Subbasin was the Red Bench Fire of 1988. This occurred in the Polebridge area and burned approximately 30,000 acres, of which approximately 4,400 acres was on private land and 5,700 acres was on National Forest lands. The remainder was within Glacier National Park. Approximately 300 acres of the burned area on National Forest lands were salvage logged in the late 1980s to early 1990s.

C. MANAGEMENT PRIORITIES

In the context of the Interior Columbia River Basin, the North Fork Flathead Subbasin was classified as high ecological integrity, and placed into forest cluster 1. Although the overall ratings for the Subbasin appear to be correct, there is considerable variation of conditions within the drainage.

The eastern portion lies within Glacier National Park, which has high ecological integrity. Within the western portion, substantial differences exist between Geographic Units in terms of management history and current conditions.

Integrity Ratings for the North Fork Flathead Subbasin (from Quigley and others 1996):

Forest	Aquatic	Hydrology	Composite
High	Moderate	High	High

Priorities for vegetation management throughout the Subbasin include restoration of whitebark pine stands that have been heavily impacted by white pine blister rust, conservation of large multistory stands, and prescribed burning on elk and deer winter ranges. Bark beetle risk is considered Moderate in the Coal Creek, Werner Creek, and Big Creek drainages; risk in other drainages of this Subbasin are currently rated as Low.

High priority drainages for watershed restoration are located in the Red Tepee, Hay Coal, Big Creek, and Canyon Geographic Units.

Conserving the high quality of grizzly bear habitat is a priority throughout the Subbasin. Current priorities for restoration are to increase habitat security within the Lower Whale, Red Meadow Moose, Hay Creek, Werner Creek, Lower Big, and Canyon McGinnis BMU Subunits.

Priorities for scenery management include restoration in the drainages at the southern end of the Subbasin, maintaining or creating views into Glacier National Park along the North Fork Road, and conserving high scenic values in the northern end of the Subbasin.

Within the Wild and Scenic River corridor, priorities include maintaining the high scenic quality and emphasis on implementing "leave no trace" practices.

Maintain and or restore adequate habitats to sustain the predator/prey relationships emphasizing the ungulate needs. Continue coordination with Montana Dept. of Fish, Wildlife and Parks to provide for wildlife habitat needs.

Continue to identify research needs in the North Fork, in coordination with Glacier National Park, Montana Dept. of Fish, Wildlife and Parks, U.S. Fish and Wildlife Service, and the universities, with an emphasis on forest carnivores.

D. GEOGRAPHIC UNITS

Trail Creek Geographic Unit - This is the northernmost unit in the North Fork Flathead Subbasin. Much of this area has a special management area designation in recognition of its importance as grizzly bear habitat.

This unit was extensively burned in 1910, 1917, and 1929 fires. Large areas regenerated to stands of lodgepole pine, which is now nearing maturity. This Geographic Unit may contain some of the healthiest stands of whitebark pine in the Subbasin, including sapling and pole size stands.

This Geographic Unit provides bull trout spawning habitat in Whale Creek and Trail Creek. Both are closed to fishing.

Harlequin ducks are known to breed in Trail Creek.

Tuchuck Research Natural Area is located in this Geographic Unit.

Recreation use is low, due to remoteness. The Trail Creek road crosses the divide to the Eureka area. Much of the recreation use is by locals from the Eureka, Fortine, and Trego areas.

Red Tepee Geographic Unit - The highest peak in the Subbasin, Nasukoin Peak at 8,086 feet elevation, occurs in the Red Tepee Geographic Unit. Large stands of alpine larch occur on the slopes of Nasukoin and other peaks in the Whitefish Range.

This area is known for its high quality grizzly bear habitat. Whitebark pine is an important component of the ecosystems in this Geographic Unit.

A big sagebrush community occurs along the North Fork River at Sonderson Meadow.

Lower elevation lakes and streams provide nesting and feeding habitat for bald eagles and common loons.

Recreation facilities include campgrounds, trails, and a scenic road crossing Whitefish Divide. A snowmobile trail is groomed from Olney to Red Meadow Lake.

Hay Coal Geographic Unit - The Coal Creek State Forest occurs in the lower portion of the Coal Creek drainage.

The valley bench area consists of glacial tills deposited by a valley glacier. These soils are easily eroded when vegetation cover is removed. A considerable amount of land along the river bottoms and lower benches are privately owned. Higher portions of the unit are characterized by steep, narrow, glaciated canyons. There are several small alpine lakes in the headwaters.

Lower elevation lakes and streams provide nesting and feeding habitat for bald eagles and common loons.

Coal Creek is closed to fishing to protect spawning bull trout. A genetically isolated strain of westslope cutthroat trout inhabits Hay Lake.

Recreation use moderate in this Geographic Unit.

Important bull trout habitat occurs in these drainages.

Big Creek Geographic Unit - This watershed drains eastward into the North Fork of the Flathead River, and also features a narrow, 4-mile long ridge (Demers Ridge) which parallels the river. There are approximately 1,700 acres of private land within this unit.

An extensive road network was developed in Big Creek to facilitate the removal of trees that died from insect and pathogen epidemics. Timber harvest was concentrated in the creek bottoms where much of the spruce mortality occurred, and on side slopes in the lower part of the drainage for regeneration harvests in the 1970s and 1980s. Corporate timberland in the headwater basin of Big Creek was clearcut in response to the spruce beetle epidemic.

This area has been identified as an important travel route for grizzly bears traveling to and from Glacier National Park along the Smokey Range Divide. This unit includes most of the big game winter habitat on the western side of the river.

Big Creek is an important bull trout and westslope cutthroat trout spawning stream, and therefore is closed to fishing.

Canyon Geographic Unit - This is the southernmost Geographic Unit within the North Fork Flathead Subbasin. Topography is steep, with narrow, alpine-glaciated canyons extending south and east to the Flathead River.

Western white pine, western redcedar, and hemlock grow in this area. Extensive stands of whitebark pine occur on the Whitefish Divide and the Smokey Range. Small fens supporting rare plant populations occur in the Geographic Unit.

Due to its proximity to towns, this geographic unit receives heavy recreation use, particularly for pleasure driving, huckleberry picking, firewood collection, hunting, and snowmobiling. Two roads provide loop drives.

The Big Mountain Ski Area is a focal point of recreational activities during both winter and summer seasons. There is a groomed snowmobile trail up Canyon Creek to the summit of Big Mountain.

MIDDLE FORK FLATHEAD SUBBASIN

721,446 acres (all ownerships within the Subbasin)

367,655 acres (Flathead National Forest land only)

A. CHARACTERISTICS OF THE SUBBASIN

The Middle Fork Flathead Subbasin is bounded by the Continental Divide to the east. The Middle Fork of the Flathead River forms the boundary between Glacier National Park and the Flathead National Forest. Approximately one half of the Subbasin is National Forest lands, with the remainder mostly within Glacier National Park. Relatively little of this Subbasin is in private ownership. The communities of Essex and West Glacier are found within this Subbasin.

Approximately two thirds of the National Forest lands in this Subbasin are within the Great Bear and Bob Marshall Wilderness Areas.

This Subbasin description focuses on the lands on the southern side of the Middle Fork River. General characteristics of the lands within Glacier National Park are not included. Unique values and characteristic features that are especially noteworthy:

Human uses

- Most of the National Forest land lies within the Great Bear Wilderness Area.
- Early settlement activities included construction of the railroad, summer homes, etc.
- High use by outfitter/guides historically and currently.
- Forest Service administrative cabins and work centers.
- Popular recreation uses including hiking, camping, rafting, firewood cutting, and hunting.
- The most used and popular segment of the Wild and Scenic River for rafting is from Moccasin Creek to West Glacier.
- Regeneration harvesting and road building occurred on lands now within the Great Bear Wilderness.
- Historic sheep and cattle grazing occurred in what is now part of designated wilderness and within the Wild and Scenic River Corridor.

Terrestrial Ecosystems

- Whitebark pine communities on ridgetops are in decline.
- Rare local presence of western redcedar; virtually no ponderosa pine types.
- Grizzly bear movement between Glacier National Park and the Wilderness complex.
- Presence of mountain goats.
- Evidence of past underburning in lodgepole stands in the Upper Middle Fork.
- Occurrence of root diseases within mid-slope Douglas-fir dominated stands.
- Very few fire starts historically above Schafer Meadows.
- Skyland area is very unique with regards to wind patterns, geology, soils, etc.

Aquatic Ecosystems

- Narrow stream valleys.
- Middle Fork of the Flathead included in the Wild & Scenic River system, "Wild" and "Recreational" segments.
- Large adfluvial migratory population of bull trout.
- Nesting population of harlequin ducks.

B. MIDDLE FORK FLATHEAD SUBBASIN HISTORY

Commercial timber harvest has occurred in the Middle Fork since the 1960s. Harvest during the 1960s to early 1970s era was concentrated in mature spruce stands, in mixed species stands with spruce, and in the high upper reaches of many of the drainages where spruce bark beetle was epidemic. The primary harvest method utilized during this period was clearcutting.

Although western white pine is not a dominant species in the Middle Fork, white pine blister rust began having an impact on the white pine in the Middle Fork in the 1970s. Some salvage of white pine has occurred from that period throughout the 1980s, generally in mixed species stands of Douglas-fir, western larch, and western white pine.

There have been no major insect or disease outbreaks in the Middle Fork during the past 30 years. It is documented that the presence of root rot is increasing within mid-slope Douglas-fir dominated stands. There has also not been large areas of wildland fire activity. Significant blowdown has occurred occasionally, the most recent being in the late 1980s. This is most common in the Skyland, Challenge, and Morrison drainages. The purpose of the commercial timber harvest since the 1960s has been a combination of white pine salvage, general blowdown and insect/disease salvage, and general timber production.

The following table displays by decade approximate harvest acreages within this Subbasin on **National Forest system lands**. Documentation of harvest levels prior to the 1950s is not readily available and is not included. Some minor amounts of salvage logging may have occurred in the valley bottom along the river corridor.

Timber harvest history on National Forest lands.

<u>Decade</u>	<u>Regeneration Harvest (acres)</u>	<u>Salvage/ Intermediate Harvest (acres)</u>	<u>Selection Harvest (acres)</u>
1950s			
1960s	328	378	
1970s	2,518	673	
1980s	4,402	20	
1990s	468	675	
Total	7,716	1,746	

The following table displays the approximate acres of wildland fire and prescribed fire (occurred with natural ignition and had an approved plan for management) that have been recorded on National Forest lands within the Subbasin. Acreage both within and outside the Great Bear Wilderness were estimated from photography or on the ground. In most cases, the fires burned the areas in varying degrees over the landscape, and reburns of previously burned areas was common. The overall trend indicates a decrease in fire activity in recent decades.

Acres of wildland fire on National Forest lands.

<u>Decade</u>	<u>Wildland Fire</u>	<u>Prescribed Fire ^{1/}</u>
<u>1880-1909</u>	<u>11,000 acres</u>	
<u>1910-1919</u>	<u>186,470 acres</u>	
<u>1920-1929</u>	<u>29,000 acres</u>	
<u>1930-1939</u>	<u>1,400 acres</u>	
<u>1940-1949</u>		
<u>1950-1959</u>	<u>500 acres</u>	
<u>1960-1969</u>		
<u>1970-1979</u>		
<u>1980-1989</u>	<u>844 acres</u>	
<u>1990 - present</u>	<u>660 acres</u>	<u>150 acres</u>
<u>Total</u>	<u>229,874 acres</u>	<u>150 acres</u>

^{1/}Prescribed fire is defined as a fire started by a natural ignition, that meets planned objectives and had a plan approved in advance of the fire start. This is dependent on relatively unpredictable lightning activity. Each individual fire start is analyzed in detail to determine the risks associated with its unique location and time of the year in relation to the approved plan.

C. MANAGEMENT PRIORITIES

In the context of the Interior Columbia River Basin, the Middle Fork Flathead Subbasin was classified as high ecological integrity, and placed into cluster 1. Like the North Fork, a portion of the Subbasin lies within Glacier National Park. The mid and upper elevations of the National Forest in this Subbasin are largely included within the boundaries of the Bob Marshall and Great Bear Wilderness Areas.

Integrity Ratings for the Middle Fork Flathead Subbasin (from Quigley and others 1996):

Forest	Aquatic	Hydrology	Composite
High	Moderate	High	High

Priorities for vegetation throughout the Subbasin include restoration of whitebark pine stands that have been heavily impacted by white pine blister rust, conservation of Large Multistory stands, and prescribed burning on elk and deer winter ranges. Bark beetle risk is considered *Moderate* in some drainages of the Paolo and Skyland Geographic Units, and *Low* or *Unknown* within the Long and Schafer Geographic Units. Fire hazard is considered *High* only for the Dickey-Java area, and generally is *Low* in the remainder of the Subbasin.

Manage vegetation to increase the dominance of seral species (larch primarily) and diversity of stand structure across the landscape. Linkages with Glacier National Park are especially important related to the seral species maintenance and stand structure diversity.

Watershed restoration priorities have been considered Low across most of this Subbasin, with *Moderate* priority for some areas in the Skyland Geographic Unit.

The Middle Fork Flathead Subbasin provides high quality grizzly bear habitat with excellent security. Maintain movement linkages with Glacier National Park to the north, and the South Fork Flathead Subbasin to the south.

Scenery as viewed into and from the National Park and the Wild and Scenic River corridor are currently high.

In the Great Bear and Bob Marshall Wilderness Areas, vegetation management will depend solely on prescribed fire opportunities. There is a continuing buildup of fuels as a result of windstorm events, soils, and age/structure of the vegetation. Recent records indicate there are not a large number of fire starts in the Middle Fork. The relative small size of the Subbasin and proximity to the Continental Divide with its associated strong winds does make prescribed natural fire a higher risk than in other locations in the wilderness.

D. GEOGRAPHIC UNITS WITHIN THE MIDDLE FORK FLATHEAD SUBBASIN

Schafer Geographic Unit - This unit lies entirely within the Great Bear and Bob Marshall Wilderness Areas. The area is dominated by dense lodgepole pine forest, with alpine larch and whitebark pine at the upper elevations. This geographic unit is all at elevations above 5000 ft.

Pentagon Mountain is a dominant feature in this unit. The Ranger Station is a significant historic site.

Aircraft use of the landing strip at Schafer is permitted, with limits on the number of landings. Backcountry recreation uses include backpacking, hunting, and fishing.

Long Creek Geographic Unit - This geographic unit lies within the Great Bear Wilderness Area, below Schafer Meadows to Bear Creek. This area is deep canyon country, with extensive avalanche chutes. The lower elevations provide big game winter range.

Backcountry recreation uses include backpacking, hunting, and fishing. The beginning of the designated Wild and Scenic River is in this geographic unit. Whitewater rafting on the upper Middle Fork has increased substantially. Flotilla and Scott Lakes are large lakes that attract recreation use.

Skyland Geographic Unit - Marias Pass, on the Continental Divide, is the northernmost point on this unit. Highway 2 and Burlington Northern Railroad tracks run adjacent to the Middle Fork, with National Forest land to the south and east of the river, and Glacier National Park to the north and west of the river. A portion of the unit lies within the Great Bear Wilderness Area.

The area is moderately moist and cool. Primary tree species are lodgepole pine, Engelmann spruce, subalpine fir, and Douglas-fir. Terrain is steep to very steep. Drainage patterns in Puzzle Creek are not typical due to geologic folds and faults. Soils are unstable in the Challenge Cabin area, which is east of the Lewis overthrust. Mass failure of cut and fill slopes on roads is very common.

The unit provides summer habitat for elk that winter in the Spruce Park area and important grizzly bear habitat. A small mountain goat population inhabits the Slippery Bill Mountain area. The most important bull trout spawning habitat in the Middle Fork Flathead Subbasin is found in this unit.

Considerable logging activity occurred in this unit in the past in response to insect and pathogen epidemics. In 1998, a large wildfire burned through much of the non-wilderness portion.

Paola Geographic Unit - This geographic unit is bounded to the east-northeast by the Middle Fork of the Flathead River, and by the Flathead Range divide to the south-southwest. A portion of the Great Bear Wilderness is included within the geographic unit.

Tracts of private land are located adjacent to Highway 2. The communities of Essex and Nyack are found within this geographic unit.

Vegetation is characterized by coniferous forests that are densely stocked at the lower elevations, becoming more open at higher elevations where tall shrubs dominate. Avalanche chutes occur on most slopes and typically are densely covered by shrubs such as maple, alder, willow, thimbleberry, and huckleberry. Dominant tree species are Englemann spruce, subalpine fir, Douglas-fir, lodgepole pine, and western larch. Whitebark pine is common at the higher elevations. Most stands consist of 80 to 400+ year old trees, depending on fire history of the site.

This geographic unit is noteworthy for its high quality grizzly bear habitat. The area is important as a linkage for movement between Glacier National Park and the Bob Marshall Wilderness complex.

The Middle Fork provides important habitat for bull trout and cutthroat trout.

Major recreational uses include snowmobiling, commercial and private whitewater rafting, hiking, fishing, and hunting. River access sites have been constructed at Moccasin Creek, Cascadilla Flats, Paola Creek, Essex, and Bear Creek. The Isaac Walton Inn in Essex has become a focal point for cross-country skiing.

The steep slopes are highly visible from highway 2, the train right-of-way, Glacier National Park, and private residences.

SOUTH FORK FLATHEAD SUBBASIN

1,072,573 acres (all ownerships within the Subbasin)

1,072,573 acres (Flathead National Forest land only)

A. CHARACTERISTICS OF THE SUBBASIN

The South Fork Flathead Subbasin encompasses a remarkably large area, bounded to the west by the Swan Mountain range crest and by the Continental Divide to the east. The upper half, (approximately 64%), of the drainage lies within the Bob Marshall and Great Bear Wilderness Areas.

There is no private land within this Subbasin. The communities of Hungry Horse and Martin City lie near the mouth of the South Fork, north of the Subbasin.

Unique values and characteristic features that are especially noteworthy:

Human Uses

- More extensive use by Native Americans than other Flathead drainages.
- Encompasses majority of the Bob Marshall Wilderness complex -- largest in lower 48 States . (Bob Marshall and Great Bear Wilderness Areas)
- Jewel Basin-- a special designated hiking area.
- Forest Service administrative cabins and work centers.
- High use by outfitters historically.
- Hungry Horse dam/reservoir has changed character of drainage.
- Resort operations at the Spotted Bear Complex.

Terrestrial Ecosystems

- Dry ponderosa pine types in south end of wilderness.
- Many "parks" of native grassland and sagebrush in the valley bottom in the upper reaches of the drainage.
- Higher growth potential for western larch than anywhere in the Northern Region; larch adjustment factor in cruise tables is only used in the South Fork.
- Whitebark pine communities in decline.
- Western white pine in decline in the lower reaches of the South Fork.
- Localized fens with rare plants in upper reaches of the South Fork.
- Rare localized presence of western redcedar.
- More extensive elk and mule deer winter ranges than North Fork or Middle Fork.
- Mountain goats.

Aquatic Ecosystems

- Fully intact native fish species assemblage (unique in western US).
- Harlequin ducks, larger number of osprey than other Flathead drainages.

B. SOUTH FORK FLATHEAD SUBBASIN HISTORY

Hungry Horse Reservoir construction began in 1948 and was operational in 1953. Approximately 24,500 acres were cleared/logged for the construction in this time period. This acreage is not included in the harvest table below. The dam reservoir changed the existing habitat availability for many species. The forest structure was modified by removing the valley bottom component. The historical range of variability is not directly applicable to the entire Subbasin, since this activity has been permanently change a portion of the landscape.

Commercial timber harvest has occurred in the South Fork since the early 1940s. During the 1950-1960s era, harvest was concentrated in mature spruce stands, mixed species stands with spruce, and in the high upper reaches of many of the drainages where spruce bark beetle was epidemic. The primary harvest method utilized during this period was clearcutting.

White pine blister rust began having a major impact on western white pine in the South Fork in the 1960s. Salvage of white pine has occurred from that period throughout the 1980s, generally through regeneration harvest in mixed species stands of Douglas-fir, western larch, and western white pine. Extensive individual tree salvage of western white pine also occurred in mature stands.

Other than blister rust, there have been no major insect or disease outbreaks in the South Fork (outside Wilderness) that has led to extensive harvest activity during the past 30 years. Neither has there been large areas of significant blowdown or wildfire activity. The purpose behind the commercial timber harvest since the 1960s has been a combination of white pine salvage, general blowdown and insect/disease salvage, and general timber production. Within the Firefighter and Emery areas, lodgepole pine mortality has been a factor in locating harvest areas. The mountain pine beetle activity has not been as expansive as compared to the North Fork Subbasin but still more active than endemic levels.

The following table displays by decade approximate harvest acreages within this Subbasin (excluding the Hungry Horse reservoir construction acreages). Documentation of harvest levels prior to the 1950s is not readily available and is not included, although it is recognized that harvest did occur prior to 1950. Harvest during this time period was generally individual tree or group selection and within the valley bottom.

Timber harvest history in the South Fork Subbasin.

<u>Decade</u>	<u>Regeneration Harvest (acres)</u>	<u>Salvage/Intermediate Harvest (acres)</u>	<u>Selection Harvest (acres)</u>
1950s	6,079	1,729	
1960s	15,692	6,352	23
1970s	12,575	9,164	268
1980s	7,734	9,525	174
1990s	2,433	921s	

<u>Total</u>	<u>44,513</u>	<u>27,691</u>	<u>465</u>
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The following table displays the approximate acres of wildfire that have been recorded. Acreage, both within and outside the Wilderness Areas were estimated from photography or on the ground. In most cases, the fires burned the areas in varying degrees over the landscape and reburns of previously burned areas was common. The overall trend indicates a decrease in fire in recent decades.

Sixty-four percent of the Subbasin lies within the Bob Marshall and Great Bear Wilderness Areas. Since 1981, the wilderness area has had an active prescribed natural fire plan. The following table displays the approximate acres of wildland fire and prescribed fire that occurred with natural ignition and had an approved plan for management that have been recorded. Acreage, both within and outside the wilderness were estimated from photography or on the ground. In most cases, the fires burned the areas in varying degrees over the landscape and reburns of 50 year and greater burns are common. The trend indicates a decrease in acres burned, but that is reversing since the implementation of the prescribe fire plan.

<u>Decade</u>	<u>Wildland Fire</u>	<u>Prescribed Fire ^{1/}</u>
<u>1880-1909</u>	<u>160,260 acres</u>	
<u>1910-1919</u>	<u>250,000 acres</u>	
<u>1920-1929</u>	<u>87,000 acres</u>	
<u>1930-1939</u>	<u>3,200 acres</u>	
<u>1940-1949</u>		
<u>1950-1959</u>	<u>1,000 acres</u>	
<u>1960-1969</u>	<u>500 acres</u>	
<u>1970-1979</u>		
<u>1980-1989</u>	<u>1,203 acres</u>	<u>6,006 acres</u>
<u>1990 - present</u>	<u>16,029 acres</u>	<u>1,320 acres</u>
<u>Total</u>	<u>519,192 acres</u>	<u>7,326 acres</u>

^{1/} Prescribed fire is defined as a prescribed fire started by a natural ignition, that meets planned objectives and had a plan approved in advance of the fire start. This is dependent on relatively unpredictable lightning activity. Each individual fire start is analyzed in detail to determine the risks associated with its unique location and time of the year in relation to the approved plan.

C. MANAGEMENT PRIORITIES

In the context of the Interior Columbia Basin, the South Fork Flathead Subbasin was classified as high ecological integrity, and placed into cluster 1. Although the evidence of past management activities, including hydroelectric dam development and timber management, is apparent in the lower end of the Subbasin, the majority of the area lies within the Bob Marshall and Great Bear Wildernesses and therefore earns a high integrity rating.

Integrity Ratings for the South Fork Flathead Subbasin (from Quigley and others 1996):

Forest	Aquatic	Hydrology	Composite
High	High	High	High

Priorities for vegetation throughout the Subbasin include restoration of whitebark pine stands that have been heavily impacted by white pine blister rust, conservation and restoration of Large Single-story ponderosa pine stands, and prescribed burning on elk and deer winter ranges. Some vegetation management activities are conducted as part of the wildlife mitigation program for Hungry Horse dam.

Bark beetle risk is currently *Very High* in portions of the Spotted Bear Geographic Unit and *High* in the Kah Geographic Unit. Risk is generally *Moderate* in the remaining Geographic Units outside the wilderness, and *Unknown* within the wilderness. Fire hazard is considered *High* in portions of the Wounded Buck, Emery, Wheeler, Kah, Spotted Bear, Black Bear, and Salmon Geographic Units. Fire hazard is generally *Low* in the Twin Creek, Bunker, and White River Geographic Units, and *Unknown* in the Danaher and Youngs Creek Geographic Units. Reducing the high risk/hazard of losses from mountain pine beetle in lodgepole dominated stands remains a priority.

Maintaining and or restoring dominance of seral species (larch, western white pine, Douglas-fir, ponderosa pine) is a priority.

The highest priorities for watershed restoration in this Subbasin are found in the Emery Geographic Unit. Drainages within the Wounded Buck, Wheeler, and Kah Geographic Units are considered *Moderate* priority for watershed restoration, with the remainder considered *Low* priority.

With the exception of Twin Creek, all Geographic Units north of Spotted Bear provide opportunities to increase habitat security for species such as elk and grizzly bear.

A primary emphasis for this Subbasin is to maintain the wilderness character of the Bob Marshall and Great Bear wildernesses. The South Fork River above Hungry Horse reservoir is designated as a Wild and Scenic River. Leave No Trace practices are emphasized for both the wilderness and river management.

D. GEOGRAPHIC UNITS WITHIN THE SOUTH FORK FLATHEAD SUBBASIN

Danaher Geographic Unit - This geographic unit lies entirely within the Bob Marshall Wilderness, and encompasses the eastern headwaters of the South Fork Flathead. A unique feature is the extensive wetland complex in the upper valley along Danaher Creek.

Ponderosa pine parks are found extensively along the river bottom. Aspen and sagebrush are also found in this geographic unit. Some lodgepole pine stands show evidence of frequent underburning. Some unique stands of limber pine can be found in the Flathead Alps.

Very limited fire activity has occurred in the unit within the last decade. This area, particularly around the Big Prairie-White River Park vicinity, provides an important winter range for small bands of elk.

Recreation uses are primarily hunting and extended wilderness trips. The Danaher meadow area has historical significance as a homestead. The residence was later abandoned, and the land reverted back to public ownership.

Youngs Creek Geographic Unit - This geographic unit lies entirely within the Bob Marshall Wilderness, and encompasses the western headwaters of the South Fork of the Flathead River.

The area is characterized by high rugged peaks with cirque basins and lakes at the high elevations, and long heavily forested drainages. Very limited fire activity has occurred in the unit within the last decade.

This geographic unit contains the primary trail access from Holland Lake and Pyramid Pass into Big Prairie. This is one of the more heavily used parts of the wilderness.

Salmon Geographic Unit - The Big Salmon and Little Salmon Rivers drain this geographic unit. This area represents an ecological break, with drier conditions and vegetation than found to the north.

High peaks, including Holland Peak, and cirque basins form with western perimeter of this geographic unit. Big Salmon Lake is known for its outstanding fishery and scenic quality. Common loons occur here during the nesting season. The unit is a stronghold for bull trout and westslope cutthroat trout.

There have been several recent prescribed fires with natural ignition in this geographic unit. Notable among these was the Charlotte Peak fire.

Black Bear Geographic Unit - This is a relatively small geographic unit, located along the South Fork of the Flathead River above Spotted Bear. Silvertip Peak is a major feature.

This geographic unit receives heavy use for fishing, and is a primary access route into the White River and to Big Prairie.

Several thousand acres have burned under the prescribed natural fire program in the past decade, primarily in the Helen Creek and Damnation Creek drainages. Non-native plant species were found in the old airstrip and at the administrative site; control actions have completed.

White River Creek Geographic Unit - This area has unique geology, with the Chinese Wall forming the eastern boundary.

Open stands of ponderosa pine are characteristic of the lower end of the drainage. Very limited fire activity has occurred in the unit within the last decade.

The area receives relatively low recreation use. White River Pass and Larch Hill Pass provide access routes to the east side.

Bunker Geographic Unit - The high country in this geographic unit is above timberline. Subalpine fir and whitebark pine predominate at the higher elevations, with western larch, Douglas-fir, lodgepole pine, and Engelmann spruce found at all elevations.

The Bunker geographic unit is considered important grizzly bear habitat. There is also a significant population of mountain goat in the north fork of Bunker Creek. The lower end of the drainage provides mule deer and elk winter range.

Recreational activities include hunting, fishing, berrypicking, firewood gathering, and hiking. The Gorge Creek trailhead is a major entry point into the Bob Marshall Wilderness.

Spotted Bear Geographic Unit - Much of this Geographic Unit is high country, with slopes that rise above timberline. In the higher elevation forested areas, subalpine fir and whitebark pine predominate. A mixture of Douglas-fir, western larch, lodgepole pine, and Engelmann spruce are found across most elevations. At lower elevations, subalpine fir occurs mainly along the bottoms of drainages. Ponderosa pine occurs at low elevations.

The area serves as a primary migration route for elk. A significant area of elk and mule deer winter range is situated in the western portion of the Unit as well. The area is heavily hunted, particularly late in the hunting season.

This Geographic Unit contains trailheads at Big Bill, Beaver Creek, and Webb Lake, that provide primary access into the Great Bear and Bob Marshall wildernesses.

Twin Creek Geographic Unit - This Geographic unit provides important winter range for elk summering in the wilderness. An active prescribed burning program has been underway in the Dry Parks and Crossover areas.

Dispersed recreation use occurs along the reservoir.

Kah Geographic Unit -

Wheeler Geographic Unit - This geographic unit lies to the west of the South Fork Flathead River, and encompasses Sullivan, Qunintonkon, and Wheeler Creeks. Terrain is generally steep and rocky. Forests are dominated by western larch, Douglas-fir, lodgepole pine, Engelmann spruce, and western white pine. Understory shrubs consist primarily of shrubs such as menziesia, huckleberry, mountain maple, mountain ash, alder, Pacific yew, pachistima, and elderberry. At high elevations, subalpine fir and whitebark pine predominate. Avalanche chutes area prominent feature in these drainages.

The first timber harvest in this area occurred in the mid 1960s, as a result of efforts to salvage mortality due to a spruce beetle epidemic.

Wounded Buck Geographic Unit - This geographic unit encompasses the lower South Fork drainage, west of the reservoir.

This geographic unit contains a large portion of the Jewel Basin Hiking Area. Handkerchief Lake also is an important recreation site.

Emery Geographic Unit - Firefighter Mountain is a well-known landmark within this Geographic Unit. Terrain is moderately steep to steep. Glacial erosion and deposition have sculpted the area, leaving rounded topographic forms.

Major tree species are Engelmann spruce, western white pine, and subalpine fir in the drainages, and lodgepole pine and Douglas-fir on the uplands. Western larch is mixed throughout.

There is mule deer and elk winter habitat adjacent to the reservoir. The high elevations provide high-quality grizzly bear summer and winter denning habitat.

The close proximity to towns lead to relatively heavy public use. Hiking is limited but occurs in the vicinity of Great Northern Mountain. Developed recreation sites are located at Emery Bay and Fire Island.

STILLWATER SUBBASIN

522,443 acres (all ownerships within the Subbasin)

219,875 acres (Flathead National Forest land only)

A. CHARACTERISTICS OF THE SUBBASIN

The Stillwater Subbasin encompasses roughly one half million acres of land 20 to 25 air miles south of the Canadian border. It includes the floor of the Flathead Valley north and northwest of Kalispell and all upland areas draining into the Stillwater River. About 40% of the area is National Forest land administered by the Flathead National Forest, while the far northwest portion lies within Kootenai National Forest.

The Stillwater Subbasin includes the communities of Whitefish, Olney, and Stryker. Private lands are concentrated on the main valley floor and along the Stillwater River and the valley bottoms of many of the major drainages. Private land uses include industrial forestry, small industry, farming, ranching and private homesites on both small and large acreages. Many valley bottom areas, once mostly forested, have been cleared and developed for human use. Most of the upper Stillwater and Swift Creek drainages are in the Stillwater State Forest and are managed by Montana Department of Natural Resources and Conservation.

The area is bounded by the Whitefish Range to the northeast, the Salish Mountain divide to the west and the Ashley watershed divide to the south. To the south and southeast, the boundary follows low-lying watershed divides. The Stillwater Subbasin is characterized by rolling glaciated terrain, varying in elevation from 3,000 to over 7,000 feet above sea level. The Stillwater drainage has a distinct northwest to southeast orientation while the remainder of the area has an east/west orientation. The area is relatively moist, and, except for the main valley floor, dominated by forest vegetation.

Forested areas are dominated by moist coniferous forest, including western larch, lodgepole pine, Douglas-fir, subalpine fir, and Engelmann spruce. Large expanses of lodgepole pine are evidence of past large wildfires, which resulted in near monoculture vegetative conditions. Lower elevation forests are primarily multi-layered older forest consisting of western larch, Douglas-fir, and lodgepole pine.

Unique values and characteristic features that are especially noteworthy:

Human Uses

- Only about 40% of the Subbasin is included within the Flathead National Forest. Ownership patterns are relatively contiguous, with most of the National Forest lands concentrated in the western half of the Subbasin at higher elevations.
- While several communities are within the valley bottoms, the Subbasin has a predominantly rural character.
- Areas of concentrated human use include Tally Lake, Whitefish Lake, Upper and Lower Stillwater Lake, smaller mountain lakes, Round Meadows cross-country ski and bike trails and the Big Mountain Ski and Summer Resort. Recreational visits to Big Mountain average 270,000 visitors in the winter and more than 50,000 during the other three seasons.
- Many of the recreational uses within the forested portions of the Subbasin are dispersed throughout the area, including hunting and fishing, wood cutting, and berry picking.

- Scenic vistas are limited by the rolling topography and the scarcity of high peaks as vantage points. Much of the area can be viewed at a distance from the top of Big Mountain.
- The Subbasin contains an extensive road system, providing relatively easy access to most of the forested lands.
- Miller Creek Demonstration Forest provides thirty years of research in a managed forest setting.

Terrestrial Ecosystems

- Fire and insect and disease activity, combined with human use and development, have been dominant forces in shaping today's landscape in the Subbasin.
- Forested uplands are highly productive and have been heavily harvested.
- Lodgepole forests are a significant part of the Stillwater landscape, encompassing large areas on both private and National Forest lands.
- Of Flathead National Forest lands in the Subbasin, more than 30% are dominated by lodgepole pine forest, about 30% are Douglas-fir/larch communities, and subalpine fir communities occupy about 20%.
- Ponderosa pine, western redcedar/western hemlock, grand fir and whitebark pine/alpine larch communities are relatively rare in the Stillwater Subbasin.
- The Subbasin supports large populations of white-tailed deer and moose and provides extensive roaded hunting opportunity. About 15% of the Subbasin is ungulate winter range.
- With the possible exception of the Lower Stillwater, all of the Geographic Units in this Subbasin appear to support the full complement of wildlife species historically found in the area. This includes grizzly bear, gray wolf, and bald eagle, in addition to sensitive wildlife such as common loons and boreal owls.
- Areas of old growth forest currently occur mostly as riparian stringers in the upland areas and in generally small patches on the landscape.
- LeBeau Research Natural Area provides a relatively remote, unroaded refugia including unique topography, and representation of numerous unmanaged forest communities.

Aquatic Ecosystems

- Glaciation has created areas where soils contain an impermeable subsurface layer, resulting in shallow subsurface flow. Small portions of the Subbasin are lacustrine in origin and have easily erodible soils.
- The Stillwater and Whitefish Rivers and other larger streams in the valley floor have a deep silt substrate which influences the makeup of aquatic life.
- Slow moving, highly sinuous streams in some valley bottoms are colored brown from organic stains. Their slow velocity and color leads to elevated summer water temperatures.
- Extensive human activity, including urban and other residential development, timber harvest, road building, grazing, and agricultural practices, have lead to deterioration of water quality and aquatic habitats. The State Department of Environmental Quality listed the Whitefish River, Stillwater River and Logan Creeks as partially impaired for beneficial uses.
- Fish occurring in Subbasin lakes and streams include native westslope cutthroat trout, mountain whitefish and bull trout as well as introduced rainbow and brook trout, grayling, northern pike, and yellow perch. In addition, several species of non-game fish including members of the sucker and minnow families are found in the lakes and streams of the area.

- This is the only Subbasin in the Flathead National Forest known to support the northern bog lemming.
- Human-caused disturbance and introduction of non-native fish have contributed to the decline of native fish populations.
- Tally Lake is the deepest natural lake in the western United States. It is also unusual in that its major inlet and outlet are adjacent to each other.

B. STILLWATER SUBBASIN HISTORY

Fire regimes in this Subbasin include both lethal and mixed-severity fires which occur on a relatively infrequent basis (50 to 300 years plus). Fire intensity has ranged from stand-replacement fires with few survivors to low severity fires where most trees survive. Patch size is highly variable ranging from 10 acres to 28,000 acres. Much of current vegetation in the Subbasin resulted from one or more major fire events occurring in the mid 1700's, 1874, 1889, 1910, 1919, 1921, 1926, 1929 and 1994. Major fires covered 10,000 to 28,000 acres or more.

Homesteading and settlement along the Stillwater River Corridor (the Old Fort Steele Trail), began in earnest after the turn of the century. The Great Northern Railroad was built along this route, and railroad ties were needed in great abundance. The railroad was completed in 1904. The large ponderosa pine, western larch and Douglas-fir were readily available along the valley bottom. Loggers in the 1910s and 1920s skidded the logs to Good Creek and the Stillwater River, where they had built "splash dams" to flush the logs downstream to the Somers Lumber Company mill. Here they were made into ties and pressure treated. Much of this wood came from land belonging to the Glacier Park Co., a subsidiary of the Great Northern Railroad. Most of this land has changed ownership over the years to private individuals. The Forest Service tended to turn down tie sales because the larger trees would be left standing (McKay 1994). The last log drive on the Stillwater River was in 1923, according the 1957 timber management plan for the Flathead National Forest, Tally Lake District.

Mountain pine beetles are a significant disturbance agent in the Stillwater Subbasin. Historical evidence suggests that the area has been repeatedly affected by a cycle of mountain pine beetle population build-up, extensive tree mortality, and increasing amounts of dead and downed material. Typically, large scale fires have followed, resulting in large contiguous areas dominated by lodgepole pine regeneration. The most recent mountain pine beetle infestation occurred in the early 1980s and affected most of the lodgepole pine stands across the Subbasin. In response to the widespread tree mortality, extensive roading and logging occurred in the 1970s and 1980s.

A summary of logging activity on the Flathead National Forest lands within the Subbasin follows. Regeneration harvest has occurred on 28% of the Flathead National Forest lands in the Stillwater Subbasin, with salvage or intermediate harvest occurring on an additional 10% of Forest land.

Timber harvest history on National Forest lands in the Stillwater Subbasin.

Decade	Regeneration Harvest (acres)	Salvage/Intermediate Harvest (acres)
1950s	1000	600
1960s	11,000	3,200
1970s	15,700	11,000
1980s	22,900	2,200
1990s	11,600	4,100

Total	62,200	21,100
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The following table displays the approximate acres of wildland fire that have been recorded by the USFS within the subbasin. It does not include those acres that have been suppressed by local city/rural fire departments on private ownership. In most cases, the fires burned the areas in varying degrees of severity over the landscape; reburns of previously burned areas were common. In these cases, the acreages were included for each of the years that an area was burned. The overall trend indicates a decrease in the acres burned per decade following the fires of 1940, probably a result of effective fire suppression efforts. The only exception is the Little Wolf Fire in 1994 which burned approximately 10,609 acres.

Acres of wildland fire in the Stillwater Subbasin across all ownership.

Decade	Recorded Wildland Fire Acres
1889-1899	25757
1900-1909	3200
1910-1919	71996
1920-1929	61619
1930-1939	4548
1940-1949	6606
1950-1959	32
1960-1969	1003
1970-1979	140
1980-1989	277
1990-present	11051
Total	186,229

C. MANAGEMENT PRIORITIES

The Stillwater Subbasin was classified in the Scientific Assessment for the Interior Columbia Basin as having a low composite ecological integrity rating, and placed into Forest Cluster 4. This cluster is typified by highly roaded moist forest types. The primary opportunities include restoration of late and old forest structure; connection of aquatic strongholds; and treatment of forested areas to reduce fire, insect, and disease susceptibility.

Integrity Ratings for the Stillwater Subbasin (from Quigley and others 1996):

Forest	Aquatic	Hydrology	Composite
Low	Low	Moderate	Low

Priorities for vegetation management include restoring Large Single-story and Large Multistory stand structures in western larch, Douglas-fir and ponderosa pine cover types on warm dry and warm moist potential vegetation groups, and prescribed burning on deer and elk winter ranges. Whitebark pine restoration opportunities are found in the Subbasin at the higher elevation along the Whitefish Divide.

Bark beetle risk is currently considered *High* in portions of the Logan Geographic Unit. Risk is generally *Moderate* in the Lower Stillwater Geographic Unit, and *Low* in the remaining Geographic Units.

Risk of severe fire is highest in portions of the Logan, Good, Whitefish River and Upper Stillwater Geographic Units. It is generally considered *Low* in the lower valley bottomlands of the Whitefish River and Lower Stillwater Geographic Units.

High priority watershed restoration needs have been identified for drainages in the Logan and Good Geographic Units.

D. GEOGRAPHIC UNITS WITHIN THE STILLWATER SUBBASIN

Upper Stillwater Geographic Unit - This Geographic unit, approximately 95,000 acres in size, includes the Sunday Creek drainage on the Kootenai National Forest, a portion of the Stillwater State Forest, and private lands along the river bottom. Flathead National Forest lands comprise about 15% of the Geographic Unit; the LeBeau Research Natural Area is the central feature on these lands. LeBeau includes unique areas of broken

glaciated topography, with a diversity of forest communities from cedar/hemlock to dry Douglas-fir. The area is highly valued by locals as a special and remote place on the Tally Lake Ranger District.

Highway 93, Olney, the Stillwater River, and the Stillwater Lakes are concentrated areas of human use. Both passenger and freight trains travel the areas on tracks along the valley bottom.

This geographic unit supports numerous wildlife species, including productive bald eagle nests and a gray wolf den. Wildlife habitat is particularly secure in the LeBeau area, where there are also relatively large contiguous areas of old growth habitat. The center of the unit is known for high concentrations of wintering white-tailed and mule deer.

Good Creek Geographic Unit - Good Creek Geographic unit is approximately 70,000 acres in size. The majority of the area is in National Forest lands, with more than 100 different private holdings concentrated along the riparian areas. Both year round and seasonal residents seem to appreciate the remoteness of the area. Many do not have phone or electrical service.

Nearly half of this geographic unit burned in 1910 and 1926, resulting in a large expanse of even-aged lodgepole pine with little surviving old growth. A greater proportion of older mixed-species forests is found throughout the Martin Creek drainage and the higher elevations of the Good Creek drainage where fire-return intervals are generally longer. The historic return interval for large mixed severity fires is about 80 years. Stand replacing fires occurred every 140 to 170 years, on average. The last large fires in this geographic unit were about 80 years ago. Many areas in the stand replacement regime have not had a disturbance for 250 years.

The predominant land use in the Good Creek Geographic Unit has been timber production since the late 1950s. The early sales were in response to a spruce bark beetle epidemic. Road building and salvage harvest continued into the 1980s in response to major lodgepole pine mortality from the Mountain Pine Beetle. This unit has been extensively roaded, with some form of harvest activity occurring on 35% of the National Forest lands. Miller Creek Demonstration Forest lies within this unit.

Good Creek provides habitat for numerous wildlife species. Some, such as gray wolves, grizzly bears, and wolverine, probably pass through the area in their travels; others such as deer and elk spend three seasons in the Good Creek Geographic Unit, but winter outside the area. Extraordinarily high numbers of moose winter in the Miller Creek area. Numerous creeks, springs, ponds and wet meadows provide the focus of deer and elk habitat. Several ponds and broad streamside wetlands are found throughout the lower elevations.

Logan Creek Geographic Unit - This geographic unit, approximately 128,000 acres in size, is the center of the Tally Lake Ranger District. Logan Creek includes numerous private ranches and seasonal and year round residences concentrated in the Star Meadows area and north of Tally Lake. Private commercial timberlands are intermixed with National Forest lands on the southern edge of the geographic unit. The majority of the area is National Forest lands.

Tally Lake, covering approximately 1,300 acres, lies within this geographic unit. This deep, steep-sided lake provides a variety of recreational opportunities including camping, boating, wildlife viewing, and fishing. Sylvia Lake is a popular undeveloped recreation

destination; this lake contains grayling. Other recreational uses of the area include hunting, woodcutting, stream fishing, and berry picking.

Logan Creek has a history of intensive forest management, with some form of harvest occurring on about one-third of National Forest lands. Much of the harvest and road construction has been in response to major lodgepole pine mortality from the mountain pine beetle.

In 1994, 10,609 acres of the Hand Creek and Ingalls Mountain area was impacted by the Little Wolf fire. This fire created a complex mosaic of varying degrees of severity, although the majority was stand replacement fire. Subsequent to the fire, there were high levels of mortality in the underburned areas. This was followed by rapid build up of bark beetles, affecting both spruce and Douglas-fir. Management activity in response to the fire has included salvage logging of a portion of the high-intensity burn areas, and efforts to control the spruce beetle and Douglas-fir beetle epidemics, including removal of infested trees, use of trap tree sites, and pheromone trapping. The fire area contains the noxious weed, tansy ragwort. Coordinated control efforts with the USDA Forest Service, State of Montana, Lincoln and Flathead counties, local grazing association, and others, are on-going.

Old-growth forest habitat is generally lacking in quantity and is fragmented in the Logan Creek unit, except for larger areas around Ashley Mountain and Tally Lake. Big game species are abundant, despite the lack of forested cover in some areas. High quality winter range covers much of the northeast part of this geographic unit. Logan Creek provides important year-round moose habitat. The large wildfire has provided habitat for a variety of fire-dependent species, including black-backed woodpeckers. Loons and bald eagles nest along Tally lake. Lynx are suspected to reproduce within this unit.

Fire exclusion has allowed a great deal of forest fuel to accumulation across the geographic unit. Lodgepole pine and Douglas-fir stands are at a stage where they are susceptible to infestation by bark beetles.

Whitefish River Geographic Unit - This long narrow Geographic Unit stretches from north of Stryker to south of the community of Whitefish, including approximately 142,000 acres. Portions of the Stillwater State Forest, industrial timber company lands, and private lands in the valley bottom occupy the majority of this area. The area is moist and moderately cool with isolated "rain shadow" effect areas, leading to highest snow accumulation in Flathead Valley.

National Forest lands are about 10% of the unit, concentrated at the highest elevations along the Whitefish Divide. The terrain is dominated by steep glaciated mountain slopes including the highest peaks on the Tally Lake Ranger District.

Vegetation includes whitebark pine, alpine larch, spruce, and subalpine fir, as well as some open rock slopes. Whitebark pine communities in the Whitefish Range are generally in decline due to white pine blister rust and fire exclusion.

Big Mountain Ski and Summer Resort lies within this geographic unit. The remainder of National Forest lands within this geographic unit are managed for visuals and semi-primitive non-motorized recreation. No management activity has occurred on most of the National Forest lands, although Stillwater State Forest and some private lands are managed for timber production.

This Geographic Unit supports grizzly bear denning, possible wolverine and lynx denning, and travel routes for gray wolf. Old growth habitat is focused in fairly contiguous patches of high-elevation types. Winter range for white-tailed deer lies along the major rivers to the south; winter range for elk and deer is northwest of Whitefish Lake.

Subdivision and residential development is rapidly expanding along the lower elevations.

Lower Stillwater Geographic Unit - The Lower Stillwater Geographic unit contains approximately 86,000 acres, mostly in private lands. Private lands have been extensively developed including agricultural uses, industry, subdivision, and numerous private holdings. Extensive development and agriculture within the floodplain has affected aquatic habitats. Fire exclusion has allowed fuels to accumulate in the wildland urban interface. This creates a potential hazard near private ownership, especially in the Rhodes Draw and Bootjack Lake areas.

National Forest lands are concentrated in the western edge of the Geographic Unit and account for about 25% of the total acreage. Warm dry and warm moist potential vegetation groups dominated by Douglas-fir, lodgepole pine and lesser amounts of ponderosa pine grow here. Small amounts of grand-fir and cedar may be found in this area.

This Geographic Unit provides extensive areas of winter range for white-tailed deer, mule deer, and elk, both on and off National Forest lands. Old growth habitat is fragmented except on Pilot Knob and east of Mountain Meadows.

FLATHEAD LAKE SUBBASIN

819,254 acres (all ownerships within the Subbasin)

139,536 acres (Flathead National Forest land only)

A. CHARACTERISTICS OF THE SUBBASIN

The Flathead Lake Subbasin encompasses a vast area extending from north of Hungry Horse more than 50 miles south to Polson. It is bounded on the east by the Mission and Swan Range and on the west by a low-lying watershed divide. The Subbasin is dominated by private ownership.

The communities of Kalispell, Columbia Falls, Coram, Hungry Horse, Marion, Lakeside, Rawlins and Polson are included within this Subbasin. Much of the area is agricultural and residential lands surrounding these communities. Private industrial timber lands and the Flathead Reservation dominate the southern portions of the Subbasin.

National Forest lands are less than 20% of the Subbasin, concentrated in the Island Unit west of Kalispell, in the Coram/Lake Five area, and in a fringe at the upper elevations of the Subbasin. Portions of four Ranger Districts are included in this Subbasin.

Unique values and characteristic features that are especially noteworthy:

Human Uses

- Diverse intermingled ownership pattern including residential, farming and ranching, industrial, and forestry uses.
- Highway 2 and Highway 93 provide major travelways through the Subbasin which are used by local residents as well as millions of visitors to the Flathead and to Glacier National Park.
- A diversity of recreational opportunities exist within the Subbasin, especially associated with Flathead Lake, Lake Mary Ronan, Ashley Lake, Little Bitterroot Lake, and the major rivers.
- Recreational uses include sight-seeing, biking, hiking, boating, hunting, fishing, skiing, and snowmobiling.
- A new ski area approved for development on Blacktail Mountain is expected to be operational by 1999.
- Coram Experimental Forest is within the northern portion of the Subbasin.
- Desert Mountain is an electronic site for valley communication.

Terrestrial Ecosystems

- A diversity of forest communities are included in this Subbasin. One of the most significant impacts to terrestrial ecosystems has been the clearing of land in the valley bottom for human use (development and agricultural).
- The southern portion of the Subbasin is made up of dryer sites including open grasslands and areas dominated by ponderosa pine and Douglas-fir.
- Forested areas to the north are more moist and contain a mixture of tree species including lodgepole pine, western larch, Douglas-fir, spruce, and subalpine fir.
- Nesting bald eagles and peregrine falcons, and denning gray wolves (threatened and endangered species) occupy habitat within this Subbasin. Grizzly bear interactions with rural development and attractants is becoming more frequent.

- The valley floor has relatively high populations of white-tailed deer, pheasant, turkey, and black bear.
- Winter range for white-tailed deer and elk occurs over about one third of the Subbasin, predominantly along the lower elevations. Residential development now occupies what was once the highest quality winter range.
- Rural interface with wildland fires and risk of fire starts, human-caused or natural, is increasing.

Aquatic Ecosystems

- Flathead Lake is the largest freshwater lake west of the Mississippi River and is the central feature of this Subbasin.
- Construction of the Kerr Dam south of Polson in the 1950s has had a significant impact on aquatics by raising the lake level.
- Key native fish include populations of adfluvial bull trout and westslope cutthroat trout that migrate into tributary streams (primarily in the North Fork and Middle Fork of the Flathead River) where spawning and rearing occur.
- Several species of game fish have been introduced including kokanee salmon, lake trout, and lake whitefish which primarily inhabit the lake. In addition, northern pike and largemouth bass have been introduced, but inhabit the sloughs and backwaters of the Flathead River as it flows throughout the valley.
- Introduction of non-native fish and the mysis shrimp into the lake system, along with changes in spawning habitat in tributary streams, have contributed to the decline of native fish populations in the lake.

B. FLATHEAD LAKE SUBBASIN HISTORY

The Flathead Lake Subbasin has a long history of human use. The valley has been a gathering place along travel routes for Salish and Kootenai Tribes for centuries. European settlement began with the fur traders in the early 1800s. While a few miners and explorers passed through the area in the mid 1800s, the growth of settlements was tied to the development of the Great Northern Railway in the 1890s and the Forest Homestead act of 1906. As people came to the valley, farming and ranching activities grew.

Access to the area was by trail, and then wagon route until the 1880s when the first steamboat came to Flathead Lake. At their peak in 1915, there were 20 boats operating on the lake. The first cars arrived in the valley about 1905, but driving as a means of transportation was not a reality until the 1920s and 1930s when massive road construction efforts were undertaken.

In the 1880s the Flathead Valley was largely wooded. The timber industry was active on a very small scale at that time. With the advent of the railroad, the demand for tie logs grew, as did the logging activity in the valley. Lumber was the first product exported from the valley via the railroad. Early logging was via horses and railroad with river drives transporting logs to mill sites on Flathead Lake. Ultimately much of the valley bottom was converted from forest to agricultural and ranch lands and homesites, and logging activity shifted to the higher-elevation forested areas. In the Cedar Flats area, roller thinning was applied to approximately 200 acres in the 1960s to early 1970s to reduce wildland fire risks and promote healthier forest stands.

The following table displays by decade approximate harvest acreages within this Subbasin that occurred on National Forest lands. Documentation of harvest levels prior to

the 1950s is not readily available and is not included, although it is recognized that harvest did occur prior to 1950. Harvest during this time period was generally individual tree, group selection, or salvage.

Timber harvest history on National Forest lands in the Flathead Lake Subbasin.

<u>Decade</u>	<u>Regeneration Harvest (acres)</u>	<u>Salvage/Intermediate Harvest (acres)</u>	<u>Selection Harvest (acres)</u>
<u>1950s</u>	<u>1,351</u>	<u>957</u>	<u>80</u>
<u>1960s</u>	<u>5,492</u>	<u>2,585</u>	<u>97</u>
<u>1970s</u>	<u>6,104</u>	<u>3,734</u>	<u>320</u>
<u>1980s</u>	<u>10,071</u>	<u>4,741</u>	<u>412</u>
<u>1990s</u>	<u>2,580</u>	<u>2,198</u>	<u>8</u>
<u>Total</u>	<u>25,598</u>	<u>14,215</u>	<u>917</u>

Grazing began on the southern end of the Subbasin, likely in the 1880s. Both sheep and cattle grazing were extensive in the first part of the 19th century. Cattle grazing on private lands in the Blankenship area is still occurring.

The following table displays the approximate acres of wildfire that have been recorded by the USFS on the National Forest lands, and does not include those acres that have been suppressed by the local city/rural fire departments on private ground. Records are fairly accurate back to the 1950s. The 1929 fire burned most of the Lake Five and Cedar Teakettle Geographic Units. The evolving improvement of firefighting techniques by the local city/rural and wildland fire agencies have kept the size of wildland fires in this area to a minimum since the 1950s.

Fire history on the National Forest portions of the Subbasin.

<u>Decade</u>	<u>Wildland Fire Acres</u>
<u>1889-1899</u>	<u>4,965</u>
<u>1900-1909</u>	<u>0</u>
<u>1910-1919</u>	<u>5,865</u>
<u>1920-1929</u>	<u>25,000</u>
<u>1930-1939</u>	<u>13</u>
<u>1940-1949</u>	<u>0</u>
<u>1950-1959</u>	<u>9</u>
<u>1960-1969</u>	<u>23</u>
<u>1970-1979</u>	<u>301</u>
<u>1980-1989</u>	<u>131</u>

1990-Present	156
Total	36,463

C. MANAGEMENT PRIORITIES

In the context of the Interior Columbia Basin, the Flathead Lake Subbasin was classified as cluster 4. This indicates the Subbasin has relatively low forest integrity, low or moderate aquatic integrity, and high road densities.

Integrity Ratings for the Flathead Lake Subbasin (from Quigley and others 1996):

Forest	Aquatic	Hydrology	Composite
Low	Low	Moderate	Low

Due to the cumulative effects of past management on public and private lands, vegetation management will emphasize restoration of Large Single-story ponderosa pine stands and management of fuels in the urban/wildland interface. Substantial opportunities also exist for prescribed burning on elk and deer winter ranges. In the East Shore Geographic Unit, there is a need to thin forest understory and re-introduce fire.

Bark beetle risk is currently considered *Moderate* in the Lake Five, Ashley South, East Shore, and Lake Mary Ronan Geographic Units, and *Low* in the remaining Geographic Units. The East Shore unit has had a recent beetle epidemic.

Fire hazard is considered *High* in portions of the Cedar Teakettle, Lake Five, East Shore, and Ashley North Geographic Units. Fire hazard is generally *Low* in the remaining Geographic Units.

High priority watershed restoration needs have been identified in drainages within all Geographic Units in this Subbasin.

D. GEOGRAPHIC UNITS WITHIN THE FLATHEAD LAKE SUBBASIN

Lake Five Geographic Unit - This geographic unit generally encompasses the confluence of the North, Middle, and South Forks of the Flathead River.

Noisy Face Geographic Unit - The unit is about 126,600 acres in total, of which 25,500 acres (20%) are managed by the Forest Service. The crest of the Swan Range to the east and State of Montana and private lands to the west border the unit. Part of the Jewel Basin Hiking Area is in the Noisy Face unit.

The terrain is moderate to steep. Rock outcrops, cliffs, and avalanche chutes characterize the upper elevations. The lower elevations are very productive sites, in terms of their ability to grow trees.

Engelmann spruce, larch, Douglas-fir, and grand fir and the predominant tree species. Western hemlock, whitebark pine, and lodgepole pine are minor components. Stands of old growth hemlock of the type found in Krause basin are relatively rare on the Forest.

Portions of the unit are inhabited by grizzly bear and there have been sightings of gray wolves. Some lower slopes provide winter range for mule deer and elk.

Some streams contain cutthroat trout, some have no fish, and none of the streams contain bull trout. Many of the lakes were once stocked with non-native fish.

The unit is a very important visual resource on the Forest. The Noisy Face unit can be viewed from a large part of the Flathead Valley. There are steep, sharp ridges and high degrees of patterns in vegetation. At higher elevations, snow-capped peaks are prominent throughout much of the year.

Hunting, berry-picking, hiking, fishing, cross-country skiing, motorcycle riding, and snowmobiling are common forms of recreation in the unit. There are several popular trails in the unit, including the Alpine Trail #7, which extends along the crest of the Swan Range.

Portions of the lower elevations in the unit have been logged, most notably in the 1960s when a severe windstorm led to salvage logging of blown-down timber. Most of the roads were built at lower elevations to accommodate the timber harvesting.

East Shore Geographic Unit - The East Shore geographic unit is a narrow strip of land that runs from the shores of Flathead Lake up to the ridge of Crane Mountain. An isolated parcel of National Forest land adjoins Flathead Lake, which is the point of lowest elevation on the Flathead National Forest. The southern boundary of the unit borders the Flathead Indian Reservation. Private lands, including numerous cherry orchards, form the western boundary.

Surface water from the East Shore unit drains into Flathead Lake. Many of the streams flow only during spring runoff and streams on Forest Service land do not contain fish. A number of local landowners use water from the unit for irrigation and domestic water supply.

The terrain is gentle at the top and bottom of the unit, and steep in the middle. Rocky terrain and shallow soils characterize the northern part, where the 646-acre East Shore Research Natural Area is located; it was designated as a natural area to provide an example of the Douglas-fir/common snowberry habitat type.

Subalpine fir and Engelmann spruce are common at higher elevations. Larch, Douglas-fir, and lodgepole pine are found at all elevations. Ponderosa pine and grand fir are also found throughout the unit at lower elevations. Historically, forests across the lower portions of this unit burned frequently. Open-grown stands of large ponderosa pine and western larch with little understory were common. Today, some of the old trees remain, including pine over 300 years of age, but ladder fuels have built up during this century and threaten their existence. Much of the upper third of the unit has been logged. Most of the lower two-thirds of the area has not been logged.

The "urban interface" is particularly important along this unit. A fire history study that was recently completed indicates that the area has shifted from a low intensity, frequent fire pattern in a non-lethal fire regime to a mixed or lethal fire regime. The unit has a large amount of fuel buildup, mainly due to effective fire suppression this century, and as a result, is experiencing increasing amounts of insect and disease outbreaks. There have been numerous new homes built in the area of private land between the lake and National Forest land. Fires starting along private lands could burn up and over the ridge of Crane Mountain, or fires starting within the unit could spill over onto private lands.

There are several hiking trails in the East Shore unit, including a trailhead at Beardance on highway 35. Other uses of the unit by people include: hunting, firewood gathering, berry-picking, and snowmobiling. The upper portions of the unit have access by roads.

The lower portions generally do not, due to private ownership along the western edge of the unit.

The unit has important visual significance. Unobstructed views of the area are provided from the lower Flathead Valley and the west shore of Flathead Lake.

Polson Geographic Unit - The majority of the Geographic Unit is within the Flathead Indian Reservation. No Flathead National Forest lands are included. This area contains the driest sites within the Subbasin, supporting ponderosa pine and Douglas-fir as well as open grass or sagebrush hillsides.

Flathead Lake is in the center of the geographic unit, as is the community of Polson. While residences are scattered throughout the area, the town and lake-side area form the hub of human activity. The Mission Mountain Tribal Wilderness is included within the area.

Ashley North Geographic Unit - This 115,000 acre Geographic Unit lies directly west of Kalispell and is dominated by gentle rolling terrain. Most of the unit is private land, including forested areas, open ranchlands, and many private residences. Less than 10% of the area is Flathead National Forest lands, mostly in isolated sections intermixed with private commercial timberlands.

The forests are dominated by mixed-species conifers, with numerous creeks and patches of wet meadows bordered by spruce, and rocky uplands with large Douglas-fir. There has been a considerable amount of harvest on all ownerships, often highly-visible straight line edges. Much of the old growth habitat was fragmented, leaving few patches over 100 acres in size. This area contains some stands of warm/dry old growth ponderosa pine with extensive ingrowth of Douglas-fir.

Big game is abundant, despite the lack of forested cover in some areas. High quality winter range covers about a quarter of the unit, mostly below 4,200 feet. MDFWP has frequently transplanted elk to the unit from the National Bison Range. Grizzly bears are still occasionally seen in the unit, including sows with cubs.

Ashley Lake (over 3,000 acres) is near the center of the unit. Loons, grebes, and relatively high numbers of waterfowl nest along this lake, as well as smaller lakes in the unit. The bald eagle nest at Ashley Lake is noted for low productivity and frequent nest failures. Sport game fisheries include kokanee salmon and state-record hybrid cutthroat/rainbow trout. Westslope cutthroat and, possibly, bull trout occur in this lake. The most important fish spawning tributaries on the Tally Lake Ranger District include Fish and Wade Creeks. In 1992, water quality concerns drove the decision to delay harvest on Flathead National Forest lands.

Much of the shoreline has been developed for recreation residences and an increasing number of year-round homes. Activities include ice fishing, hunting, fishing, berry picking, firewood gathering, and hiking.

Ashley South Geographic Unit - The total size of the Ashley South unit is 119,700 acres, of which the Forest Service manages 28,800 acres (24%). Plum Creek Timber Company owns a large portion of the remaining acreage and it manages its lands for long-term timber production. There is also a large portion of small private landowners within this unit.

The southwest facing slopes of this unit are warm, dry habitats supporting Douglas-fir and ponderosa pine. Other aspects are cool, moist and support Douglas-fir and western larch. Upper elevations are cold and moist and support sub-alpine fir, Engelmann spruce, and lodgepole pine.

There are no bull trout in the streams of this unit. Several streams have cutthroat trout at very high elevation, but downstream areas are largely occupied by exotic brook trout.

There are many roads and there has been extensive timber harvesting in this unit. There are some opportunities for watershed restoration.

Blacktail Mountain is located within the Ashley South Geographic Unit. There is a developed downhill ski area located at the top of Blacktail Mountain, expected to be in operation for the 1998-1999 ski season. There are about 30 special use electronic sites located at the top of the mountain.

There are many roads and there has been extensive timber harvesting in this unit. Primary recreation uses include snowmobile and motorbike riding, driving for pleasure, skiing, biking, and hunting.

Lake Mary Ronan Geographic Unit - The total area of the Lake Mary Ronan unit is roughly 100,000 acres, of which the Forest Service manages 18,600 acres (19%). Plum Creek Timber Company owns a large portion of the remaining acreage, which it manages for long-term timber production. There is a large portion of small private landowners within this unit.

Overall, the unit is relatively dry. Southwest facing slopes of this unit are warm and dry, supporting Douglas-fir and ponderosa pine. Other aspects are cool and moist and support Douglas-fir and western larch. Upper elevations are cold and moist and support sub-alpine fir, Engelmann spruce, and lodgepole pine.

Lake Mary Ronan is a very popular fishery. The streams in this unit have few fish in them.

There are many roads and there has been extensive timber harvesting in this unit. Primary recreation uses include snowmobile and motorbike riding, driving for pleasure, skiing, biking, and hunting. There is a cross-country ski trail system and an ATV trail and parking lot located within the geographic unit. Water from Stoner and Truman Creeks is used for domestic purposes.

Little Bitterroot Geographic Unit - This Geographic Unit of approximately 65,000 acres actually falls within the Lower Flathead Subbasin, but because of the very minor acreage of Flathead National Forest land, we have included it here. Ownership patterns within the geographic unit are a checkerboard of corporate timber lands and private holdings, many containing residences. Highway 2 bisects the unit. Little Bitterroot Lake, with a surface area of more than 3,000 acres, lies along the northern edge of this unit.

The Lower Flathead Subbasin was placed into cluster 6, which is described as mixed-integrity dry and moist forests with low aquatic integrity. The emphasis for this cluster is restoration to the extent that opportunities exist on the limited amount of federal land, containment of weed expansion, and conservation of fish strongholds.

The 200-acre Little Bitterroot Research Natural area lies within this geographic unit. This RNA was designated in recognition of the presence of good examples of all four phases of the Douglas-fir/pinegrass habitat type.