CHAPTER 3

Affected Environment and Environmental Consequences

I. Introduction

This chapter presents both the existing environment of the *Flathead National Forest* area and potential consequences to that environment by implementing any of the six alternatives presented in Chapter 2. Discussions of the current condition describe the physical, biological, social, and economic environment for each potentially affected resource. Discussions of environmental consequences form the scientific and analytic basis for comparing the alternatives. All direct, indirect, and cumulative effects are disclosed. The means by which potential adverse effects would be reduced or mitigated are also described (also see Chapter 2). Some resource conditions consider a larger area than the project area boundary if predicted effects extend beyond the project area. The project record contains information concerning the boundaries for each area analyzed.

The discussions of resources and potential effects take advantage of existing information included in the Forest Plan, other project documents, project-specific resource reports and related information, and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication.

Analyzing Effects

Direct, Indirect, and Cumulative Effects

Direct environmental effects are caused by the proposed project activities and occur at the same time and place (40 CFR 1508.8). Indirect effects are those that occur later or at a distance from the activity but may have significance to the action in the near future. Cumulative effects result from incremental consequences of actions when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over time.

Past, Present, and Reasonably Foreseeable Actions

Past, present, and reasonably foreseeable actions are activities have already occurred, are currently occurring, or are likely to occur in the vicinity of the project area and may contribute cumulative effects. The past and present activities and natural events have contributed to creating the existing condition, as described in the Affected Environment sections of Chapter 3. These activities, as well as reasonably foreseeable activities, may produce environmental effects on issues or resources relevant to the proposal. Therefore, the past, present, and reasonably foreseeable activities have been considered in the cumulative effects analysis for each resource.

Not all past, present, or reasonably foreseeable actions affect resources (e.g. wildlife, recreation, etc.) the same. For instance, one reasonably foreseeable action may greatly affect one resource while not affecting another. The cumulative effects analysis for each resource considered those past, present, and reasonably foreseeable actions that would have relevant effects.

Past Actions - Flathead National Forest System Lands

- Road construction/reconstruction/maintenance. Approximately 3508 miles of National Forest System roads remain within the Flathead National Forest, many of which provide snowmobiling access.

- Hunting, fishing, snowmobiling and dispersed recreation

- Snowmobile trail grooming started in 1977. A warming hut exists on the Lakalaho Road 1696, maintained by local snowmobile groups.

- Road decommissioning. Approximately 405 miles of road have been decommissioned since we began decommissioning roads in 1995, reducing snowmobile access to some areas of the forest.

Current and Reasonably Foreseeable Actions - Flathead National Forest System Lands

- Northern Rockies Lynx Amendment –Management for Canada Lynx will be incorporated into Forest Plans, based on the Lynx Conservation and Assessment Strategy. This may limit the ability to increase the amount of groomed snowmobile trails in the future.

- Forest Plan Revision – The Flathead Forest Plan is currently being revised, with completion expected in 2006 or 2007. Winter motorized recreation direction resulting from this amendment will be reviewed during the revision process to determine whether there is "need for change."

- Noxious weed monitoring and treatment – Monitoring and treatment of noxious weed infestations is authorized by the *2001 Forest-wide Noxious and Invasive Weed EA and Decision Notice.*

- Recreational public uses such as sightseeing, hiking, camping and snowmobiling are expected to continue. Public use is anticipated to increase over the next 10 years. Existing infrastructure was taken into consideration for analyzing cumulative effects.

- Road decommissioning authorized by previous decisions will continue.

- Proposed Logan Vegetative Management Plan.

- Fire Restoration and Salvage as a result of 2003 fire season.

II. Recreation

1. Introduction

The landscape of the Flathead National Forest is very diverse. It is known for its spectacular mountains and numerous lakes. Much of the Forest's terrain consists of glacially carved mountains and broad U-shaped valleys. These features draw recreational users to the area all four seasons of the year. Valley bottoms are generally open. As one climbs in elevation, the slopes are densely covered with trees, and the highest elevations become again more open. Past timber harvest and the forest road system provide openings for snowmobile play areas and access across the densely wooded slopes. Snowmobile riders seek the open areas to play and high elevations sites to enjoy scenic views. Most of the dense timber slopes, while open for snowmobile use, receive no or almost no use because of steep terrain and dense timber stands, brush and lack of special scenic features. For much of the winter, the snow condition under the timber canopy is uncompacted making snowmobile riding difficult until the snow sets up in the spring. In addition, snow depth under the tree canopy is reduced due to interception by the canopy, making riding of snow machines difficult over rocks and downed logs. The groomed routes of Canyon Creek, Crane Mountain, Skyland Creek and Desert Mountain receive the most use and are very popular with local users. The Flathead Valley area is broadly advertised as a destination vacation site across the States and Canada, and snowmobiling is one of many available activities touted. One local outfitter provides guide services on the Canyon Creek trail system and one from Seeley Lake provides like services on the Holland Lake trail system if the Holland Lake Lodge is open. In addition several local businesses provide snow machines that are available for rent. One snowmobile rental business provides delivery and pickup service at the trailhead location.

2. Affected Environment

Winter motorized recreation is a popular activity on the Flathead National Forest, and has been occurring for many decades. The earliest registration of a snowmobile in Flathead County occurred in 1926. Snowmobiling in the Flathead Valley started in earnest in the early to mid 1960s, and the Flathead Snowmobile Association was chartered in 1966. Grooming of trails by Flathead County began in 1977. The first trail groomed was up the Trumble Creek road to Canyon Creek; shortly after that the Crane Mountain trail system came on line. From 1978 to 1980, the Montana Fish, Wildlife and Parks took over the grooming program from Flathead County. In 1980, the Flathead Snowmobile Club took over the grooming program and has continued to this day. The grooming program expanded to include Desert Mountain in 1984-85. Eventually grooming came down the Canyon Creek road to the North Fork road, and Trumble Creek was abandoned. There are five groomed routes on the Forest, totaling approximately 156 miles, three of which are groomed by the Flathead Snowmobile Club under a "challenge cost-share agreement". The Cutbank Snowgoers groom the Skyland area trails, also under a cost-share agreement. See Table 3-1.

Table 3-1. Groomed snowmobile routes on the Flathead National Forest

Route	Miles
Canyon Creek	46
Crane Mountain (groomed intermittently)	43
Desert Mountain	28
Skyland Challenge	33
Holland	6

Flathead County registration figures now show that three percent of county residents own registered snowmobiles. The precise number of snowmobile users on the Flathead National Forest is difficult to determine. From monitoring and observations, the Forest has been mapped using three categories, low, medium and high use. The highest use occurs on the Canyon Creek trail system followed by the Skyland trail system. Trail counters have been used at several locations in past years. Use numbers have steadily increased and it is estimated that 8,000 riders used the groomed trail system at Canyon Creek in 2002, with about 2500 to 3000 recreation visitor days on the remainder of the Glacier View District. The Swan Lake District receives an estimated 8500 snowmobile recreation visits a year, not including the Island Unit. An estimated 5000 visitor days are found on the Hungry Horse District. The Island Unit and the main portion of the Tally Lake District have less desirable topography for scenic snowmobiling, and experience substantially less use than other areas on the Forest. Numbers are reaching an estimated 24,000 winter motorized recreation visits across the Flathead National Forest, annually (Project Record J-2). These numbers have been fairly consistent over the last five years. During the winter of 2002-03, with general drought conditions across northwestern Montana during November and December, the use numbers were down by a third to one-half. However, the general trend for snowmobile use is expected to follow the national trend and continue to increase as the Flathead Valley population continues to grow.

Use also occurs in high elevation alpine areas of the forest, where riders go for scenic views, and some to participate in "high marking". High marking is the practice of taking a snowmobile as high as possible on a steep slope or alpine bowl. Other open areas where snowmobiles can move about randomly are referred to as "play areas."

Areas where snowmobiling is prohibited by existing programmatic Forest Plan direction include Wilderness, the Jewel Basin Hiking Area, certain management areas such as MA 2 (primitive non-motorized recreation emphasis) and MA 23 (Research Natural Areas). On the forest, this leaves about 1,095,000 acres where snowmobiling is allowable, although topography or dense vegetation makes many areas difficult if not impossible to use. Concentrated use appears to have been occurring on about 63,000 acres across the Forest. This number corresponds to known use areas mapped on the Glacier View, Hungry Horse, Spotted Bear, and Swan Lake districts. It does not include use on Tally Lake or the Island Unit, where use is light.

It is important to note that numerous site-specific seasonal and yearlong closures exist in areas where snowmobile use is generally permissible under programmatic Forest Plan direction. For instance, many roads are open most of the winter to snowmobile use, but are restricted during hunting season. Likewise, a yearlong area closure has been instituted on a

portion of the Tally Lake Ranger District to reduce the risk of noxious weed spread. These and other similar closures have been authorized by site-specific decisions.

Users of snowmobiles on the forest are primarily from the Flathead Valley, but areas on the eastern edge of the forest are visited by snowmobilers from Cut Bank and Browning. Some use by Canadian visitors is seen in areas across the Forest. Although the area does receive some national marketing, the Flathead is not generally seen as a "snowmobile destination" to the same extent as areas such as West Yellowstone or Yellowstone National Park. Visitors who come to the Big Mountain Ski and Summer Resort for downhill skiing often take a day to snowmobile as an additional activity.

For residents of the remote North Fork, snowmobiling is a form of transportation to travel to neighbors' homes and is part of the social fabric of the area. Snowmobiling provides a means of winter recreation and allows persons not physically capable of cross-country skiing or snowshoeing to get outside during the relatively long winters experienced in northwest Montana. Families, including children and the elderly, can access places during winter they would otherwise be unable to reach.

The season of use varies from year to year depending on weather conditions and elevation, but snow conditions are generally conducive to snowmobiling from mid-December to the end of April. During some years, excellent snowmobiling conditions extend into June. Seasonal restrictions are in place in certain areas and on certain roads for wildlife habitat or other resource concerns. The snowmobile use season varies with the winter conditions. Winter snowfall can begin in the month of September on the highest peaks, with the valley bottoms receiving snowfall typically in late November and December. The grooming of the trail system can start December 1 but typically snowmobile use season starts in mid to late December. Some of the best snow conditions for snowmobile riding and best sunny weather occur during the time frame of mid-March and early April. Some users follow the snowmelt to higher elevation by trailering their snowmobiles to the snowline, and have on some years ridden snowmobiles into early summer. Good spring riding is found along the Whitefish Divide from Werner Peak to Huntsberger Lake, from Doris Mountain to Strawberry Mountain and from Mt. Orvis Evans to Con Kelly Mountain in the northern end of the Swan Range. For the most part, the level of use decreases dramatically in late spring as other activities in the Flathead Valley present themselves.

As would be expected with most forms of outdoor recreation, use is heaviest on weekends. Parking areas and trailheads can be highly congested on any given Saturday in winter. The most popular weekend for snowmobiling has consistently been the President's Day weekend.

User conflicts have been known to occur between motorized and non-motorized use groups. Many recreationists seeking a non-motorized experience feel the quality of their outing is diminished by the sounds and odors caused by snowmobiles, while others appreciate the packed trail created by snowmobiles as this eliminates the sometimes difficult job of breaking a new trail. However, the track left in the snow by snowmobiles is not analogous to the narrow side-by-side track used by cross-country skiers, which, once established, allows for efficient self-powered movement.

The scenic landscape draws a variety of winter recreation users to the Flathead Valley. They include downhill, telemark, and cross-country skier, snowboarders, snowshoers, trappers and winter campers to list a few. Downhill and telemark skiers, as well as snowboarders, are accommodated at Blacktail Mountain and Big Mountain Ski Resorts. For those seeking groomed cross-country areas, there are trail systems on Blacktail Mountain, Round Meadow, Essex, and at the Big Mountain Ski Resort. The Nordic Club grooms tracks at the Whitefish Golf Course when snow conditions permit. For the remote backcountry ski or snowshoeing experience, the Jewel Basin, the Forest wilderness areas and Glacier National Park provide spectacular opportunities. These areas also allow for a quiet winter experience, as snowmobiling is prohibited. Backcountry enthusiasts may combine several forms of recreation in one outing. Access to many backcountry areas on the forest is difficult without using a snowmobile. Some backcountry skiers use the compacted trails left by snowmobiles to reach areas that would otherwise be difficult to access if skiers had to break trail, especially to reach the boundaries of wilderness areas where roads are generally not plowed. In the areas mapped as low snowmobile use, there are numerous places available where encounters between users are likely to be minimal.

A copy of the Montana Snowmobile Laws is included in the project file. Two of the laws that are most important to this document are: 23-2-631 Operation on public roads, streets and highways; and 23-2-634 Regulation of snowmobile noise.

23-2-631 A person may not operate a snowmobile upon a controlled access highway or facility at any time. The Forest Service interprets this as shared use of a road is not permitted.

23-2-634 (1) Except as provided in this section, every snowmobile must be equipped at all times with noise-suppression devices, including an exhaust muffler in good working order and in constant operation. A snowmobile may not be modified by any person in any manner that will amplify or otherwise increase total noise emissions to a level greater than that emitted by the snowmobile as originally constructed, regardless of date of manufacture.

(2) Every person who owns or operates a snowmobile manufactured after June 30, 1972, but prior to June 30, 1975, shall maintain the machine in such a manner that it will not exceed a sound level limitation of 82 dbA measured at 50 feet.
(3) A snowmobile manufactured after June 30, 1975, except snowmobiles designated for competition purposes only, may not be sold or offered for sale unless that machine has been certified by the manufacturer as being able to conform to a sound level limitation of not more than 78 dbA measured at 50 feet. Every person who owns or operates a snowmobile manufactured after June 30, 1975, shall maintain the machine in such a manner that it will not exceed a sound level limitation of 78dbA measured at 50 feet.

3. Environmental Consequences

The analysis area used for recreation is the Flathead National Forest.

The following significant issue was identified based on public comment:

There is concern that the proposed action reduces snowmobiling opportunities on the Flathead National Forest. There is a concern that a substantial amount of acreage was lost to the snowmobiling community in the settlement agreement, and many people asked that we go back to the 1986 travel map that allowed motorized winter recreation use over a wider area. Concentrating use in certain areas has prompted concerns about safety for snowmobilers. Scoping comments also provided suggestions on improving the proposed action.

Measurement Indicators:

- The extent of area on the Flathead National Forest available to snowmobilers in each alternative.
- Acres of open and usable terrain for snowmobile by alternative.

Direct and Indirect Effects

Alternative 1 – No Action

The maps for Alternative 1 display areas where snowmobile use would be allowed and prohibited by Forest Plan direction. The area open to snowmobile use provides a mix of terrain and features that meet most users' expectations.

Acres of Useable Terrain Within Open Areas
Forest Plan direction under Alternative 1 would allow snowmobile use on an estimated 1,142,00 acres. Of this, about 63,000 acres are estimated to be commonly used terrain where slope and vegetation do not impede snowmobile use. This figure does not include the main portion of the Tally Lake District, where a nominal amount of riding occurs, but is generally physically possible. The generally lower elevation and rolling topography of the Tally Lake District does not provide an aesthetic snowmobiling experience.

Season of use
In the areas outside the grizzly bear recovery area (generally the Tally Lake Ranger District and the Island Unit of the Swan Lake District) snowmobile use season is dependent on the snow conditions. Within the Northern Continental Divide Ecosystem (NCDE) grizzly bear recovery area (the remainder of the Swan Lake District, Glacier View, Hungry Horse and Spotted Bear Districts), winter motorized use is allowed during the denning season, which is defined as generally November 15 to March 15 (Amendment 19, ROD page 19). These dates eliminate virtually all spring snowmobile opportunities on the Forest, when higher elevation snow conditions are usually excellent for snowmobiling and the weather most fair. This would have a substantial impact on the snowmobiling public in and around the Flathead Valley.

Number of users
This alternative would accommodate the highest number of users during the time winter motorized use is allowed.

Safety
Of the alternatives, the No Action alternative disperses use across the forest to the greatest extent. This improves safety in terms of congestion among riders, but increases risk to snowmobilers by exposing them to a wider range of environmental and topographical conditions.

Conflict between winter users
The potential for conflict between user groups will always exist because of differing attitudes amongst people. Recreationists seeking quiet use may find that experience at one of the designated cross-country ski areas, Jewel Basin, within a research natural area, one of the three wilderness areas, or within Glacier National Park. Access to these quiet use areas is variable, however. The highest potential for conflict does exist with the No-action alternative, based on the 1,142,000 acres available for motorized use with this alternative.

Alternative 2 - Proposed Action

Compared with Alternative 1, the most substantial changes would occur on the Glacier View District and portions of the Swan Lake District on the Swan Crest. See Figures 1-2 and 1-6 on the CD Rom for specifics of the alternative. On the Glacier View District, all the existing groomed routes and most of the popular play areas would remain open and existing roads/routes accessing those play areas remain open for use. Some play areas, such as Shorty Creek, would no longer be available. Large tracts of land between the designated routes would be closed. In the Swan Crest, an area south of Trinkus Lake and the Bond Creek Trail would also be closed to snowmobile use.

The result would be a reduction in areas where snowmobile use would be allowed. While much of the area where use would be prohibited received very little or no use, some popular areas in the North Fork and near the community of Swan Lake would be closed. Local residents in the North Fork would find it more difficult to snowmobile from their property to neighbors or to National Forest System lands due to snowmobile closures in the valley bottom around private property. Areas adjacent to the town of Swan Lake would also be closed, which would force residents to either access open areas by transporting them via trailer or ride adjacent to the Swan Highway. Popular routes directly adjacent to the town would be closed. In the North Fork, Swan and Pinnacle areas, the private landowners that have traditionally accessed the National Forest System lands would be restricted. Although this is not a large number of people, those affected would be greatly impacted.

Acres available programmatically for snowmobiling on the Forest, including the Island Unit, would amount to approximately 784,400 acres with Alternative 2.

Acres of Useable Terrain Within Open Areas
Forest Plan direction under Alternative 2 would allow snowmobile use on an estimated 784,400 acres. Of this, about 57,100 acres are estimated to be commonly used terrain, not counting the main portion of the Tally Lake District, where use is nominal. Compared to the existing condition, Alternative 2 sustains winter motorized recreation access to 90.6% of the area being used by snowmobilers under Alternative 1 (~63,000 acres).

Season of Use
Same as Alternative 1. Spring riding opportunities would be severely limited to non-existent if snowmobiling were not allowed within the NCDE after March 15. Areas outside the NCDE are lower elevation and generally do not provide enough snow coverage on which to ride after March 15.

Number of users
Some snowmobile users may find that less open area is available and the pattern of use may shift; however, most popular areas remain open and available areas will meet demand.

Safety
Some use areas, particularly around the Sixmile area on the Swan Lake District, may experience more congestion as local snowmobilers are limited to the much smaller area of use than that which they have had historically. It is possible that use may shift to other open areas on the forest if users feel "crowded".

Conflict between Users
The groomed cross country trail system and surrounding areas are similar to Alternative 1, the additional restrictions on the Glacier View District will limit snowmobile users to designated areas and routes; the remaining area will provide areas for other non-motorized users. It should be noted, however, that not all areas where snowmobiles are prohibited or not present are actually accessible by quiet use recreationists. The distance from a plowed road to a wilderness boundary is often prohibitive for most people operating under their own power.

Due to differing attitudes among users, the potential for conflict will always remain. For a time, based on the public input we have received on the proposal, animosity will remain high among those members of the public who strongly disagree with the proposed action, or with having any restrictions imposed on them.

Alternative 3

This alternative is similar to Alternative 2 with the following changes. Many, but not all, small blocks of National Forest System lands immediately adjacent to and between parcels of private property would be open to provide local access in the North Fork valley bottom. See travel map. In addition, Great Northern Flats, a popular area for families to take their children, would remain open. The *lower* portion of the Bond Creek Trail near the community of Swan Lake would also be open to provide a loop for local users to enjoy, and minimize crossing or riding adjacent to the Swan Highway. The open routes on the Glacier View District would be 200 feet in width where terrain allows small play areas and areas to cool the tracks of liquid-cooled snow machines. In Alternative 2 these routes are only the width of the roads or trails.

The route to Tuchuck Campground would also be open to snowmobile use with this alternative. See Figures 2-7 and 2-11 on the CD Rom for complete details.

Acres available for snowmobiling on the Forest, including the Island Unit, would amount to approximately 793,600 acres with Alternative 3.

Acres of Useable Terrain Within Open Areas
Forest Plan direction under Alternative 3 would allow snowmobile use on an estimated 793,600 acres. Of this, about 57,300 acres are estimated to be commonly used terrain, not counting the main portion of the Tally Lake District, where use is nominal. Alternative 3 sustains winter motorized recreation access to 91 percent of the area currently being used by snowmobilers under Alternative 1 (~63,000 acres).

Season of Use
Within the Tally Lake District and Island Unit portion of the Swan Lake District, the season of use is determined by snow availability. On the remainder of the Swan Lake District and the Glacier View, Hungry Horse and Spotted Bear Districts within the NCDE grizzly bear recovery area, winter motorized use would be allowed from December 1 through April 30. The later spring date would allow snowmobile use in what is referred to by some as the "prime season" and allow for an extended spring season at higher elevations on the Forest. This alternative and Alternative 6 are the only alternatives that would allow spring snowmobiling within the NCDE after April 1.

Number of users
Some snowmobile users may find less open area is available and the pattern of use may shift; however, most popular areas remain open and available areas will meet demand. In addition, the area around the community of Swan Lake will help meet local demand and provide a safer pattern of use, not requiring a highway crossing or encourage users onto plowed roads. In the North Fork, the private landowners will be able to snowmobile from their property to their neighbors, and cross National Forest System lands to reach additional areas open for snowmobile use.

Safety
When compared to the proposed action (Alternative 2), Alternative 3 would not significantly reduce congestion, especially for Swan Lake residents. The Trinkus Lake area would remain closed to snowmobiling, causing heavier use in the Sixmile area. However, with the lower section of the Bond Creek trail open to snowmobile use, safe access is afforded to reach other trails to the south of Bond Creek, and improve access from private land to the national forest. Alternative 3 also allows access between private land parcels in the North Fork, eliminating the need to ride on the shoulder of plowed roads.

Conflict between Users
Effects would be similar to Alternative 2 with the exception of the additional areas opened for snowmobile use.

Alternative 4

This alternative is similar to Alternative 2 with additional closures to snowmobile use to further protect wildlife. In the Swan Valley an additional winter range area north of Holland Lake would be closed, a mule deer winter range near Tally Lake would be closed; the Miller Creek Demonstration Forest would be closed for moose winter range and an area between the LaBeau Research Natural Area and Upper Stillwater Lake would also be closed. On the Glacier View District an additional closure would be located in the area between Dry Creek and McGinnis Creek, the tracts along the North Fork between the private property would remain closed similar to Alternative 2. On the Hungry Horse District an additional closure would include an area in Pinnacle Creek, an area between Canyon Creek to Riverside Creek including the Fire Fighter area. All these areas are generally low use areas but would affect local private landowners that have traditionally used these areas.

Acres of Useable Terrain Within Open Areas
Forest Plan direction under Alternative 4 would allow snowmobile use on an estimated 763,500 acres. Of this, about 56,200 acres are estimated to be commonly used terrain, not counting the main portion of the Tally Lake District, where use is nominal. Therefore, 89.2 percent of the area being used by snowmobilers under Alternative 1 (~63,000 acres) remains available for winter motorized recreation.

Season of Use
Within the Tally Lake District and Island unit portion of the Swan Lake district, the season of use is determined by snow availability (i.e. no spring closure date prescribed by the Forest Plan). On the remainder of the Swan Lake District and the Glacier View, Hungry Horse and Spotted Bear Districts within the NCDE grizzly bear recovery area, winter motorized use would be allowed from December 1 to April 1. This would allow two more weeks of spring snowmobiling than Alternatives 1, 2 or 5. While this would allow some additional spring snowmobiling, it would still curtail nearly all snowmobile use during what many consider to be the best snowmobile conditions of the year.

Number of users
Some snowmobile users may find less open area is available and the pattern of use may shift; however, most popular areas remain open and available areas will meet demand. In the North Fork, Swan and Pinnacle areas, the private landowners that have traditionally accessed the National Forest Lands will be restricted. Although this is not a large number of people, it would greatly impact those affected.

Safety
Alternative 4 would allow the fewest number of acres open to snowmobiling across the Forest, while still allowing the most popular areas to remain accessible. This could increase congestion, but not significantly more than Alternatives 2 and 3.

Conflict between Users
While Alternative 4 may lessen impacts between users to a greater extent than Alternatives 1, 2 or 3, by providing more area available for a quiet use winter experience on the Forest, it may increase the level of animosity for motorized users who feel they are losing areas they

are accustomed to riding. While it may appear that all areas where snowmobiles are prohibited provide opportunities for quiet use, much of it is not actually accessible by quiet use recreationists. The distance from a plowed road to a wilderness boundary is often prohibitive for most people operating under their own power.

Alternative 5

This alternative would close all Management Areas 2A to snowmobiling across the forest. Sections of existing groomed routes would be closed along with most of the high elevation play areas in the North Fork. In the Skyland area, the route between Zip's Cabin area to Skyland area within Management Area 2A would be closed. Access to Baldhead Mountain would be closed in the Challenge Skyland area. This alternative would also close areas around Jewel Basin. It would also close scenic Pioneer Ridge above Hungry Horse Reservoir, which is a popular area for average skilled riders.

This alternative would close to snowmobile use most of the high elevation play areas in the North Fork, portions of the groomed routes in Canyon Creek, popular routes in the Middle Fork and several areas that are currently enjoyed by all skill levels of snowmobile riders. Much of the scenic areas that are sought by snowmobile users would not be available for use. This alternative would, however, continue to allow snowmobile use in the MA 2B area south of Trinkus Lake in the Swan Valley, similar to Alternative 1.

Acres available for snowmobiling on the Forest, including the Island Unit, would amount to approximately 1,035,600 acres with Alternative 5.

Acres of Useable Terrain Within Open Areas
Forest Plan direction under Alternative 5 would allow snowmobile use on an estimated 1,035,600 acres. Of this, about 57,500 acres are estimated to be commonly used terrain, not counting the main portion of the Tally Lake District, where use is nominal. Therefore, 91.3 percent of the area being used by snowmobilers under Alternative 1 (~63,000 acres) remains available for winter motorized recreation.

Season of use
Same as Alternative 1, allowing snowmobiling for a four-month period and eliminating high elevation spring snowmobiling, what many users describe as the best time for snowmobiling.

Number of users
It is difficult to estimate the reduction in snowmobile users but it could be predicted if this alternative was selected, it would be the most impacting. All skill levels of snowmobile riders would be affected. Many vacation homeowners, especially in the Middle Fork area, have purchased property in the Flathead area specifically to enjoy snowmobile use. If implemented, some existing users would find the remaining open areas would not provide the recreational experience they seek and would not continue to snowmobile here. Snowmobile users from outside the area may not come to the Flathead, which could reduce the local outfitter and guide business and sale and rental businesses locally.

Safety
By eliminating snowmoible use in MA 2A, this alternative would create the largest reduction in access to snowmobiling areas that have been traditionally used on the forest. If the same amount of persons continued to snowmobile, use could be concentrated in the remaining open areas, increasing the possibility of collisions and resource damage. It is more likely, however, that if access were lost to most scenic high elevation areas, overall snowmobile use would decrease.

Conflict between users
This alternative would likely reduce the number of snowmobile users and in theory should reduce the on site conflict between the various users. In practice, the conflict between the users groups could be greatly escalated due to lingering animosity and most likely result in some hostile relations when different users paths cross. This could change; however, it is likely to take considerable time.

Alternative 6

This alternative addresses the need for areas to snowmobile during the winter and spring. As mentioned in the affected environment, springtime can be one of the best times to snowmobile depending on the snow pack. These areas are generally upper elevations that include north-facing slopes and have trailhead access points that can move up the road as the lower elevations melt out. Weather conditions in the spring (too warm) generally limit or end the trail grooming program. However if the nights remain cold enough the general snowpack will have a hard surface layer in the morning that allows snowmobiles to travel over without sinking in. This allows access to spots that are more difficult to reach in powder conditions. This hard surface layer will break down in the warm afternoons and cause snowmobiles to fall through. Thus, snowmobiling in the spring is mostly a morning activity.

Effects of this alternative from December1 till March 30 will closely resemble Alternative 3. Access across National Forest System land that lies between parcels of private land would be open, the same as described in Alternative 3, to allow local residents in the North Fork and at Swan Lake to reach neighbor's homes. See maps of Alternative 6.

The routes in the North Fork would be 200 feet wide, the same as described in Alternative 3. Access to 100 feet on either side of open road corridors will be available, enabling riders of liquid-cooled snowmobiles to maintain a proper temperature for their machines, and reduce congestion.

This alternative will have six snowmobile areas with different closing dates from March 31 till the snow runs out. This may lead to some confusion during the first couple of years.

Acres of Useable Terrain Within Open Areas

Forest Plan direction under Alternative 6 will allow snowmobile use on an estimated 787,100 acres. Of this about 57,200 acres are estimated to be commonly used terrain not counting the main portion of the Tally Lake District where use is nominal. . Alternative 6 sustains

winter motorized recreation access to 91 percent of the area currently being used by snowmobilers under Alternative 1 (63,000 acres).

Season of Use

Provides for a wide variety of snowmobile use in the winter and spring.

Number of Users

This alternative would accommodate the most snowmobilers in the winter and spring.

Safety

This alternative will help keep use spread out and less congested. During the spring riders will be more concentrated into the several open areas; however, there are substantially fewer riders in the spring. The Forest would have fewer reports of snowmobile springtime violations, which would mean less patrol time and fewer chances of accidents. Having the ability to cross the Bond Creek Trail will not force riders to parallel Highway 83 near Swan Lake in order to reach other open trail systems.

Conflict between Users

Alternative 6 is a result of ongoing discussions between user groups and the Forest Service, as well as public comments. It is hoped that all types of recreationists will recognize a compromise had to be reached to resolve the issue of winter motorized recreation on the Flathead National Forest, and that all groups can enjoy their chosen recreational pursuits here if they practice some tolerance and respect for others.

4. Regulatory Framework and Consistency

We are directed by the Flathead Forest Plan to provide a full array of recreation opportunities, including both motorized and non-motorized. All of the alternatives meet this requirement.

III. Economics

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

This section presents a description of the economic environment that could be potentially affected by the proposed Forest Plan amendment along with an estimate of what those effects might be. The focus is on the economic relationship of the Flathead National Forest to the economy within and around the Forest and the economic influence of goods and services the Forest provides. Emphasis will be placed on those components of the economy identified throughout the scoping process, mainly through public comments.

REGULATORY FRAMEWORK – Forest Plan Requirements

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

- Provide for public benefits from National Forest lands – the planned allocation, development, and efficient distribution of selected natural resources (II.Goals.A.1).
- Develop and implement a road management program, with road use restrictions and closures, that is responsive to resource protection needs and public concerns (II.Goals.B.5.).
- Provide a range of quality outdoor recreation opportunities within a forest environment that can be developed for visitor use and satisfaction (II.Goals.B.8.).

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

- Section II. Objectives1.a and b. provide objectives for investment in developed recreation facilities including developed sites and trails.
- Section II B. Recreation Standards are numerous. They include:
    - Encourage Forest visitors not desiring a wilderness setting to use nonwilderness National Forest System lands which can provide for their recreation needs.
    - Develop additional cross-country ski trails where increased demand exists.
    - Continue the Memorandum of Understanding with the State of Montana to provide grooming and maintenance of snowmobile trails.

Amendments subsequent to the original Forest Plan have not added any economic analysis requirements.

Forest Service policy for economic and financial analysis is contained in FSM 1970 – Economic and Social Analysis. Policy is in Section 1971.3, which generally states that economic efficiency analysis and economic impact analysis must be done "where

appropriate". Recommended methodology is in FSH 1909.17. Chapter 10 recommends methods to use to evaluate economic efficiency for all types of projects including recreation and road management. Chapter 20 recommends methods for economic impact analysis.

ECONOMIC ISSUES

The primary economic concerns related to the economic environment primarily based on public scoping are:

1) Employment and income in the local area, especially small firms catering to the snowmobile industry and the viability of the industry.

There was concern that the proposed action would reduce snowmobile activity in the Flathead County region and would have a detrimental effect on the local economy, especially on those small businesses catering to the snowmobile population. Many of the people commenting felt that snowmobilers both local and non-local spend a substantial amount of money in the Flathead County area, in pursuit of their sport.

THE ECONOMIC ENVIRONMENT AND EFFECTS OF PROPOSED PROJECTS.

The Economic Community

The Flathead National Forest includes parts of six Montana counties: Flathead, Lincoln, Lake, Missoula, Powell, and Lewis and Clark. About three-fourths of the area of the Forest is in Flathead County. However, most of the effects of Forest programs and projects, including the economic effects of snowmobiling, occur in Flathead County. Forest programs have lesser effects in Lake County and only minimal effects in the other four counties. However, the economic impact area can vary and is systematically determined for each proposed project or program.

The economic setting in the area of influence is described in terms of industry composition, economic diversity, economic dependence, employment and income, and other trends affecting the economy. As the proposed action features the management of snowmobile activity an emphasis is placed on describing the existing local snowmobile industry and the past and present role of the Flathead National Forest in that industry.

The Flathead National Forest is an important part of the Northern Continental Divide Ecosystem, which covers most of northwest Montana. This area has significant economic value on a regional, national, and international scale when recreation and tourism, wildlife, and aesthetic values are considered along with a significant timber management program. However, it is beyond the scope of this analysis to evaluate markets for all these resources because they have not been identified as significant economic issues in respect to the proposed action. The emphasis is on the economic effects that the Proposed Action and the alternatives would have on the snowmobile industry and the economic communities that would be primarily affected.

The Economic Impact Area

The proposed action and its alternatives are located in the economic influence area of Flathead County, Montana. Although a small amount of the proposed activities might occur in Lincoln or Lake Counties, most of the economic effects will be felt in Flathead County. The designation of Flathead County as the affected area was based on the multiple criteria suggested in the Forest Service Economic and Social Analysis Handbook (FSH 1909.17)(USDA FS 1988). Criteria include the location of the economic center, location of retail and service businesses where snowmobilers spend their money, location of the residences of snowmobile industry workforce, and the center of spending for retail and wholesale goods and services.

The Economy

Industry Profile – The *economic base;* i.e. that portion of the economy that involves the importing of dollars into the area is relatively diversified in the Flathead County economic region but was still led by the wood products industry in 1999 (last year of available data). As shown in Table 3-2, about 22 percent of labor income in the basic economy is attributed to the wood products industry. This industry would not be affected by the proposed action. Other basic industries of significance include transportation (15%), federal government (14%), other manufacturing (12%), primary metals (11%), and trade center (10%). Trade center income would include the nonresident snowmobilers spending. Agriculture and other related industries comprise six percent of the basic economy (USDC 2003). The primary metals industry, which consists almost totally of the Columbia Falls Aluminum Plant, has declined significantly since 1999, when the plant temporarily halted the production of aluminum (Polzin 2002). However, limited production resumed in the last months of 2002.

Table 3-2. Basic Industry Sector Profile - Flathead County

Industry	Percent of Total Labor Income - 1999
Agriculture	6.0%
Trade Center	10.0%
Nonresident Travel	10.0%
Primary Metals	11.0%
Other Manufacturing	12.0%
Federal Government	14.0%
Transportation	15.0%
Wood Products	22.0%

However, when looking at the entire economy as sectored by the U.S. Department of Commerce (Bureau of Economic Analysis 2003) a different picture arises (Table 3-3). The services industry becomes the largest industry followed by trade, manufacturing, and government. Most of the spending by snowmobilers, resident and nonresident, in pursuit of their sport, is in the service and retail industries. Agriculture contributes 1.2 percent. In this

type of sectoring, tourism is not considered to be an industry by itself, and tourism spending is primarily in the services and trade industries. Future expectations of these industries are discussed in the " Economic Trends" section of this chapter. The wood products industry is included in "Manufacturing".

Table 3-3. Total Industry Sector Profile – Flathead County and Montana

Industry	Percent of Total Labor Income	
	Flathead County	Montana
Agriculture	1.2%	3.6%
Mining	0.6%	2.3%
Construction	9.5%	7.5%
Manufacturing	15.6%	7.3%
Transportation and Utilities	7.3%	8.0%
Trade	16.6%	16.8%
Finance, Insurance, Real Estate	6.7%	5.9%
Services	28.0%	27.0%
Government	14.4%	21.6%

The economic profile for Flathead County is similar to the state of Montana for most industries. However, there are a few exceptions. The manufacturing industry is more than twice the state percent and is the highest rate of any county in the state. This is presently dominated by the wood products industry. Government, which includes federal, state, and local government is significantly smaller in Flathead County than it is in the state as a whole. Agriculture and mining are a relatively minor part of the total income generated in both Flathead County and the state of Montana. However, agriculture varies greatly from year to year depending on weather and market conditions. All other industries are very similar (U.S. Department of Commerce 2003).

Effects of Proposed Amendment on Industry Profile – As explained in the recreation effects section of this report, with the exception of Alternative 5, there will be no measurable reduction in the level of snowmobiling in the Flathead Valley area as a result of the proposed action or alternatives. Snowmobile activity will likely be redistributed, but not reduced. Consequently, neither resident nor non-resident snowmobiler spending should decline as a result of the proposed action or alternatives. Therefore the existing industry profile should not change. Changes in snowmobile activity are much more likely to be a result of factors such as weather or general economic conditions.

Alternative 5, as previously explained, has not only the potential to redistribute snowmobile activity, but could slightly reduce both resident and non-resident snowmobile activity in the Flathead area. The reductions would be in the nature of resident snowmobilers going elsewhere to snowmobile, not snowmobiling as much, or not snowmobiling at all and spending their money on other products or activities in or out of the Flathead Valley area. Potential changes would occur in those economic sectors where snowmobilers spend their money (i.e. retail, services). These effects would be very localized (i.e. Columbia Falls, Swan Lake). As snowmobiling activity accounts for a very small part of the local economy, even the largest possible changes in the snowmobile industry under Alternative 5, would have no measurable change on the overall economic profile of the Flathead Valley area.

Industry Trends

Employment

Job Growth Rate Although wage and income growth in Flathead County and Montana have been lagging, job growth has been significant. Positive job growth has occurred in every year from 1991 through 2000 in Flathead County. During this period over 10,000 jobs have been created for an increase of 41 percent, or an average of more than 1,000 jobs per year and an average annual growth rate in excess of four percent. This is significantly ahead of the Montana growth rate as well as all but a few of the other counties in Montana (U.S. Department of Commerce 2003).

Effects on Job Growth Rate – As previously explained, no economic changes should occur as a result of Alternatives 1 through 4 and 6. Any reduction resulting from the implementation of Alternative 5 would be quite small in relation to the area economy and would occur primarily in the services and retail economic sectors. Therefore it is highly unlikely there will be any measurable changes in the job growth rate resulting from the implementation of the proposed action or any alternatives.

Unemployment Related to job growth is the unemployment rate. Flathead County has historically the highest unemployment rate among the larger counties of Montana. The annual unemployment rate for Flathead County for the year 2002 was 5.6 percent. Although this is still above the Montana rate of 4.6 percent it is the lowest rate experienced by Flathead County for the past 30 years. In general, the unemployment rate for Flathead County has been steadily decreasing since 1991 when it was over nine percent. Along with a lower annual average rate, the monthly rates have shown much more stability. In 2002 the highest monthly rate was 7.7 percent in February and the lowest was 3.5 percent in August. This suggests that seasonal employment is not as prevalent as it once was although it is still greater than the state average. The unemployment rates for Flathead County vary quite closely with the State of Montana but rates in the winter months are relatively higher therefore suggesting a higher percentage of seasonal employment (Montana Department of Labor and Industry 2003). However, monthly unemployment rates since May 2003 are significantly exceeding the rates in the same months of 2002. This same pattern is occurring at the state and national level but to a lesser extent.

Effects on Unemployment Rate – The unemployment rate is a function of the number of unemployed people in the workforce as a percent of the total workforce. If there is no change in the size of the workforce or the number of unemployed people there will be no change in the unemployment rate. As Alternatives 1 through 4 and 6 predict no reduction in snowmobile activity and associated spending and Alternative 5 predicts very little change, there is little reason to expect any changes in the unemployment rate – seasonal or annual.

Income

Components of Total Personal Income and Trends Total personal income (TPI), includes the earnings (wages and salaries, other labor income, and proprietor's income); dividends, interest, and rent; and transfer payments[1] received by the residents of Flathead County. In 2001, earnings were 59.1 percent of TPI (compared with 59.1 percent in 1991); dividends, interest, and rent were 25.6 percent (compared with 25.2 percent in 1991); and transfer payments were 15.2 percent (compared with 15.8 percent in 1991). From 1991 to 2001, earnings increased on average 6.3 percent each year; dividends, interest, and rent increased on average 6.5 percent; and transfer payments increased on average 6.0 percent (U.S. Department of Commerce 2003).

Per Capita Personal Income In 1999, Flathead County had a per capita personal income (PCPI) of $24,801. This PCPI ranked 10th in the State, and was 103 percent of the State average of $24,044, and 82 percent of the national average, $30,413. In 1991, the PCPI of Flathead was $16,762 and ranked 18th in the State. The average annual growth rate of PCPI over the past 10 years was 4.0 percent. The average annual growth rate for the State was 3.9 percent and for the nation was 4.3 percent (U.S. Department of Commerce 2003).

Effects on Per Capita Personal Income - Per capita personal income is total income in an area divided by the total population of the area. If there is no change in personal income or the total population then there will be no change in the per capita personal income. As Alternatives 1 through 4 and 6 predict no reduction in snowmobile activity and associated spending and Alternative 5 predicts very little change, there is little reason to expect any measurable changes in per capita personal income as a result of the proposed amendment.

Total Personal Income In 2001, Flathead County had a total personal income (TPI) of $1.9 billion. This TPI ranked 4th in the State and accounted for 8.7 percent of the State total. In 2001, the TPI of Flathead was $1.0 billion and ranked 4th in the State. The average annual growth rate of TPI over the past 10 years was 6.3 percent. The average annual growth rate for the State was 5.0 percent and for the nation was 5.5 percent. However, as mentioned above, the per capita income has decreased as a percent of the national per capita income because the population in Flathead County has increased at a rate significantly higher than the national rate (U.S. Department of Commerce 2003).

Wages Annual wages of employees are another indicator of economic well being of a region. Year 1999 and 2000 data shows that Montana has the lowest average annual pay of any state in the U.S. In the year 2000, wages in Montana were only

[1] Transfer payments are income payments to persons for which no current services are performed. They are payments by government and business to individuals. Examples are social security, Medicare, government retirement, worker's compensation, and income maintenance (ex, AFDC and food stamps).

67 percent of the U.S. average. From 1999 to 2000 Montana wages increased by 4.4 percent, which was higher than approximately one-third of the states in the U.S. but was still below the U.S. average increase of 5.9 percent (U.S. Department of Labor 2003a). U.S. wage growth averages exceeded Montana averages in every industry category except mining and government. Montana wage rates for the top employing industries in the Flathead County area (services, trade, and manufacturing) significantly lagged U.S. growth rates for wages (U.S. Department of Labor 2003b).

Effects on Personal Income and Wages – As previously explained, no economic changes should occur as a result of Alternatives 1- 4, or 6. Any reduction resulting from the implementation of Alternative 5 would be quite small in relation to the area economy and would occur primarily in the services and retail economic sectors. Therefore it is highly unlikely there will be any measurable changes in personal income, personal income growth rate, or wages, resulting from the implementation of the proposed amendment.

Cost of Living Per capita income alone is not an adequate measure of economic well-being. The cost of living in an area must also be considered (Power 1990). The relative cost of living in the Flathead Valley is not well understood by many. Public opinion surveys conducted in the past indicate that many people identify the "cost of living" as one of the reasons they relocated to the Flathead Valley. This has led many people to perceive the cost of living to be low. However, cost of living indices provided by the American Chamber of Commerce Researchers Association (ACCRA) indicate the cost of living in the Flathead Valley in the fourth quarter of 2001 is approximately 100 percent of the national average. Transportation is the highest component at 106 percent and Utilities the lowest at 94 percent. The cost of housing is 95 percent of the national average (American Chamber of Commerce 2002).

Effects on the Cost of Living - There should be no measurable effects to the cost of living resulting from the proposed action or alternatives. Small changes in spending by snowmobilers in the local economy, would not likely affect the local prices of the goods they compete for, as they are such a small proportion of the total retail goods and services purchased. Also, most consumer goods are priced in a regional market, which buffers the potential changes in local markets.

Diversity/Dependency

It is generally believed that *economic diversity* is a positive attribute of a regional economy. A diverse economy is economically resilient which means it has the ability to adapt to change (Haynes 1999). *Dependency* refers to a community's dependence on a single or small group of industries for its survival. Communities that are highly dependent are not usually diverse and are frequently vulnerable to changes occurring in its major industries. Flathead County is thought to have a relatively diverse economy. A recent analysis of Montana counties using the Shannon-Weaver entropy indices found Flathead County to be the most diverse county in Montana (USDA Forest Service 2001). Diversity also usually increases with population and Flathead County is the fourth most populous county in Montana. The number of industry sectors is also a common indicator of diversity. A review of the IMPLAN economic impact model shows Flathead County to have the third most economic sectors in

Montana. All of the above indicators suggest that the economy of Flathead County is very diverse and likely not vulnerable to external forces.

In the past it was thought that Flathead County was highly *dependent* upon the wood products industry, which at one time comprised over 40 percent of the basic economy. However, the most recent data shows that approximately 22 percent of the economy is attributable the wood products industry (Table 3-2). This decline is due primarily to the rapid growth of other sectors of the economy. The transportation industry, which accounts for approximately 15 percent of the economy, also includes communications and public utilities and is very diversified and normally not greatly effected by Forest Service management decisions. All other industries each account for less than 15 percent of the Flathead County economy. The economy shows very little dependence on the snowmobile industry.

Effects on Economic Dependency and Diversity – The local economy, as explained above is not very dependent on any individual industry, with the exception of the wood products industry. Any possible reductions in the snowmobile industry from the implementation of the proposed action or alternatives would not effect the dependency of the local economy on any individual or small group of industries. The same forecast would be valid for the economic diversity of the area economy. The size of the snowmobile industry is small enough and the proposed potential changes are so minor, in terms of snowmobiler spending, there should be no adverse effects on the overall health of the economy in terms of both dependency and diversity.

Economic Trends.

Wood products and aluminum refining have traditionally been the largest components of Flathead County's economic base. Together they were primarily responsible for the growth in the 1970s and the sharp decline between 1979 and 1982. From its trough in the early 1980s, the wood processing industry in Flathead County expanded significantly to become the states largest timber-processing center – a position it still retains.

Nonresident travel has generally been the Flathead's most rapidly growing basic industry in the 1980s and 1990s and continues to grow. Part of this growth is resulting from the non-resident snowmobile industry although the snowmobiling is relatively small when compared to some of other tourism sectors. High technology manufacturing, led by Semitool, also grew at a significant pace.

As elsewhere, construction, health care, and business services accounted for much of the income growth for the past decade. The following synopsis of the recent past and predictions for the future of Flathead County, has been provided by The University of Montana's *Bureau of Business and Economic Research* (BBER) as follows:

> *Overall, Flathead County has been one of the fastest growing counties in the state. There has been significant volatility in the recent past as the growth rates have vacillated from one year to the next. The large increase in 1998 and the subsequent decline in 1999 were caused by the large back wages payment to Columbia Falls Aluminum Company workers. The forecasts call for moderate growth in the future,*

but they incorporate some resumption of aluminum production and stability in "high tech" manufacturing. Significant changes in either of these important industries could dramatically alter the forecasts (Polzin 2002).

The BBER goes on to predict growth rates in nonfarm labor income from 2001 to 2006 varying from a low of 1.2 percent in 2002 to a high of 2.5 percent in 2004 and 2005. This is very similar to the prediction for the state of Montana as a whole.

Effects on Economic Trends – The proposed amendment should have very little effect on economic trends because of the small potential change in snowmobiler spending resulting from the proposed amendment. There are so many other economic factors effecting the local economy that minor changes in snowmobiler spending would be obscured by these other changes and probably be un-measurable. The proposed amendment would not cause any adverse pressure on present trends.

The Snowmobile Industry

Montana

Snowmobile Activity. It has been estimated that about 10 percent of Montana households, or about 95,000 Montanans recreate with snowmobiles. These residents snowmobile about 14 days a year, *on average* (Sylvester 2003). This suggests a total of about 1.2 million activity days per season for residents. In addition to this, it has been estimated that nonresidents snowmobile approximately 204,000 activity days per year bringing the total to around 1.4 million activity days per year. Around 75 percent of the nonresident activity is in the area of West Yellowstone. Other nonresident activity occurs in the Big Hole Valley, Lookout Pass, and in northwestern Montana where Marias Pass and Eureka draw some limited Canadian visitation. Smaller numbers of nonresident snowmobilers also visit Cooke City, Lincoln, and Seeley Lake.

Snowmobiling activity is expected to increase through the year 2055 on a nation-wide basis as well as in the Rocky Mountains. In many cases it will exceed the rate of population growth (Bowker *et al*. 1999).

Snowmobiler Expenditures and Economic Contribution. On the average (mean) resident Montana snowmobilers spend over $60 per activity day. This includes expenditures for gasoline, eating and drinking, and entertainment. Each year Montana residents spend about $30 million on trip related expenditures and another $70 million on yearly expenditures, such as snowmobile purchases and repair. Average expenditures for *nonresidents* are about $225 per activity day and consist of the same type of expenditures as *residents* plus lodging. Nonresidents also spend more for other items such as eating and drinking, and entertainment. This amounts to about $44 million per year from nonresidents. About $14.6 million of this goes for lodging while another $7.6 million is spent in Montana restaurants and bars.

Overall, it has been estimated that nonresident snowmobilers generate more than $11 million per year in labor income for Montanans, or about 800 full and part time jobs.

Residents also spend money to snowmobile in Montana, but are not considered part of the economic base since they do not bring new money into Montana. If they did not spend their money for snowmobiling they would likely spend it for some similar activity that would have a similar economic effect.

Snowmobilers in Montana use about 4.5 million gallons of gas per season in pursuit of their sport. This results in contributions of about $1.2 million annually to the highway trust fund (Sylvester 2003).

Flathead Valley Area

Snowmobile Activity. Information on the magnitude of snowmobile use and the extent of the snowmobile industry in the Flathead Valley area is very limited for both resident and nonresident snowmobilers. One approach to estimating *resident* snowmobile use would be to assume that use is in approximate proportion to the population. For example, Flathead County has approximately eight percent of the states population (Bureau of Census 2003). This would suggest that there would be approximately 96,000 resident activity days per year by Flathead County residents in the Flathead Valley area. This is based Sylvester's average of 14 days of snowmobile use a year for each snowmobiler. This number is substantially larger than local monitoring results indicate.

Nonresident activity is more difficult to estimate. If 75 percent, (or approximately 151,000 activity days) of the nonresident activity occurs in the Yellowstone National Park area we can assume that there are only about 53,000 activity days distributed throughout the remainder of Montana. There are very few clues as to how much of this occurs in the Flathead Valley area. Surveys (Sylvester *et al*. 1994) indicate that Montana residents did not travel very far to go snowmobiling in Northwestern Montana. This could be an indication of the ability of the area to attract snowmobilers from afar, regardless of whether they are residents or nonresidents. For lack of better information we will estimate that there are approximately 10,000 nonresident activity days per year of snowmobiling in the Flathead Valley area. A license plate survey taken at various snowmobile access areas on the Flathead National Forest indicated that slightly more than 20 percent of snowmobilers were non-residents.

Snowmobiler Expenditures and Economic Contribution. There is no readily available information to suggest that spending patterns by snowmobilers, resident or nonresident, are any different for the Flathead Valley area than they are for Montana as a whole.

Given the snowmobile activity data above, we can estimate that resident snowmobilers spend approximately $5.8 million per year in pursuit of their activity in and around Flathead County. However, these expenditures do not increase aggregate disposable income or the economic base of Flathead County or the surrounding area.

Nonresident snowmobilers spend an estimated $2.3 million per year that adds to total income and employment in the Flathead County area. Using the activity days/job ratio for Montana, given above, it is estimated that nonresident snowmobile spending generates approximately 40 total full time and part time jobs in the Flathead County area.

Assuming that eight percent of Montana snowmobiling is done in and around Flathead County, we can estimate that about 360,000 gallons of gas is used per season in their sport. This results in contributions of about $100 thousand annually to the highway trust fund.

Potential Effects of Alternatives on Local Employment and Income – Previous sections of this report discussed the likely economic effects of the proposed Forest Plan amendment. Most of these effects relate, in one way or another, to potential changes in local employment and income. With the exception of Alternative 5, there were no anticipated changes in total snowmobile activity; therefore, no consequent changes in local employment and income. Alternative 5 has the potential to create minor reductions in snowmobile use, particularly for the more expert snowmobilers – who are mostly local residents. If additional impact scenarios arise from further public review it is important to keep the potential economic effects in perspective. A change of 10 percent in non-resident snowmobile activity days in the Flathead Valley area will cause a change of approximately four total jobs. A change in resident snowmobiling might have no aggregate effect at all if spending is locally redistributed throughout the service and retail sectors.

Revenue Sharing from Flathead National Forest Programs

Revenues from National Forest programs are distributed to counties annually in accordance with several Federal acts. Historically, the 25 Percent Fund Act has been the greatest source of funds. However, the recent enactment of the Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393) has significantly changed the revenue distribution. The Payment in Lieu of Taxes Act (PILT), also distributes funds to counties based on the amount of federal land in each county. This amount is normally reduced by other certain payments (including 25% funds) paid in the prior year. The Bureau of Land Management administers the PILT fund program.

Under the Twenty-five Percent Fund Program, 25 percent of all funds generated from National Forest programs are paid to the state in which national forest lands are located. The funds generated by each Forest are distributed to each county in which the Forest is located in proportion to the amount of National Forest System land in each county. The location of the project within a particular Forest generating the revenue does not matter.

The amount distributed from the Twenty-five Percent Fund is based on all receipts, including special use fees, recreation fees, minerals returns, grazing fees, and timber sales. This includes special use fees paid by snowmobile outfitters licensed to operate on Flathead National Forest. In Montana, two-thirds of the dollars received go to the counties' general fund for road maintenance, while the remaining one-third goes to public schools. For the Flathead National Forest, timber sale receipts have historically composed about 85 percent of the Twenty-five Percent Fund payments returned to counties.

PILT payments are made to local governments to supplement other receipt-sharing programs such as the Twenty-five Percent Fund. PILT payments may be used for any government purpose; they are not limited for use in roads and schools. Generally, the more 25 percent funds received, the less will be the PILT payments. However, the formula is complex, and varies from county to county, and will not be explained in the document. A

complete explanation of the PILT provisions and revenue sharing can be found in Schuster, 1995 and 1996.

Due to declining Forest Service timber revenues in the west, Congress enacted the Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393) to supplement the Twenty-five Percent Fund Act. This allowed electing counties to base their Twenty-five Percent Fund payments on an average of the highest three years payments from 1986 to 1999. If elected, counties would receive the newly calculated payment instead of what would have been normally received under the Twenty-five Percent Fund Act. This would provide level payments over the election period regardless of what the Forest revenues were for the present period. All counties receiving payments based on Flathead National Forest programs elected the new option. This election will remain in effect through 2006.

Effects of Proposal on Revenue Sharing – The only revenue sharing event related to the proposed amendment is the payment of outfitter-guide fees to the Forest Service by a single snowmobile outfitter. The payments are based on the gross revenues of the outfitter. As most of the outfitter activity is on the groomed trail system, total outfitter use will not change as a result of the proposed amendment. Consequently, there should be no change in revenues. Also, due to Public Law 106-393 explained above, the payments to Flathead County will not change – at least through 2006.

Local Economic Development Strategy

The economic development strategy and objectives for Flathead County are documented in *Comprehensive Economic Development Strategy (CEDS) – Flathead County, Montana*, *2002* (Flathead County, Montana Board of Commissioners 2002). These objectives were developed by a team of interested citizens, subjected to intensive public review through public meetings etc. and endorsed by the Flathead County Board of Commissioners. Objectives involved subject areas such as quality of life, business development environment, education, housing, physical infrastructure, and the improvement of communications technology. Specific goals and objectives stated for natural resources in Flathead County include improving the viability of the natural resource based industries, which includes winter sports oriented tourism.

Effects on Local Economic Development Objectives – The visions, goals, and strategies related to the tourism industry development contained in the CEDS were reviewed to determine consistency, or otherwise, with the proposed amendment. It was determined that the proposed amendment does not conflict with the listed development objectives.

Although Alternatives 2 - 6 reduce the total area available to snowmobiling, this is not one of the factors that are important to the present development of the tourism industry in the Flathead Valley area.

Environmental Justice

The alternatives were assessed to determine whether they would disproportionately impact minority or low-income populations, in accordance with Executive Order 12898. No local minority or low-income populations would be impacted by implementation of any of the alternatives.

IV. Heritage Resources

1. Analysis Area and Information Sources

The area analyzed is the Flathead National Forest, excluding the Island Unit as no management change is proposed there. The forest initiated consultation with the Confederated Salish and Kootenai Tribes to identify any potential concerns they may have regarding this proposed amendment.

2. Affected Environment

The area considered for Heritage Resources is the Flathead National Forest, exclusive of the Island Unit.

Survey Methods

The proposed Forest Plan Winter Recreation amendment does not require nor trigger any specific ground-disturbing activities or other actions that would likely effect historic properties that are significant and eligible for listing on the National Register of Historic Places. According to 36CFR800.3(a)(1) undertakings that have no potential to cause effects on historic properties do not require consultation with the Montana State Historic Preservation Office (MtSHPO). If ground-disturbing undertakings related to winter recreation use of the National Forest are planned in the future, then those undertakings would require consultation with the State Historic Preservation Office as per 36CFR800.

3. Environmental Consequences

Heritage resource inventories are required by the Forest Plan prior to all ground disturbing projects in order to locate and identify historic or Native American sites or artifacts. Once sites or artifacts are identified in a project area protective measures are carried out which would ensure preservation of the values associated with the site.

Heritage resources can be diminished in value by any change in their historical, architectural, archaeological, or heritage character. Adverse impacts to heritage resource sites can result in damage or complete destruction of the sites; effects of this damage may be irreversible.

This forest plan amendment does not trigger any specific ground disturbing activities and therefore according to 36CFR800.3(a)(1) consultation with the State Historic Preservation Office is not required. If in the future specific actions such as trail improvements or warming huts are warranted to improve or better manage winter recreation on the Forest, then section 106 consultation with Mt. SHPO and effected Tribal groups may be necessary.

Direct and Indirect Effects of the Action and No-Action Alternatives

Adherence to the regulations for implementing the National Historic Preservation Act insures that significant heritage resources are identified prior to project implementation and that project effects are identified and either avoided through project redesign or moderated. Site significance and project effects are determined through consultation with MtSHPO and the CSKT.

The Flathead National Forest consulted with both the MtSHPO and the CSKT on the proposed Forest Plan amendment. There were no concerns identified during consultation. Implementation of any of the five alternatives would neither directly nor indirectly affect heritage resources since there would be no change to the integrity of significant heritage resources.

Cumulative Effects

It is unlikely that there would be cumulative effects to identified heritage resources from the Winter Recreation Forest Plan amendment area. However, any such effects would have been identified as part of the consultation process with MtSHPO and the CSKT. No such effects were identified during consultation.

4. Regulatory Framework

The Forest Service is mandated to comply with the National Historic Preservation Act of 1966 (NHPA) [Public Law 89-665]. "Section 106 of the NHPA requires that Federal agencies with direct or indirect jurisdiction over Federal, federally assisted, or federally licensed undertakings afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity for comment on such undertakings that affect properties included in or eligible for inclusion in the National Register of Historic Places (NRHP) prior to the agency's approval of any such undertaking" [36 CFR 800.1]. Historic properties are identified by a heritage resource inventory and are determined as either eligible or not eligible for the National Register. Eligibility is reviewed, and concurrence given, by the Montana State Historic Preservation Office. Sites that are determined eligible are then either protected in-place or adverse impacts must be moderated. This process takes place prior to any decisions relative to the project.

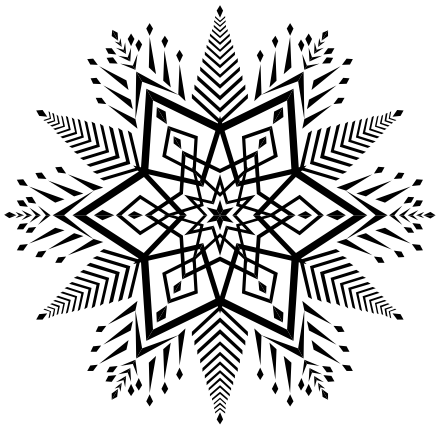
The Forest Service has obligations under the American Indian Religious Freedom Act (AIRFA) of 1978 to "protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian" [Public Law 95-442]. Executive Order 13007 of 1996 further directs federal agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners and to avoid adversely affecting such sites.

The Confederated Salish and Kootenai Tribes of Montana have been identified as a tribal group concerned about the management of heritage resources on the Flathead National Forest. The tribes were contacted in the initial planning stages of the Winter Recreation Forest Plan amendment in order to establish lines of communication between the two parties, to advise them on the scope of the undertaking including potential effects, and to make their resource concerns (if any) an official part of the project record. Consultation with recognized tribal governments is further defined and required by the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 [Public Law 101-106] and the 1992 amendments to the National Historic Preservation Act (NHPA).

The Flathead Forest Plan incorporates the requirements under the following statutes: the National Historic Preservation Act (1966) and the American Indian Religious Freedom Act (1978). Forest Plan standards applicable to this project that reflect the mandates under the above statutes include inventory procedures, evaluation procedures, protection/preservation procedures, and coordination/consultation procedures. Details of these measures and procedures are located in the Forest Plan.

5. Regulatory Consistency

All Winter Recreation Forest Plan amendment alternatives are consistent with the laws and regulations listed in the Regulatory Framework discussion of the Heritage Resources, Affected Environment section and incorporated into the requirements of the Flathead Forest Plan.



V. Wildlife

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

A variety of wildlife species occur across the forest in habitats that overlap with winter motorized recreation use. Many of these species fall into categories that receive additional emphasis due to legal direction or policy.

Congressionally designated Wilderness areas are very large blocks of land containing potential habitat for numerous wildlife species where motorized activity is prohibited by law. Wilderness would be treated the same under all alternatives (no snowmobiling allowed). To help distinguish effects and the distribution of effects among alternatives, the entire Flathead National Forest and the non-wilderness areas were both analyzed for many of the following species. The potential effects from snowmobiling are concentrated in the non-wilderness portion of the forest. Distinguishing between Wilderness and non-wilderness aids in evaluation of distribution and effects to habitat between alternatives.

Endangered, Threatened, and Proposed Species

Table 3-4 lists the endangered and threatened wildlife species that occur on the Flathead National Forest. No terrestrial wildlife species that occur on the Flathead National Forest are proposed for listing under the Endangered Species Act at this time.

Table 3-4. Endangered and threatened terrestrial wildlife species on the Flathead National Forest.

Species	Listed Status	Forest Status
Grizzly Bear (*Ursus arctos)*	Threatened	Resident
Gray Wolf (*Canis lupus)*	Threatened	Resident
Canada Lynx (*Lynx canadensis)*	Threatened	Resident
Bald Eagle (*Haliaeetus leucocephalus)*	Threatened	Resident

Threatened and Endangered Species

Grizzly Bear

1. Analysis Area

The analysis area used for grizzly bears is the Flathead National Forest. For some elements, the portion of the Forest inside the Recovery Area for the Northern Continental Divide Grizzly Bear Ecosystem is used. The viability analysis includes the entire Forest.

2. Affected Environment

The Grizzly Bear Recovery Plan (US Fish and Wildlife Service 1993) established criteria for recovery in each Recovery Zone. Criteria included minimum number of females with cubs seen annually, distribution of family groups throughout the recovery zone, and a limit on human-caused mortality.

According to the US Fish and Wildlife Service website (http://mountain-prairie.fws.gov/es/Montana/Missoula.htm) progress toward grizzly bear recovery in the NCDE is unclear. The following 4 items are also listed on the site.

1. We believe grizzly bears in this ecosystem (called the NCDE) have increased in numbers as we continue to see them in many areas outside the recovery zone and recent population estimates for Glacier Park exceed previous estimates.

2. Current funding does not allow agencies to monitor this population to determine the total number of bears with statistical confidence or to determine the trend of the population.

3. More than 17% of this ecosystem is private land and the majority of bear-human conflicts and bear deaths occur on these private lands. There is a need for continued preventative actions and education efforts with private landowners to help people live with bears with minimal conflicts.

4. We have not made more progress toward recovery and delisting in this ecosystem due to the lack of a population monitoring system across the whole ecosystem and funding to implement necessary monitoring and research.

Flathead National Forest lands comprise approximately 40 percent of the Northern Continental Divide Grizzly Bear Ecosystem (NCDE). Land administered by the Flathead National Forest occurs within 73 grizzly bear subunits totaling 2,452,410 acres, and the Flathead Forest Plan's Amendment 19 (USDA 1995) applies to 54 subunits totaling 1,662,162 acres (Figure 3-1). Forest Service ownership ranges from less than 10 percent to 100 percent within the subunits.

Amendment 19 modified motorized access management direction in the Flathead Forest Plan to conserve grizzly bears. Open route density, total route density, and security core are the three parameters used to measure motorized access; numerical standards are set for those subunits where Forest Service ownership is 75 percent or greater. In those subunits where Forest Service ownership is less than 75 percent, the standard is "no net loss on Forest Service lands." The status of individual subunits is contained in Project Record O-1.

The area on the Flathead National Forest within the grizzly bear recovery area includes portions of the Swan Valley, North Fork Flathead, and Stillwater River drainages where Plum Creek Timber Company, Montana Department of Natural Resources and Conservation, and/or small private lands may account for substantial land ownership. Also, the South Fork, Middle Fork, and Swan River drainages contain substantial areas of Wilderness. All of these areas and land categories play an important role in determining and describing grizzly bear management and habitat suitability on the Flathead National Forest.

The Forest, in cooperation with Plum Creek Timber Company, Montana Department of Natural Resources and Conservation, and the U. S. Fish and Wildlife Service developed and implemented an agreement for access management and timber harvest scheduling in the intermingled

ownership lands of the Swan Valley that would promote grizzly bear habitat use and security. The Swan Valley Grizzly Bear Conservation Agreement (US Fish and Wildlife Service 1997) applies to eleven subunits. Those subunits are: #20 South Fork Lost Soup, #21 Goat Creek, #22 Lion Creek, #23 Meadow Smith, #24 Buck Holland, #26 Porcupine Woodward, #27 Piper Creek, #28 Cold Jim, #29 Hemlock Elk, #30 Glacier Loon, #31 Beaver Creek.

Of the nineteen subunits where Amendment 19 does not apply, sixteen are within the Bob Marshall Wilderness where road management is not an issue. Habitat effectiveness is very high in all the wilderness subunits with only a few high use trails affecting grizzly bears. The other three subunits are in the Stillwater River drainage where NFS lands comprise less than ten percent of the subunits.

Grizzly bears also occur on a regular basis on portions of the forest outside the NCDE. Only the southern portion of the Tally Lake Ranger District and the Island Unit of the Swan Lake Ranger District are not currently considered to have grizzly bears on a regular basis.

Potential denning habitat has been modeled on the forest (Project File O-2), based on data collected by Mace and Waller (1997), with the model predicting ~420,400 acres. The potential denning habitat is well distributed across the forest except for the Island Unit on the Swan Lake Ranger District and the portion of the Tally Lake Ranger District away from the Whitefish Range, both of which are outside the recovery area.

Potential denning habitat overlaps with roads and areas that are currently open for snowmobile use, and where snowmobile use has occurred for decades. Two zones around roads/routes where winter motorized use is allowed are used to assess potential effects to denning grizzly bears. A zone within 200 meters is used to assess potential den abandonment and a zone within 1000 meters is used to assess the area where disturbance is most likely to occur (Linnell *et al*. 2000 pg 409).

Female grizzly bears on the Flathead Forest begin emerging from their dens about April 1. Males typically begin to emerge about two weeks earlier (Mace and Waller 1997, pg 37). Grizzlies typically spend a few days to a few weeks at or near the den before moving to other locations to begin feeding (*ibid,* pg. 39). Mace and Waller (*ibid*, pg. 41) considered the greatest potential for disturbance from snowmobiling activities to be during den emergence when they are still confined to the den vicinity. Snow conditions often allow snowmobiling to continue well past April 1, especially in higher elevations.

Often grizzlies move to lower elevation habitats like riparian areas and avalanche chutes for much of their foraging during spring (Mace and Waller 1997, pg. 16). April 1-June 30 is considered the period of spring habitat use (NCDE Access Task Group 1998). Where roads occur in or near these preferred spring habitats and the roads are available for snowmobile use after April 1, the potential for disturbance and displacement exists.

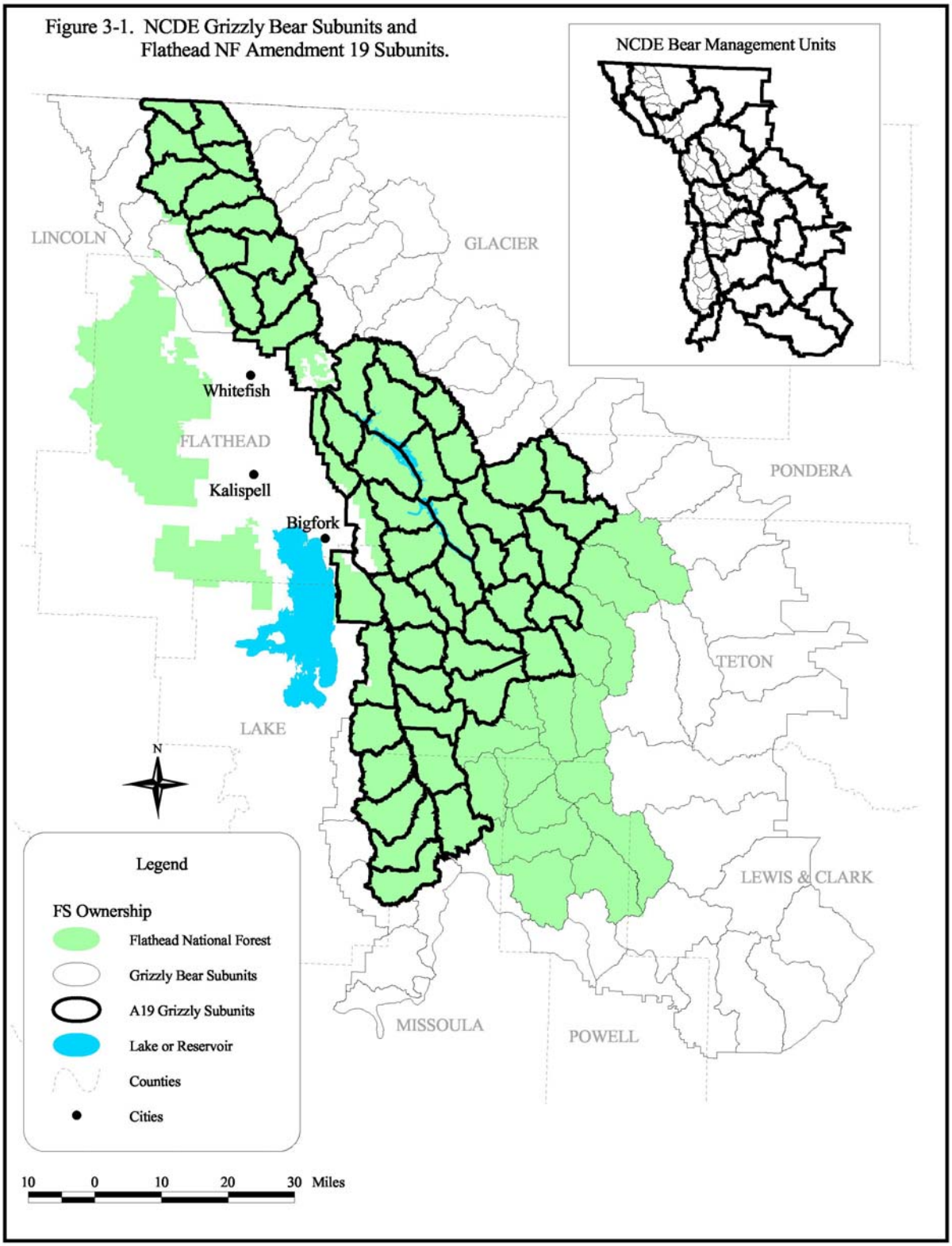


Figure 3.1 NCDE grizzly bear subunits

3. Environmental Consequences

Chapter 2 identified a significant issue and concern that snowmobile use may affect grizzly bears in the den and during den emergence. The measurement indicator will be the acres of potential denning habitat where snowmobiling is allowed.

In addition, to disclose relevant environmental effects, other effects indicators will be used. The miles of roads available for snowmobile use, the overlap of the roads' zones of influence with denning habitat, and potential disturbance to grizzly bears from winter motorized use.

Direct and Indirect Effects

In Chapter 7 of *Effects of Recreation on Rocky Mountain Wildlife*, Claar *et al.* (1999) wrote

" Winter motorized recreation can be associated with defined routes or dispersed over the landscape. Mace and Waller (1997) reported no den abandonment in the northern Swan Range, Montana, although the routinely observed snowmobile activity with 2km of grizzly bear dens….Harding and Nagy (1980) reported den abandonment due to hydrocarbon exploration activities in Northwest Territories, Canada. Reynolds *et al.* (1986) reported on the responses of denning grizzly bears in Alaska to winter seismic surveys, including snow machines, drill rigs, aircraft and detonation of dynamite. Detonations with 0.8 – 1.2 miles of denning bears did not cause abandonment, but movements within the den were noted in some cases. A female with yearlings did not abandon her den when vehicle use was occurring with 325 ft. They reported probable den abandonment by an unmarked bear when seismic activity was with 650 ft. of the den. When vehicles operated within approximately 3300 ft. of denned bears, their heart rates were elevated compared to undisturbed conditions. The heart rate of denned bears increased in response to overflights by small aircraft near the time of den emergence but not at other times."

Considering the above information, alternatives that reduce winter motorized use in grizzly bear habitat during the denning and non-denning seasons are likely to be most beneficial for bears. Although all alternatives have potential for disturbance to individuals and habitats, it must be kept in mind that for many years snowmobiling was allowed on the Flathead National Forest to a spatial and temporal extent equal to or greater than that described in Alternative 1. Closing areas to snowmobiling, closing roads to snowmobiling, and/ or reducing the length of the snowmobiling season, some of which are proposed in each of Alternatives 2-6, would be an overall improvement for grizzly bears and grizzly bear denning habitat.

Linnell *et al.* (2000) summarized available information concerning the effects of disturbance to denning bears. However, the literature reviewed by Linnell *et al.* did not directly consider the effects of snowmobiling on grizzly bears. Responses to the types of disturbance addressed ranged along a continuum beginning with waking from deep sleep, progressing through increased heart rate, body warming, movement within the den, and ultimately den abandonment. The impact of such responses on survival increases dramatically at each step, with den abandonment having the greatest cost, especially for cubs. Raising body temperature to normal levels requires about a 60-80 percent increase in metabolic rate and even minor physiological changes like frequent waking or small increases in body temperature may have a cumulative effect on energy use and consequent weight loss. Table 3-5 displays the extent of overlap of areas where winter motorized use would be allowed within modeled denning habitat.

Table 3-5. Overlap of modeled grizzly bear denning habitat on Flathead National Forest with areas where winter motorized use would be allowed.

Alternative	Total Acres of Modeled Denning Habitat (Outside Wilderness)	Acres of denning habitat in areas prog.* open to winter motorized use	Acres of denning habitat in all areas open to winter motorized use	% of Denning habitat including Wilderness (420,400 acres)		% of Denning Habitat Outside Wilderness (134,700 acres)	
				Prog. Open	All Open	Prog. Open	All Open
1	420,400 (134,700)	100,300	95,000	24	23	74	71
2		33,300	32,300	8	8	25	24
3		33,500	31,900	8	8	25	24
4		33,200	31,600	8	8	25	23
5		67,900	66,300	16	16	50	49
6		31,900	30,700	8	7	24	23

*Prog. refers to programmatic areas that would be affected by Amendment 24. Figures in programmatic columns represent maximum amounts of areas available for winter motorized use under each alternative. Changing areas from programmatically closed to open for winter motorized use in the future would require an amendment to or revision of the forest plan. Columns summarizing all open areas reflect programmatic closures and current site-specific closures for current on the ground effects to winter motorized use. Future site specific changes could increase or decrease future winter motorized travel in areas and/or routes without amending or revising the forest plan.

As shown in Table 3-5, all action alternatives decrease the amount of denning habitat exposed to snowmobiles. Alternative 6 shows the greatest benefit to bears, with eight percent of the available modeled denning habitat on the forest occurring where snowmobiling would be allowed, as opposed to 24 percent with Alternative 1. Denning habitat undisturbed by winter motorized recreation would be available on 84 to 92 percent of the forest with the action alternatives. The no-action alternative (Alt. 1) allows 76 percent of the modeled denning habitat to be undisturbed by winter motorized recreation.

Linnell *et al*. (*ibid*) also reported that although individual bears display variable responses, bears may be disturbed by human activities within 1000 meters, and activities within 200 meters pose a risk of den abandonment which has been shown to cause cub mortality. Disturbance activities considered ranged from resource extraction to recreation. Even though deep snow provides excellent acoustic insulation (Blix and Lentfer 1992 *in* Linnell), winter activities in proximity to denning grizzly bears may increase the risk of adverse effects to some individuals.

Roads are often the focus of snowmobiling activity, especially when traveling to and from play areas. Analyzing the amount of overlap between modeled denning habitat and 200 and 1000-meter zones from roads is another way to display potential effects of snowmobiling on denning grizzly bears. Tables 3-6 and 3-7 display the extent of denning habitat within 200 and 1000 meters of open roads/routes.

Table 3-6. Overlap of modeled grizzly bear denning habitat on Flathead National Forest in areas within 200 meters of roads/routes open for snowmobiling.

Alternative	Total Acres of Modeled Denning Habitat (Outside Wilderness)	Acres of denning habitat within 200 meters of roads open to winter motorized use	% of Denning habitat including Wilderness (420,400 acres)	% of Denning Habitat Outside Wilderness (134,700 acres)
1	420,400 (134,700)	2,700	0.7	2.0
2		2,100	0.5	1.5
3		2,100	0.5	1.5
4		2,100	0.5	1.5
5		2,000	0.5	1.5
6		2,100	0.5	1.5

Table 3-7. Overlap of modeled grizzly bear denning habitat on Flathead National Forest in areas within 1000 meters of roads/routes available for snowmobiling.

Alternative	Total Acres of Modeled Denning Habitat (Outside Wilderness)	Acres of denning habitat within 1000 meters of routes open to winter motorized use	% of Denning habitat including Wilderness (420,400 acres)	% of Denning Habitat Outside Wilderness (134,700 acres)
1	420,400 (134,700)	36,600	9	27
2		24,300	6	18
3		24,300	6	18
4		24,000	6	18
5		28,300	7	21
6		24,300	6	18

Less than one percent of potential grizzly bear denning habitat is within 200 meters of roads/routes where snowmobiling is allowed (Table 3-6). Table 3-7 shows about nine percent of modeled denning habitat is within 1000 meters of roads/routes where snowmobiling is allowed.

Alternatives 2, 3, 4 and 6 would have very similar effects on potential denning habitat. Table 3-5 shows that for those four alternatives, about eight percent of the total denning habitat overlaps with open areas, and Tables 3-6 and 3-7 show about 0.5 percent and 6 percent of the denning habitat is within 200 meters and 1000 meters of open roads/routes, respectively. It appears that under each of these alternatives there would be a substantial increase in the amount of denning habitat where snowmobiling would be prohibited. However, even though nearly the entire Glacier View District was open under Alternative 1, a large portion of the district and many areas of the forest are not accessible for snowmobiles due to topography and vegetation. Since snowmobiles were not actually traveling throughout all of the "open" areas, the number of acres of potential grizzly bear habitat that would actually benefit from the reduced extent of open areas is substantially less than the figures would indicate. Likewise, less habitat is actually impacted by

snowmobiles than the numbers would indicate because not all of the "open" areas are actually used by snowmobiles. However, should vegetative conditions change in the future (such as through fires or timber harvest), or snowmobile technology change to enable travel on steeper topography, the denning habitat would benefit from the reduced area open to snowmobiling under these four alternatives.

Alternative 5 would provide a level of protection to denning habitat that is intermediate to Alternative 1 and Alternatives 2, 3, 4 and 6. The extent of denning habitat in open areas would be 16 percent (Table 3-5) and the extent of denning habitat within 1000 meters of open roads/routes would be seven percent (Table 3-7). Alternative 5 would provide essentially the same level of protection to denning habitat within 200 meters of open roads/routes as do Alternatives 2, 3, and 4 (Table 3-6).

Seasonal Restrictions

Female grizzly bears on the Flathead Forest begin emerging from their dens about April 1, with males typically beginning to emerge about two weeks earlier (Mace and Waller 1997, pg 37). Grizzlies typically spend a few days to a few weeks at or near the den before moving to other locations to begin feeding. During this time bears have been observed to be very lethargic and approachable. Often grizzlies move to lower elevation habitats like riparian areas and avalanche chutes for much of their foraging during spring (*ibid*, pg. 16). Open areas and gated, bermed, decommissioned and historical roads used by snowmobiles after den emergence have a greater potential for disturbing and displacing grizzly bears (based on bear response in Mace and Waller's study).

Snow conditions are often suitable for snowmobiling to continue beyond April 1, but at higher elevations. The potential exists for interactions between snowmobiles and bears recently emerged from dens. The greatest potential would be expected in the same areas described previously, where denning habitat overlaps with open areas and the influence zones around roads.

Alternatives 1, 2 and 5

Alternatives 1, 2 and 5 would allow snowmobiling, within the NCDE, in all "open" areas and on all open snowmobile roads/routes including gated, bermed, decommissioned and historical roads during the grizzly bear denning period defined as November 15 to March 15. Within the NCDE, exceptions would be for existing specific special use permits that allow use in the Big Mountain Ski Resort permit area until April 15, use of Canyon Creek trails until April 15 and existing agreements to groom snowmobile trails until April 1. Outside the NCDE there would be no programmatic date limitations for snowmobile use.

Alternative 3

Under this alternative the snowmobiling season would occur from December 1 to April 30 on the FNF within the NCDE recovery area. Outside the NCDE there would be no date limitations and is the same in all alternatives. The effects to denning bears would remain unchanged, but once bears emerge from dens there is a greater temporal and spatial overlap where grizzly bears and snowmobiles could occur. In other words, there is a greater potential for grizzly bears to be disturbed or displaced from snowmobiling during the non-denning season within the NCDE

compared to the other alternatives. Over 95 percent of grizzly bears in the South Fork study area denned above 5500' elevation (*ibid*, pg. 40). Snow conditions often are suitable for snowmobiling to continue beyond April 1 especially in the higher elevations so the potential exists for interactions between snowmobiles and bears recently emerged from dens. The greatest potential would be expected in the same areas described above where denning habitat overlaps with open areas and the influence zone around roads. Mace and Waller (*ibid*, pg. 41) considered the greatest potential for disturbance from snowmobiling activities to be during den emergence when they are still confined to the den vicinity—typically a few days to a few weeks. Many of the roads on the forest follow stream courses or go along the valley floor and would not be expected to be at an elevation in conflict with denning grizzly bears. However, as bears emerge and head toward lower elevation spring habitat, there is greater potential for disturbance and displacement from road use. Selection data from Mace and Waller's (*ibid,* pg. 73) study suggested that grizzly bears have increased spatial avoidance and decreased survival as traffic levels, road densities, and human settlement increases; however, snowmobile use was not specifically studied. Snowmobiling would be allowed to continue well past den emergence on roads that in many cases were gated, bermed, or decommissioned to improve grizzly bear habitat and security. Snowmobile use decreases after April 1, but snowmobiling in these areas would be expected to disturb and displace grizzlies during this period of use.

Alternative 4

This alternative would allow snowmobiling from December 1-March 31 on the FNF inside the NCDE recovery area. Outside the NCDE there would be no date limitations. Under this alternative, the denning season would be considered December 1 – March 31 (Project Record O-3) which would shift the allowable snowmobile season two weeks later than under Alternatives 1, 2, and 5. Shifting the allowable snowmobile season two weeks would allow nearly all grizzly bears to choose a den site prior to the snowmobiling season and associated disturbances. Males would be less likely to be encountered prior to den entry and slightly more likely to be encountered after den emergence, but females are expected to be in their dens during the allowable snowmobiling season. Alternative 4 would provide better protection to bears emerging from dens than would Alternative 3 because Alternative 3 allows snowmobiling to continue about one month past the date when females begin emerging from dens. Also, under Alternative 4, programmatic area restrictions would prohibit snowmobile use from April 1 – June 30 on approximately 35 miles of roads located in quality spring grizzly bear habitat that are currently considered "open" under A19 standards to increase grizzly bear security in these early spring habitats. The Alternative 4 map shows road closures and all areas around those roads would be closed simultaneously as described in Chapter 2.

Alternative 6

This alternative would allow snowmobiling to begin December 1 within the NCDE recovery area and continue until May 31 in the Doris-Lost Johnny area, May 15 in the Challenge area, and April 30 in the Six-mile area (Fig. 2-27 and 2-29). The remaining open areas of the FNF within the NCDE would allow snowmobiling from December 1-March 31. The majority of the NCDE would allow snowmobiling to coincide with the grizzly bear denning period and would have similar effects to the dates in alternatives 1, 2, 4 and 5. Under this alternative, spring snowmobiling would be allowed after April 1 on approximately 52,000 acres of the Doris-Lost Johnny, Challenge and Sixmile areas (Table 2-7; see also Table 9 in Biological Assessment). This equates to ~11 percent

of the FNF within the NCDE where snowmobiling is allowed, and ~2.5 percent of all FNF lands within the NCDE. This use after April 1 should not be considered new use, rather a restriction on use that has occurred previously. Nevertheless, snowmobiling during the non-denning period increases the risk of disturbing and displacing grizzly bears, especially in spring habitats and in proximity of ~6700 acres of potential denning habitat within these areas.

Allowable snowmobiling dates under Alternatives 1, 2, 4 and 5 would have similar effects to grizzly bears following den emergence and would provide adequate security and habitat during the early spring. Alternative 4 would be the most beneficial for grizzly bears because of the added security to spring habitat by restricting snowmobile use on areas including an additional 35 miles of from April 1- June 30. Extending the snowmobiling season beyond April 1 as in Alternatives 3 and 6 would increase the chance of encountering bears as they emerge from the den and move to spring habitat. This would affect a relatively small area on the landscape scale.

Under Alternatives 3 and 6 where snowmobiling would continue after April 1, black bear hunters would be able to access more areas by motorized means, which could increase grizzly bear mortality from mistaken identity. However, black bear hunters focus on lower elevations where green up attracts bears and a lack of snow makes snowmobile use impractical.

Table 3-8. Changes to Definitions in Appendix TT

Appendix TT Changes	Alternative					
	1	2	3	4	5	6
Denning Season Dates Established		**X**	**X**	**X**	**X**	**X**
Restricted Road Definition Modified			**X**			**X**
Reclaimed Road Definition Modified			**X**			**X**
Security Core Definition Modified			**X**			**X**

Alternatives 2 and 5 would formally define the grizzly bear denning season as November 15 through March 15. Alternatives 3, 4 and 6 would define the denning season as December 1 through March 31 (Project Record O-18), based on Mace and Waller's local data.

Alternatives 1, 2 and 5 would retain the rest of the original language in Appendix TT for Restricted Roads, Reclaimed Roads, and Security Core Area.

Alternatives 1, 2, 4 and 5 would not allow snowmobiling during the non-denning season.

Cumulative Effects

Past, present, and reasonably foreseeable infrastructure, access points, and use levels were taken into consideration when determining effects to grizzly bears.

Northern Rockies Lynx Amendment

The process is underway to amend Forest Plans in the Northern Rockies to incorporate management direction for Canada Lynx based on the Lynx Conservation and Assessment Strategy (Ruediger *et al*. 2000). Direction in the LCAS concerning no net increase in compacted snow areas

and routes is compatible with grizzly bear denning habitat management. There would be no net increase in areas where snowmobile use could overlap with denning habitat.

NCDE and Forest Scale Assessment

A viability analysis for grizzly bears at the forest scale is located in Project File O-5 (Hillis *et al*. 2003, pp. 6-10).

Although recovery does not necessarily equate to viability, it is likely that providing for recovery contributes to maintaining long-term viability. One of the goals of the Flathead Forest Plan is to provide sufficient habitat to promote the recovery of threatened and endangered species and conserve the ecosystems upon which they depend. Past and ongoing actions taken by the Flathead National Forest are contributing to the recovery of grizzly bears, consistent with NFMA.

4. Regulatory Framework

The grizzly bear is listed as a "threatened" species under the Endangered Species Act, and the Grizzly Bear Recovery Plan provides recovery goals and objectives. The Flathead Forest Plan provides management direction for grizzly bears. Amendment 19 to the Forest Plan incorporated standards for motorized access management and security within the recovery zone.

NFMA includes a requirement for maintenance of population viability.

5. Regulatory Consistency

Under all alternatives the Forest Plan would be amended to incorporate the management described in each alternative thus making all alternatives consistent with Forest Plan direction.

All alternatives would result in a may effect-likely to adversely affect determination for grizzly bears. Formal consultation with U.S. Fish and Wildlife Service will be conducted regardless of which alternative is selected for implementation. A decision will be made only after the Fish and Wildlife Service issues a biological opinion and take statement that specifies actions needed to continue to recover the species.

Canada Lynx

1. Analysis Area

The analysis area used for lynx is the Flathead National Forest.

2. Affected Environment

The Canada lynx was listed as threatened in 2000. A Lynx Conservation Assessment and Strategy (LCAS) (Ruediger *et al*. 2000) was developed to help guide lynx management. The Lynx Conservation Agreement (USDA and USDI 2000) states that the action agencies should consider the standards and guidelines identified in the LCAS.

Following the guidance in the LCAS, 109 Lynx Analysis Units (LAUs) have been identified and mapped on National Forest Lands. The size of the LAU represents the approximate home range of a female lynx.

Potential lynx habitat is common across the Flathead Forest with 1,733,094 acres of habitat estimated through modeling or approximately ¾ of the forest (Project Record O-6). Suitable lynx habitat is generally described as mesic coniferous vegetation with cold, snowy winters that provide a prey base of snowshoe hares. In the LCAS, habitat components are used to describe different portions of lynx habitat and associated direction.

A Regional, multi-scale lynx habitat assessment by Hillis *et al.* (2002) derived estimates of foraging and unsuitable habitat components at the forest-scale and compared them to what could be expected to have existed prior to vegetative changes due to fire suppression and/or substantial logging (Table 3-9).

Table 3-9. Levels of lynx habitat components in the Flathead National Forest compared against larger scales.

Habitat component	HRV*	LCAS standard	Flathead NF	Region One
Unsuitable	9.5%	30% max	9.7%	9.2%
Foraging	19%	--	8.9%	5.4%
Denning	10%	10% min	81.4	15.1%

*HRV or the Historic Range of Variability reflects the average conditions expected before fire suppression or logging substantially changed the vegetative pattern in lynx habitat.

Snow compaction is hypothesized to facilitate increased competition from other predators such as coyote and bobcat that were previously at a disadvantage in deep, soft snow (Claar *et al*. 1999, pg. 7.41). Taking a conservative approach, the LCAS includes standards to prevent net increases in snow compacted areas due to increases in designated routes and play areas.

The LCAS also addresses the potential for effects to lynx from trapping due to increased snowmobile access. There is no open trapping season for lynx in Montana currently, but trapping efforts for other species may result in lynx being inadvertently captured, injured, or killed. Greater snowmobile access facilitates trapping and could indirectly lead to more lynx being captured as a "non-target" species. The season for trapping other species that might result in inadvertent

capture of lynx runs from December 1 through February 15 for the Flathead National Forest and surrounding areas.

3. Environmental Consequences

Chapter 2 identified a significant issue and concern that snowmobile use may affect lynx distribution and habitat use.

The effects indicator is the acres of modeled potential lynx habitat in areas where snowmobile use would be allowed, and the miles of available snowmobile roads/routes intersecting potential lynx habitat.

Direct and Indirect Effects

Although all alternatives have potential for disturbance to individuals and habitats, it must be kept in mind that for many years snowmobiling has occurred on the Flathead National Forest to a spatial and temporal extent equal to or greater than that described in Alternative 1. Closing areas to snowmobiling, or closing roads to snowmobiling, some of which are proposed in each of Alternatives 2-6, would be an overall improvement for lynx and lynx habitat.

Alternative 1 would have the greatest amount of lynx habitat in areas where snowmobile use would be allowed and the greatest amount of roads/routes through lynx habitat where snowmobile use would be allowed (Table 3-10). Lynx management would follow the guidance in the LCAS for recreation management, which is designed to conserve lynx and lynx habitat because there would be no increase in designated routes or play areas.

Alternative 5 would result in a reduction of about 120,000 acres and 40 miles of roads/routes where snowmobile use would be allowed in lynx habitat compared to Alternative 1 (Table 3-10). The reduced overlap of lynx habitat and snowmobiling would result in decreased potential effects to lynx from snow compaction or risk of inadvertent trapping. Lynx management under Alternative 5 would follow the guidance in the LCAS for recreation management because designated routes or play areas would not increase.

Alternatives 2, 3, 4 and 6 would have substantially less lynx habitat where snowmobile use would be allowed than Alternatives 1 or 5 (Table 3-10). Although all three alternatives are fairly similar, Alternative 4 would result in the least amount of lynx habitat open to snowmobiling. These three alternatives would have the least potential for lynx to be affected through snow compaction or risk of inadvertent trapping.

The primary difference between Alternatives 2, 3, 4 and 6 and Alternatives 1 and 5 occurs in the North Fork drainage where snowmobiling would not be allowed except in certain mapped areas and roads/routes. These mapped areas and roads/routes would not be "new" areas but only a smaller portion of those where snowmobile use has been allowed for decades. The LCAS contains a programmatic planning standard for Recreation Management that discourages any net increase in designated routes and play areas (Ruediger *et al*. 2000, pg 7-9). However, the Lynx Biology Team that prepared the LCAS has clarified the language in that standard to state: "On federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and designated play areas by LAU unless the designation serves to consolidate unregulated use and

improves lynx habitat." (McAllister 2003). Alternatives 2, 3, 4 and 6 comply because compacted snow areas would be consolidated from previously unregulated use in the North Fork drainage.

The overall effect of Alternatives 2-6 would be snowmobile use on many fewer acres than the existing situation (Alternative 1). This is important, because even though we may have a "net increase in designated routes" we would have (1) no areas with new use; and (2) many areas with existing use where snowmobiling would be prohibited under Alternatives 2-6.

Table 3-10. Extent of Overlap of Modeled Potential Lynx Habitat with areas where Winter Motorized use Would be Allowed.

Alternative	Acres FNF Lynx Habitat (Outside Wilderness)	Miles of roads/ routes open thru lynx habitat	Acres Lynx Habitat Prog.* Open to snowmobiling	All Acres lynx habitat open to snowmobiling	% Total FNF Lynx Habitat Including Wilderness		% FNF Lynx Habitat Outside Wilderness	
					Prog.	All	Prog.	All
1	1,733,100 (1,002,400)	2,400	920,700	889,200	53	51	92	89
2		2,200	608,300	551,700	35	32	61	55
3		2,200	613,600	552,900	35	32	61	55
4		2,100	591,900	531,900	34	31	59	53
5		2,400	840,700	765,700	49	44	84	76
6		2,200	608,400	536,700	35	31	61	54

*Prog. refers to programmatic areas that would be affected by Amendment 24. Figures in programmatic columns represent maximum amounts of areas available for winter motorized use under each alternative. Changing areas from programmatically closed to open for winter motorized use in the future would require an amendment to the forest plan. Columns summarizing all open areas reflect programmatic closures and current site specific closures for current on the ground effects to winter motorized use. Future site specific changes could increase or decrease future winter motorized travel in areas and/or routes without amending the forest plan.

None of the alternatives would change any denning, foraging, or suitable lynx habitat components. Snowmobiling does not alter any of the vegetation characteristics that define lynx habitat components.

Alternatives 2, 3, 4 and 6 would have the lowest risk of inadvertent lynx capture by trappers since these three alternatives greatly reduce the area and roads/routes open for snowmobiling in the North Fork drainage. As noted earlier, Montana Fish, Wildlife, and Parks has no open season for lynx. The alternatives' varying dates when snowmobiling could occur would have no effect on the risk of inadvertent lynx capture by trappers because the open trapping season (Dec 1-Feb 15) is entirely contained within the snowmobiling dates for all alternatives.

Cumulative Effects

Cumulative effects to lynx may result from the Proposed Action. Several programmatic decisions or potential decisions may have a role in cumulative effects when combined with the Proposed Action or its alternatives.

Northern Rockies Lynx Amendment

The process is underway to amend Forest Plans in the Northern Rockies to incorporate management direction for Canada Lynx based on the Lynx Conservation and Assessment Strategy (Ruediger *et al.* 2000). If the current direction in the LCAS concerning no net increase in compacted snow areas and routes is retained in the amendment, that would be compatible with lynx habitat management because there would be no net increase in compacted areas where snowmobile use could overlap with lynx habitat.

Regional and Forest Scale Assessment

A Regional, multi-scale lynx habitat assessment was conducted by Hillis *et al*. (2002) (Project File O-5). They concluded that the levels of habitat components at the regional and forest scales are consistent with maintaining well-distributed habitat for viable populations of lynx.

4. Regulatory Framework

Lynx are listed as a threatened species under the Endangered Species Act. The LCAS describes conservation measures to be considered to conserve lynx. The Flathead Forest Plan contains a goal to provide sufficient habitat to promote the recovery of threatened and endangered species and conserve the ecosystems upon which they depend.

5. Regulatory Consistency

All alternatives would be consistent with the regulatory framework. All alternatives would result in a may effect-not likely to adversely affect determination for lynx. A decision will be made only after the US Fish and Wildlife Service issues a biological opinion that specifies actions needed to continue to recover the species.

Bald Eagle

1. Analysis Area

The analysis area used for bald eagles is the Flathead National Forest.

2. Affected Environment

The recovery goal for de-listing eagles in Montana in the 1986 Recovery Plan was 99 breeding pairs (U.S. Fish and Wildlife Service 1986). The Bald Eagle Recovery Team recommended a set of criteria to measure recovery that included among other items a minimum of 800 nesting pairs in the 7-Western State Area (Montana Bald Eagle Working Group 1994). The Montana Bald Eagle Management Plan has developed specific direction for recovery to non-listed status. There were 138 active nests in western Montana and 297 active nests statewide after the 2001 nesting season. Within western Montana, 96 of the 138 active nests produced 158 fledglings (Youmans, personal communication, MDFWP 2001 Statewide Bald Eagle Nest Records in Hillis 2002). Montana alone has more than 1/3 of the nests needed to meet the 7-State recovery goal of 800 nests.

Twelve nests occur within or near the Flathead National Forest. Some occur on private or other federal and state agency ownerships. Not all the 12 nests are active every year.

Although some nesting pairs remain in Idaho, Montana, and North Dakota year-round, the winter population is generally composed of migrants from Canada (Magaddino 1989). Winter habitat is generally associated with areas of open water where fish and waterfowl congregate (Stalmaster 1987). Perching and roosting trees are typically dominant mature conifers or cottonwoods providing a good view of the area (Magaddino 1989). The bald eagle is an opportunistic predator and feeds primarily on fish, but also consumes a variety of birds and mammals (both dead and alive) when fish are scarce or these other species are readily available.

Bald eagle courtship, egg laying, and incubation occur between about February 1 and May 1 and they are most sensitive to disturbance at this time. Snowmobiling may continue well after February 1 in most years thereby creating the potential for disturbance if it occurs in the vicinity of a nest.

The Montana Bald Eagle Management Plan (MTBEWG 1994) describes three zones around recently active and alternate nest sites. All three zones have management direction designed to minimize human activity near nest sites during sensitive periods of the nesting cycle to avoid disruption of normal behavior, loss of productivity, or abandonment of the breeding area.

3. Environmental Consequences

No significant issues or concerns were raised regarding snowmobiling and bald eagles. Consistency with the MTBEWG guidelines will be used to assess environmental effects.

Direct and Indirect Effects

All Alternatives

None of the alternatives would alter MTBEWG guidelines. The MTBEWG guidelines would continue to be applied to each bald eagle nest site and the application of the guidelines are considered to provide for adequate bald eagle conservation.

Bald eagle nests are located near an abundant source of fish, which tend to be larger rivers, lakes and reservoirs. These locations are typically low elevation forested areas, hence lower snow accumulations and are not snowmobile destinations. While snowmobiling could occur within bald eagle nest territories, to date, snowmobiling has not been identified as a concern for nesting bald eagles on the Flathead NF. Other recreational activities such as boating, fishing and hiking pose a much greater risk to nesting eagles. Additionally, all alternatives would result in a temporal and/or spatial reduction of snowmobile use compared to what occurred prior to the settlement agreement.

Snowmobiling would not be expected to have any direct or indirect effects on bald eagle migration, prey base or roost trees under any alternative.

Cumulative Effects

The Proposed Action is not expected to contribute to cumulative effects on bald eagles since no direct or indirect effects are expected. Several programmatic decisions or potential decisions exist but none are expected to affect eagles when combined with the Proposed Action.

Regional and Forest Scale Assessment

Hillis *et al*. (2003) assessed the status of bald eagles at the Forest and Region 1 scale and concluded that the Flathead National Forest is contributing to recovering bald eagles at all scales (Project Record O-5).

4. Regulatory Framework

The bald eagle is listed as a "threatened" species under the ESA and the Montana Bald Eagle Management Plan and Pacific Bald Eagle Recovery Plan provide recovery goals and objectives. The Flathead Forest Plan provides management direction for bald eagles.

5. Regulatory Consistency

All alternatives are consistent with the protection of the bald eagle as a federally listed threatened species and with the forest plan. All alternatives would result in a no effect determination for bald eagles.

Gray Wolf

1. Analysis Area

The analysis area used for gray wolves is the Flathead National Forest.

2. Affected Environment

The recovery goal for wolves in the Northern Rocky Mountains is 30 breeding pairs distributed equitably throughout the three recovery areas in Montana, Idaho, and Wyoming for three years (U.S. Fish and Wildlife Service 1987). The wolf population has increased dramatically within the last three years and 2002 marked the third consecutive year that recovery goals were met (U.S Fish and Wildlife Service *et al*. 2003).

In April 2003 the status of wolves in the Northwest Montana Recovery area were downlisted from "endangered" to "threatened", and the process for delisting would be initiated once satisfactory state management plans are in place for Montana, Idaho and Wyoming.
The Flathead National Forest falls within the Northwest Montana recovery area that had 11 breeding pairs in 2002. In 2002, nine packs (Kintla, Murphy Lake, Grave Creek, Spotted Bear, Whitefish, Lazy Creek, Lonepine, Fishtrap and Hog Heaven) were documented within or near the forest (U.S Fish and Wildlife Service, *et al*. 2003) and all but the Lonepine pack were considered breeding pairs *(ibid).* The Apgar and Danaher Packs are no longer thought to be present.

Key components of wolf habitat (U.S. Fish and Wildlife Service 1987) are: 1) a sufficient, year-round prey base of ungulates (big game) and alternate prey, 2) suitable and somewhat secluded denning and rendezvous sites, and 3) sufficient space with minimal exposure to humans. Wolves can live in a wide variety of habitats as long as they are occupied by ungulates.

Affects to wolves are primarily related to the potential effects of snowmobiling on wintering ungulates that provide the prey base for wolves. Denning and rendezvous habitats are not considered to be limiting across the forest.

3. Environmental Consequences

No significant issues or concerns were raised for gray wolves; however, Chapter 2 identified a significant issue and concern that snowmobile use may affect winter habitat for ungulates (primary wolf prey).

Prey availability is a major factor that influences wolf movements. Of all requirements for wolf survival, snowmobiling has the greatest potential to affect the wolf prey base. The measurement indicator will be the acres of mapped ungulate winter range in open and closed areas and miles of snowmobile roads/routes that intersect ungulate winter range where snowmobiling is allowed.

Direct and Indirect Effects

Effects Common to All Alternatives

Refer to ungulate analysis (pg. 3-59) for snowmobiling effects on winter range.

Snowmobiling in the vicinity of wolf packs likely results in both attraction and displacement of wolves depending on the level of human use. Creel *et al*. (2002) found that wolves and elk in Yellowstone exhibited stress responses that paralleled variations in snowmobile use. They also stated; "Despite these stress responses, there was no evidence that current levels of snowmobile activity are affecting the population dynamics of either species in these locations". Snow compaction activities can provide relatively easy travel routes for wolves into areas difficult to reach in deep snow (>18") (Claar *et al*. 1999, pg 7.6). Radio-collared wolves in Alaska were attracted to roads with limited human use, but avoided oil field access roads open to the public *(ibid*, pg 7.9). The tradeoff, however, is increased mortality. Twenty-one of 25 human-caused wolf mortalities in a Central Rockies study including Glacier National Park occurred at less than 200 meters of roads/routes *(ibid*, pg 7.8).

All alternatives allow snowmobiling in areas occupied by wolves. The potential for wolf mortality is reduced under Alternatives 2, 3, 4 and 6, but remains moderate under all alternatives since packs typically occupy valleys and lower elevations, which are also areas with more human developments. These valleys and lower areas are especially important during winter since this is where the prey base is concentrated.

Wolf populations in the Northwest Montana Recovery area have increased steadily the last three years with more liberal snowmobile restrictions than any of the alternatives contain. Increased temporal and/or spatial restrictions on snowmobiles should not have an adverse effect on the wolf prey base, den or rendezvous sites.

Alternatives 2, 3, 4 and 6

The potential for human caused wolf and ungulate mortality would be reduced by prohibiting snowmobile use on ~230 miles roads/routes under Alternatives 2, 3 and 6 and ~320 miles under Alternative 4. The acres available for snowmobile use under Alternatives 2, 3, 4 and 6 are 300,000-400,000 less than that available in Alternatives 1 and 5 (Table 3-11).

Table 3-11. Alternative comparison of areas and roads/routes available for snowmobile use.

Alternative	Programmatic Acres available for snowmobiling	All Acres Available for Snowmobiling	Miles roads/routes available for snowmobiling
1	1,142,000	1,080,400	3,210
2	784,400	665,000	2,980
3	793,600	691,600	2,980
4	763,500	644,200	2,890
5	1,035,600	948,300	3,170
6	787,200	690,900	2,980

Alternatives 1 and 5

These alternatives are similar in the amounts of snowmobiling that would be allowed, and would not provide as much security for wolves or ungulates as Alternatives 2, 3, 4 or 6.

Dates

Alternatives 1, 2, 4, 5, and 6

The November 15—March 15 snowmobiling season for most of the forest under alternatives 1, 2 and 5 and the December 1—March 31 snowmobiling season under Alternative 4 and most of Alternative 6 are the most desirable for wolves because the length of the snowmobiling season is the shortest and would minimize potential effects on wolves and ungulates described previously. Alternative 6 does have three areas that would allow spring snowmobile use, but these areas do not contain known wolf packs or ungulate winter range.

Alternative 3

The December 1—April 30 snowmobiling season for most of the Forest under Alternative 3 is the least desirable for wolves because the snowmobiling season would last one month longer than the other alternatives, increasing the duration of snowmobile effects on wolves and ungulates.

Cumulative Effects

Cumulative effects to gray wolves may result from the Proposed Action or its alternatives. Programmatic decisions or potential decisions may have a role in cumulative effects.

Northern Rockies Lynx Amendment

The process is underway to amend Forest Plans in the Northern Rockies to incorporate management direction for Canada Lynx based on the Lynx Conservation and Assessment Strategy (Ruediger *et al*. 2000). The lynx amendment would be compatible with wolf management because it would have neutral effects on wolf prey base or risk of mortality.

Regional and Forest Scale Assessment

A Regional, multi-scale wolf assessment was conducted by Hillis *et al*. (2002) (Project File O-5). They found that wolf pack numbers at the Forest, Western Montana, and Tri-State area clearly indicate that cumulative, broad-scale activities are consistent with recovery at all scales. Further, they reported " Wolves are also the one species where we can probably conclude that *recovery (to de-listing levels) equals viability*. Wolves have an extremely high fecundity rate, are highly mobile, and have sustained some habitat connectivity with large populations in Canada. Consequently, there is little concern among wildlife professionals that the 30-pack recovery goal should not be sufficient for long-term species viability."

4. Regulatory Framework

The gray wolf is listed as a "threatened" species under the Endangered Species Act and the Recovery Plan provides recovery goals and objectives. The Flathead Forest Plan provides management direction for gray wolves.

5. Regulatory Consistency

All alternatives are consistent with the protection of the gray wolf as a federally listed threatened species and with the forest plan. All alternatives would result in a may effect-not likely to adversely affect determination for gray wolves.

Sensitive Species

Sensitive wildlife species are those identified by the Regional Forester for which population viability is a concern as evidenced by either: 1) a significant current or predicted downward trends in population numbers or density or 2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Table 3-12 lists the sensitive species on the Flathead National Forest that could potentially be affected by snowmobiling.

Table 3-12. Sensitive species on the Flathead National Forest potentially affected by snowmobiling.

Species	Habitat(s) Used	Forest Status
Wolverine (*Gulo gulo*)	Wide ranging species.	Known occurrences
Northern bog lemming (*Synaptomys borealis*)	Mostly open wetlands with thick moss mats.	Known from 1 specimen collected on forest. Other potential habitat occurs.

Table 3-13 lists those sensitive species that are omitted from further analysis due to lack of potential effects from snowmobiling.

Table 3-13. Sensitive species on the Flathead National Forest omitted from further analysis.

Species	Habitat(s) Used	Reason for omission from further analysis.
Peregrine falcon (*Falco perigrinus anatum*)	Considered sensitive after delisted from ESA. Nests on tall cliffs, usually near riparian/meadow areas.	Combination of low elevation, early snow melt, steep topography, and dense vegetation near nesting cliff makes snowmobile use near nest site unlikely.
Boreal toad (*Bufo boreas boreas*)	Wetlands for breeding, uplands at other times of year.	Still inactive below ground when snow covers the ground for snowmobiling.
Common loon (*Gavia immer*)	Large lakes or rivers with low human activity	Loons require open water on large lakes or rivers and snowmobiles can't operate on them when unfrozen.
Flammulated owl (*Otus flammeolus*)	Mature forests with open understories especially at lower elevations.	No vegetation change due to snowmobiling and flammulated owls tend to arrive after snowmobiling season.
Black-backed woodpecker (*Picoides arcticus*)	Concentrations of recently dead conifers—especially fire-killed.	No effects on preferred habitat due to snowmobiling and not considered especially sensitive to human presence.
Townsends' big-eared bat (*Plecotus townsendi*)	Roosts in caves, abandoned mines, snags, buildings. Maternity roosts in warm caves.	No impact to preferred habitat from snowmobiling and they tend to arrive after the snowmobiling season.
Northern leopard frog (*Rana pipiens*)	Wetlands	Still inactive below ground when snow covers the ground for snowmobiling and no known populations on the forest.

Species	Habitat(s) Used	Reason for omission from further analysis.
Harlequin duck (*Histronicus histronicus*)	Medium or larger mountain streams with extensive riparian vegetation. Documented breeding limited to a few streams.	Snowmobile use near known or potential nesting streams generally limited to roads because of dense vegetation near streams. Streams inaccessible to snowmobiles due to open, running water at the time of occupancy by harlequins.
Northern Goshawk (*Accipiter gentilis*)	Mature forests for nesting.	Preference for mature conifer stands with high canopy closure precludes frequent snowmobile use beyond adjacent road corridors.
Fisher (*Martes pennanti*)	Mature forests with high canopy closure, especially in riparian areas.	Preference for mature, relatively low elevation conifer stands with continuous cover precludes frequent snowmobile use beyond adjacent road corridors.

Wolverine

1. Analysis Area

The analysis area used for wolverines is the Flathead National Forest.

2. Affected Environment

Wolverines are the largest mustelid and typically weigh 12-18 kg and 8-12 kg for males and females respectively (Claar *et al*. 1999, pg 7.34). Home ranges are very large, ranging from 80 to 700 km^2 for females and more than 2,000 km^2 for males in an Idaho study. Wolverines are not believed to be associated with any vegetative community and preferences for cover types and topography are attributed to food abundance, avoidance of high temperatures or avoidance of humans (*ibid,* pg. 7.35). Denning is likely the most specific habitat need for wolverines and begins in early February to late March. Wolverines appear to be very sensitive to human disturbance at maternal dens, moving to new den sites 1 hour to one day after discovering human presence nearby (Magoun and Copeland 1998, pg. 1316).

Potential wolverine denning habitat has been modeled for the forest with 190,460 acres predicted (Exhibit O-7, Project Record) with 87,900 acres outside the wilderness (Table 3-14). Outside the wilderness, over 1/2 of modeled denning habitat occurs within the North Fork drainage.

Montana and Alaska are the only states that still allow wolverine harvest. The limit in Montana is set at one wolverine per trapper per season. Harvest for the state has been steady at about ten wolverines per year for the past 25 years (MTFWP 2003). Wolverines have few predators and starvation is likely an important factor for younger and older wolverines (Claar *et al*. 1999, pg. 7.36). Trapping likely results in partially additive mortality for the wolverine population and could play a key role in wolverine population size. Both male and female wolverine are slow to mature (2-3 years) for sexual maturation, females of reproductive age do not bear young every year (50% did not in studies summarized in Magoun and Copeland 1998), and produce an average of three young per litter. Untrapped refugia (areas where trapping does not occur) and linkages with these areas are of great importance for wolverine viability (Claar *et al*. 1999, pg. 7.37).

3. Environmental Consequences

Chapter 2 identified a significant issue and concern that snowmobile use may affect denning wolverines.

The measurement indicator is the acres of modeled potential wolverine denning habitat in areas open to snowmobile use and the amount of denning habitat within 1000 meters of available snowmobile roads/routes.

Direct and Indirect Effects

Areas

Few wolverine studies have been conducted in the conterminous US, with most of the current knowledge coming from a study on the Flathead NF from 1972-1977 (Hornocker and Hash 1981)

and a central Idaho study from 1993-1996 (Magoun and Copeland 1998). Twenty-four and 19 wolverines were observed in the Montana and Idaho studies respectively, with only seven dens by two females over four years documented during the Copeland's study. There is still very much to learn about the biology and ecology of wolverines. Models previously developed for potential wolverine denning habitat and the following analysis were conducted using the best available science, but given the paucity of wolverine knowledge, additional studies could alter the current understanding of wolverines and their habitat requirements.

Considering the sensitivity of wolverines while in the den (Banci and Harestad 1988, Copeland 1996, Krebs and Lewis 1997, Magoun and Copeland 1998, Lofroth *et al*. 2000), human disturbance over a large spatial area could have negative consequences for individuals and populations. Similar to denning grizzly bears, consequences to wolverines from human disturbance likely range from increased heart rates to den abandonment, which could lead to increased energy expenditures during a physically demanding time period and ultimately decreased survival. Unlike grizzly bears, wolverines appear more susceptible to den abandonment from low levels of human disturbance. Given nearly immediate abandonment of den sites after detection of human presence and the wolverine's acute sense of smell, a 1000 meter buffer was placed around roads/routes where snowmobiling is allowed to determine proximity of wolverine denning habitat in relation to concentrated snowmobile use.

Alternatives 1 and 5

Alternative 1 and 5 have substantially greater amounts of wolverine denning habitat open for snowmobile use than Alternatives 2, 3, 4 and 6 (Table 3-14). Most notably, 98.5 percent of ~46,000 acres of potential wolverine denning habitat on the Flathead National Forest in the North Fork is open for snowmobiling in Alternative 1, and 68 percent is open to snowmobiling in Alternative 5 (Project Record O-7). Much of the denning habitat is in cirque basins and other open areas often used as snowmobile "play areas".

Alternatives 2, 3, 4 and 6

The extent of human disturbance on denning wolverines is greatly reduced in Alternatives 2, 3, 4 and 6, but could still have an effect on ~57 percent of wolverine denning habitat outside the wilderness when the effects of open areas and roads/routes (buffered at 1000 meters) through closed areas are combined (Project Record O-7). The 57 percent figure cannot be derived from Table 3-14 due to the overlap between open areas and the buffered roads/routes. About 30,000 acres would remain open to snowmobiling under Alternatives 2, 3, 4 and 6 as compared to about 55,00-73,000 acres under Alternatives 1 and 5. This reduction is mainly attributed to closures in the North Fork where only ~6,100 acres out of 46,100 acres of available denning habitat would be open to snowmobile use compared to 45,400 acres in Alternative 1 and 31,300 acres in Alternative 5.

Compared to Alternatives 2, 3 and 6, Alternative 4 provides additional protection to ungulate winter range and wolverine denning habitat, which would benefit wolverines during the winter when their primary food source is ungulate carrion. Alternative 4 would be the most beneficial for wolverines because of the additional area and road closures.

Table 3-14. Extent of Overlap of Modeled Wolverine Denning Habitat with areas where Winter Motorized use Would be Allowed.

	Alt	Total Acres of Modeled Denning Habitat (Outside Wilderness)	Acres of denning habitat in areas prog.* open to winter motorized use	Acres of denning habitat in all areas open to winter motorized use	% of Denning habitat including Wilderness (190,500 acres)		% of Denning Habitat Outside wilderness (87,900 acres)	
					Prog. Open	All Open	Prog. Open	All Open
Denning Habitat in Areas Open to Snowmobiles	1	190,500 (87,900)	75,900	73,400	40	39	86	84
	2		31,000	29,800	16	16	35	34
	3		31,600	29,800	17	16	36	34
	4		30,700	29,600	16	16	35	34
	5		56,700	54,900	30	29	65	62
	6		30,800	29,300	16	15	35	33
Acres of Denning Habitat within 1000m of Roads/Routes Open for Snowmobiling	1	190,500 (87,900)	36,200		19		41	
	2		32,800		17		37	
	3		32,800		17		37	
	4		32,500		17		37	
	5		33,900		18		39	
	6		32,800		17		37	

*Prog. refers to programmatic areas that would be affected by Amendment 24. Figures in programmatic columns represent maximum amounts of areas available for winter motorized use under each alternative. Changing areas from programmatically closed to open for winter motorized use in the future would require an amendment to or revision of the forest plan. Columns summarizing all open areas reflect programmatic closures and current site-specific closures for current on the ground effects to winter motorized use. Future site-specific changes could increase or decrease future winter motorized travel in areas and/or routes without amending or revising the forest plan.

Seasonal Restrictions

Alternatives 1, 2, and 5

Under Alternatives 1, 2 and 5 the snowmobiling season would occur from November 15 to March 15 and would overlap 1-2 months with the wolverine denning season. Of all alternatives, these closure dates would have the least effect to wolverines by allowing the least overlap of snowmobiling with wolverine denning.

Alternative 3

This alternative's May 1 closure would allow snowmobiling nearly the entire wolverine denning season. Spatial effects are similar to Alternatives 2 and 4, and an improvement over Alternatives 1 and 5. Temporal effects would last ~4-6 weeks longer than other alternatives and would be least desirable for wolverines.

Alternative 4

Compared to Alternatives 1, 2, and 5, delaying the snowmobile closure two weeks to April 1 under Alternative 4 would increase the duration of disturbance to denning wolverines and is not as desirable as the existing March 15th closure. An April 1 closure date would have intermediate effects compared to Alternative 3 and Alternatives 1, 2 and 5.

Alternative 6

Compared to Alternatives 1, 2, and 5, delaying the snowmobile closure two weeks for most of the NCDE to April 1 under Alternative 6 would increase the duration of disturbance to denning wolverines and is not as desirable as the existing March 15th closure. Additionally, ~52,000 acres would remain open 4-8 more weeks to accommodate spring snowmobilers, of which ~6,000 acres has been modeled as potential wolverine denning habitat. Alternative 6 would have similar effects to Alternative 4 with additional temporal effects resulting from the three spring snowmobiling areas totaling ~52,000 acres.

All Alternatives

Trapping mortality would be expected to be similar under all alternatives since much of the Forest would remain open to snowmobiling and harvest limits and trapping restrictions set by Montana Department of Fish Wildlife and Parks are not expected to change in the near future. There are fewer miles of roads and reduced acreages of National Forest System land available for snowmobile use in Alternatives 2-4, which would indirectly affect the amount of trapping, especially on the Glacier View District (North Fork Flathead area).

Although all alternatives have potential for adverse effects to individuals and habitats, it must be kept in mind that for many years snowmobiling has occurred on the Flathead National Forest to an extent equal to or greater than that described in Alternative 1, while the number of wolverines trapped annually has remained steady for nearly 2½ decades. Shortening the length of the snowmobiling season, closing areas to snowmobiling, or closing roads to snowmobiling, some of which are proposed in Alternatives 2-6, would be an overall improvement for wolverines and wolverine habitat. For these reasons all alternatives may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Programmatic decisions or potential decisions exist but none are expected to affect wolverines when combined with the Proposed Action. Other programmatic decisions or potential decisions considered for cumulative effects include continued implementation of the Swan Valley Conservation Agreement 1997 and continued implementation of Amendment 19 (USDA Forest Service 1995).

Regional and Forest Scale Assessment

Hillis *et al*. (2003) assessed wolverine habitat at the Flathead National Forest scale and the Region 1 scale. They concluded that the proportion of natal den habitat protected by designated

wilderness and Glacier National Park would sustain viable populations at the Forest or Region 1 scale (Project Record O-5).

4. Regulatory Framework

The wolverine is listed as a sensitive species under in Region 1 of the Forest Service. The Flathead Forest Plan provides management direction for sensitive species including wolverines.

5. Regulatory Consistency

All alternatives are consistent with the protection of the wolverine as a Region 1 sensitive species and with the forest plan. All alternatives would result in a "may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of species" determination for wolverines.

Northern Bog Lemming

1. Analysis Area

The analysis area used for bog lemmings was riparian habitat types NL1A and NL1E on the Flathead National Forest (Table 3-15).

Table 3-15. Characteristics of Riparian Landtypes NL1A and NL1E.

Riparian landtype	Gradient	Substrate material	Habitat type or vegetation community
NL1A	Nearly level, valley bottom, 2-4% slopes	Clays, silts, fine & medium sand	Subalpine fir
NL1E	Nearly level, valley bottom, 2-4% slopes	Clays, silts, fine & medium sand	Willow & sedges

2. Affected Environment

The northern bog lemming has few populations in the lower 48 states, known from eight locations in Washington, four locations in Idaho, and 13 sites in Montana (Reichel and Beckstrom 1993). Since about 10,000 years ago, this species has become a glacial relict with localized primary habitat. The northern bog lemming is found in wet meadows containing standing water and extensive coverage of sedges and species such as sphagnum moss. Special habitat features seem to include fallen logs and other woody debris used for burrowing (Hickman *et al*. 1999, pg. 4.8).

Potential year-round habitat for the northern bog lemming was identified as Riparian Landtypes NL1A and NL1E (US Forest Service 1995), which total ~12,400 acres on the Flathead National Forest (Project Record O-8). Snow compaction could degrade these fragile habitats by changing habitat composition or productivity, reducing the insulating value of snow, and inhibiting subnivian movement of bog lemmings (Hickman *et al*. 1999, pg. 4.8).

On the Flathead Forest, bog lemmings have only been documented in one small spot near the far western boundary of the Tally Lake district.

3. Environmental Consequences

No significant issues or concerns were raised for bog lemmings.

The measurement indicator is the acres of NL1A and NL1E riparian habitat types in areas open and closed to snowmobile use and the amount of available snowmobile roads/routes intersecting these habitats.

Direct and Indirect Effects

All Alternatives

Programmatically ~86-97 percent of mapped NL1A and NL1E habitat on the Flathead National Forest occurs in areas open to snowmobiling in each of the alternatives (Table 3-16). It should be noted that these habitat types were not defined in the wilderness and could occur in some places. It should also be noted that bog lemmings may only be found on a tiny portion of the mapped NL1A and NL1E habitats on the forest, if at all, but these represent the most likely habitats where bog lemmings may occur. Bog lemmings have only been documented in one small spot near the far western boundary of the Tally Lake District. Snowmobile use is low in the main portion of the Tally Lake District (Project Record O-47).

Table 3-16. Extent of overlap of potential bog lemming habitat types with areas where winter motorized use would be allowed.

Alternative	Acres FNF Bog Lemming Potential Habitat*	Miles of roads/routes open through potential habitat	Acres Potential Bog Lemming Habitat Prog. Open to Snowmobiling	All Acres Potential Bog Lemming Habitat Open to Snowmobiling	% Total FNF Potential Habitat*	
					Prog. Open	All Open
1	12,400	15	12,000	10,900	97	88
2		15	10,800	9,800	87	79
3		15	10,900	9,800	88	79
4		15	10,700	9,600	86	77
5		15	11,900	10,800	96	87
6		15	10,800	9,700	87	78

* No modeling of bog lemming habitat has been done inside the wilderness.

During winter these non-forested marshes and bogs could be used by snowmobiles, but these areas would not likely be snowmobiling destinations because of their small size, low gradient, and may often be surrounded by dense vegetation. Snowmobiles that did use areas where bog lemmings were present could have substantial direct and indirect effects to bog lemmings and their habitat. Any snowmobile use in bog lemming inhabited areas would cause snow compaction, possibly crushing individuals, but at least reducing the insulating value of the snow and inhibiting subnivean movement for some length of time. Frequent ubiquitous snowmobile compaction in these environments could render them uninhabitable for small mammals or at least cause a

marked increase in mortality as reported by Schmid (1972) (in Hickman *et al*. 1999, pg 4.8). Heavy snowmobile use could also lead to changes in vegetation characteristics, which could affect bog lemming forage. Wanek (1973) reported declines in herbs and shrubs were directly related to snowmobile traffic intensity. He also reported that in bog communities, snowmobiling caused a delay in the spring thaw as much as two weeks (in Hickman *et al*. 1999, pg 4.8). However, in the one area known to have bog lemmings on the Forest, snowmobile use is low.

Although all alternatives have some potential for adverse effects to individuals and habitats it must be kept in mind that only 1 site on the Flathead has been documented to have northern bog lemmings although other sites have been surveyed (Reichel and Beckstrom 1993). Also as mentioned earlier, bog lemming habitat is very specific and the areas mapped as landtypes NL1A and NL1E likely contain very small amounts of potential bog lemming habitat. For these reasons all alternatives may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Several programmatic decisions or potential decisions exist but none are expected to affect bog lemmings when combined with the Proposed Action. Other programmatic decisions or potential decisions considered for cumulative effects include the continued implementation of the Swan Valley Conservation Agreement 1997 and Amendment 19 (USDA Forest Service 1995).

4. Regulatory Framework

The northern bog lemming is listed as a sensitive species in Region 1 of the Forest Service (Bosworth 1999). The Flathead Forest Plan provides management direction for sensitive species including bog lemmings.

5. Regulatory Consistency

All alternatives are consistent with the protection of the bog lemming as a Region 1 Sensitive species and with the forest plan. All alternatives would result in a "may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of species" determination for bog lemmings.

Ungulates (Big Game)

1. Analysis Area

The analysis area used for ungulates is the Flathead National Forest.

2. Affected Environment

Elk, mule deer, white-tailed deer, moose, and mountain goat winter ranges occur on portions of the forest and contain varying densities of animals. Winter ranges are typically characterized by lower snow depths, availability of forage, especially browse, and some level of security. Mountain goats tend to be at much higher elevations than the other species but still select areas with lower

snow depths and adequate forage and security. White-tailed deer are omitted from further analysis because they appear more tolerant of human activities than other big game (Canfield *et al*. 1999, pg. 6.5). Canfield reviewed several studies of white-tailed deer where snowmobiling was not found to cause significant changes in their home ranges. Also, the majority of white-tailed deer winter range occurs at low elevations highly influenced by human activities on a checkerboard ownership of state, Plum Creek, private and Flathead National Forest land.

Montana Fish, Wildlife, and Parks mapped winter ranges throughout northwestern Montana and those mapped biological winter ranges are used for this analysis. The Flathead Forest Plan (1986) identified two Management Areas (MA 9 and 13) where big game winter ranges were the featured management emphasis. However, these MAs did not include all of the biological winter ranges therefore the Forest Plan MAs will not be used for detailed analysis.

Human activities on winter ranges have the potential to disturb and displace wintering animals, which can increase their energy requirements at a time of year when they are already under stress due to cold temperatures and low forage quality and quantity. Creel *et al*. (2002) found that elk in Yellowstone exhibited stress responses that paralleled variations in snowmobile use. They also stated that "Despite these stress responses, there was no evidence that current levels of snowmobile activity are affecting the population dynamics of either species in these locations". However, increased energy requirements can lead to increased weight loss, lowered productivity, or even mortality for individuals (Canfield *et al*. 1999).

Snowmobiling occurs on several winter ranges and Table 3-17 displays the amount of overlap of roads/routes and open areas with winter ranges.

3. Environmental Consequences

Chapter 2 identified a significant issue and concern that snowmobile use may affect winter habitat for ungulates. The measurement indicator will be the acres of winter range where snowmobiling is administratively allowed.

In addition, another indicator used to disclose relevant environmental effects will be the miles of roads available for snowmobile use within winter ranges.

Direct and Indirect Effects

Alternative 1

Snowmobiling is generally allowed on winter ranges under Alternative 1. Closures to snowmobiling in biological winter ranges can and do occur for other reasons and that's why Table 3-15 shows various proportions of each species total winter range as open to snowmobiling. Although most winter ranges are open to snowmobiling, nearly all of the activity is confined to roadways due to dense vegetation, or using roads to reach higher elevation play areas where snow tends to be deeper. Table 3-17 shows the amount of ungulate winter ranges on the Forest, ungulate winter range open for snowmobiling, and the miles of roads/routes open through winter ranges. Responses of ungulates to snowmobiling activity are well summarized in Canfield *et al*. (1999) and range from no apparent response to flight. Increased energy expenditures result from responses to snowmobiling and add to the energy demands on animals already under stress from body

weight loss that occurs in a normal winter. Even when disturbances do not induce overt behavioral responses, heart rates have been shown to increase which result in relatively high-energy expenditures. Excessive weight loss reduces the condition of animals and may influence both reproduction and survival. Displacement to less desirable habitats or habituation to human activities are other potential effects.

Alternative 2

The majority of the differences between this alternative and Alternative 1 occur in the North Fork and the Swan drainages. Alternative 2 would provide considerable benefits to wintering ungulates compared to Alternative 1 due to fewer acres open to snowmobiling and fewer miles of road open through winter ranges. Due to the reduced extent of winter range being used by snowmobiles fewer animals would be subjected to the effects of snowmobiling as discussed under Alternative 1.

Alternative 3

The areas and roads available under Alternative 3 are nearly identical to Alternative 2 and the effects would be similar with the exception of the North Fork. Some NFS land along the North Fork of the Flathead River bordered by privately owned land would be opened for snowmobile use; however, levels of use are not expected to increase in this area. Many of these areas coincide with ungulate winter range and snowmobile use could have effects described in Alternative 1. For ungulates, the biggest difference would be the season in which snowmobile use is allowed. Under this alternative the snowmobiling season would occur from December 1 to April 30, which is longer into the spring than under other alternatives. Ungulates are at their lowest body condition at the end of winter and continuing snowmobile use until April 30 would prolong the exposure to effects from snowmobiling. However, snowmobile use is occurring at higher elevations during late spring months, while ungulates are keying in on habitat below the snow line.

Alternative 4

Alternative 4 would make modest additional reductions in areas and roads open in winter ranges compared to Alternatives 2 and 3. The additional acres closed in Alternative 4 would give added protection from snowmobiles to ungulate winter ranges. This would reduce the number of wintering animals subjected to the effects of snowmobiling as discussed under Alternative 1. Additionally, the spring closure of areas including about 35 miles of roads located in high quality spring grizzly bear habitat would also benefit ungulates due to reduced disturbance along those roads. Overall, Alternative 4 is the most beneficial of all alternatives to ungulates.

Table 3-17. Extent of overlap of mapped ungulate winter range with areas where winter motorized use would be allowed.

Species	Alternative	Acres FNF Winter Range (Outside Wilderness)	Miles of roads/routes open through winter range	Acres Winter Range Programmatically Unrestricted to snowmobiling	Total Acres Winter Range Unrestricted to snowmobiling	% Total FNF Winter Range Including Wilderness		% FNF Winter Range Outside Wilderness	
						Prog.	All	Prog.	All
Elk	1	213,800 (130,000)	235	118,400	97,000	55	45	91	74
	2		230	109,300	74,700	51	35	84	57
	3		230	111,100	74,700	52	35	85	57
	4		200	98,700	68,200	46	32	76	52
	5		235	117,700	78,300	55	37	91	60
	6		230	110,200	77,500	52	36	85	60
Mountain Goat	1	9,000 (3,300)	0	1,300	1,200	15	13	40	36
	2		0	600	600	7	7	18	18
	3		0	300	300	3	3	9	9
	4		0	300	300	3	3	9	9
	5		0	1,200	1,200	13	13	36	36
	6		0	50	50	1	1	2	2
Mule Deer	1	73,500 (57,100)	100	55,200	49,200	75	67	97	86
	2		95	46,900	35,700	64	49	82	62
	3		95	48,500	35,700	66	49	85	62
	4		70	36,100	29,100	49	40	63	51
	5		100	54,100	40,200	74	55	95	70
	6		95	47,500	34,800	65	47	83	61
Moose	1	540,600 (476,000)	1,485	461,200	424,500	85	78	97	95
	2		1,300	275,100	227,500	51	42	58	48
	3		1,300	281,600	229,500	52	42	59	48
	4		1,235	263,300	215,700	49	40	55	45
	5		1,445	433,300	379,700	80	70	91	80
	6		1,300	281,600	228,200	52	42	59	48

Alternative 5

This alternative would have effects to ungulates that would be intermediate between Alternative 1 and Alternatives 2, 3, 4 and 6. Fewer acres of and roads through winter ranges would be open to snowmobiling than under Alternative 1 but more would be open than under Alternatives 2, 3, 4 or 6.

Table 3-17 shows the amount of ungulate winter ranges outside the wilderness open for snowmobiling under Alternative 5 and the miles of road open through winter ranges.

Alternative 6

This alternative would have effects to ungulates that would be intermediate between Alternatives 3 and 4. Fewer acres through winter ranges would be open to snowmobiling than under Alternative 3 for most ungulates, but more would be open than under Alternative 4. The three areas that allow spring snowmobiling under this alternative do not contain ungulate winter range and would have the same temporal effects as Alternative 4.

Table 3-17 shows the amount of ungulate winter ranges outside the wilderness open for snowmobiling under Alternative 6 and the miles of road open through winter ranges.

Cumulative Effects

Several programmatic decisions or potential decisions exist but none are expected to affect ungulates when combined with the Proposed Action. Other programmatic decisions or potential decisions considered for cumulative effects include:

Swan Valley Conservation Agreement 1997
Amendment 19 (USDA Forest Service 1995).

Regional and Forest-Scale Assessment

A viability analysis for deer and elk at the regional and forest scale is located in Project File O-5 (Hillis *et al*. 2003). Although Hillis *et al*. limited their discussion to deer and elk, their conclusions regarding viability applies equally well to moose and mountain goats.

Ungulate viability does not appear to be a concern on the Flathead National Forest and within Region One. Effects of the Winter Motorized Recreation Amendment project, which maintains or improves condition for ungulates, are consistent with maintaining viable populations of ungulates at Forest and Region One scales.

4. Regulatory Framework

The Flathead Forest Plan provides management direction for ungulates in various ways. Elk and mule deer are Management Indicator Species and other direction is provided under goals, objectives, and specific management area direction.

NFMA regulations include maintenance of viable populations of species.

5. Regulatory Consistency

All alternatives would comply with the Flathead Forest Plan. Since all alternatives either maintain or improve the habitat for ungulates at the forest scale, all alternatives would not detract from maintaining viable populations of ungulates.

Migratory Birds

1. Analysis Area

The analysis area used for migratory birds is the Flathead National Forest.

2. Affected Environment

Executive Order 13186, signed on January 10, 2001, outlined responsibilities of Federal agencies taking actions having or likely to have a negative impact on migratory bird populations to work with the US Fish and Wildlife Service to conserve those birds. On January 17, 2001, the USDA Forest Service and US Fish and Wildlife Service signed a Memorandum of Understanding to guide implementation of the Executive Order.

In December 2002, the US Fish and Wildlife Service released a report entitled "Birds of Conservation Concern 2002" that identifies bird species of concern at three scales. The report includes a national list, seven lists corresponding to the US FWS regional administrative units, and lists for each of the 37 Bird Conservation Regions (BCR's) in the U.S. as described by the North American Bird Conservation Initiative.

The Flathead National Forest falls within BCR 10 (Northern Rockies) where 28 species (Table 3-18) of conservation concern are listed. As noted, not all 28 species are known to occur in the Flathead Basin area (Flathead Audubon 2002). The Flathead Audubon publication describes the status of birds across the entire Flathead Basin area so some birds may not be documented on the Flathead National Forest but where suitable habitat occurs those species may be expected to occur.

Table 3-18. Status of Birds of Conservation Concern in the Northern Rockies Bird Conservation Region (BCR 10) in the Flathead Basin (Flathead Audubon 2002).

Species	Status[1]	Winter	Spring	Summer	Fall
Ferruginous Hawk	t	r[2]	r	r	r
Golden Eagle	B	o	u	u	u
Peregrine Falcon	B	r	r	r	r
Prairie Falcon	t	r	r	r	r
Yellow Rail	t				r
American Golden-Plover	t		r	r	r
Snowy Plover	no record				
Mountain Plover	no record[3]				
Solitary Sandpiper	t		u	r	u
Upland Sandpiper	t		r	r	
Whimbrel	t		r		
Long-billed Curlew	B		u	u	o

Species	Status[1]	Winter	Spring	Summer	Fall
Marbled Godwit	t		r	r	
Wilson's Phalarope	B		c	c	u
Yellow-billed Cuckoo	no record[4]				
Flammulated Owl	b		o	o	
Black Swift	B		r	r	r
Lewis's Woodpecker	B	r	o	o	r
Williamson's Sapsucker	b		u	u	u
Red-naped Sapsucker	B	r	c	c	u
White-headed Woodpecker	t		r		
Loggerhead Shrike	t		o	o	o
Pygmy Nuthatch	B	c	c	c	c
Virginia's Warbler	no record				
Brewer's Sparrow	b		o	u	o
McCown's Longspur	no record[5]				

[1]Status
B – Direct evidence of breeding
b – Indirect evidence of breeding
t – No evidence of breeding
[2]Relative abundance in suitable habitat:
c – common to abundant, usually found on every visit in moderate to large numbers
u – uncommon, usually present in low numbers but may be missed
o – occasional, seen only a few times during the season, not present in all suitable habitat
r - rare , one to low numbers occur, but not every year
[3] Recorded as "t" in QLL 2 from pre-1995 data in P.D. Skaar's Montana Bird Distribution, Fifth Edition.
[4] Recorded as "t" in QLL 2 and 14 from pre-1995 data in P.D. Skaar's Montana Bird Distribution, Fifth Edition.
[5] Recorded as "t" in QLL 3 from pre-1995 data in P.D. Skaar's Montana Bird Distribution, Fifth Edition but it could be from east of the Continental Divide.

3. Environmental Consequences

Direct and Indirect Effects

Table 3-18 shows that the majority of the birds are not found on the Flathead Forest during the winter when snowmobiling is most prevalent and that those that do occur in the winter are considered rare or occasional with the exception of the pygmy nuthatch which is common. More of the birds may be found in the spring but snowmobiling use drops off rapidly so there is much less potential for any effects during the spring.

Of those occurring in the winter only the peregrine falcon, golden eagle, Lewis' woodpecker, red-naped sapsucker, and pygmy nuthatch are known breeders in the Flathead Basin so they might be beginning courtship and other nesting activities in late winter. Peregrine falcons are addressed under Sensitive Species. Golden eagles are not known to nest on the Flathead National Forest so no effects to nesting eagles would be expected from any alternative. The two woodpeckers and the pygmy nuthatch utilize medium or larger sized trees for nesting and none of the alternatives would affect their habitat and disturbance from human activities has not been identified as a concern.

A larger group of the birds of conservation concern from Table 3-16 arrive in the spring and some breed in the area while others are en route to other breeding grounds. The spring arrivals generally are either wetlands or forest-oriented birds. In the spring there is little or no concern for snowmobile effects on wetlands birds since the birds can't use them until they thaw at which time the wetlands are unusable for snowmobiles. The forested habitats required by the forest-oriented birds would not be affected by any of the alternatives.

Cumulative Effects

Several programmatic decisions or potential decisions exist but none are expected to affect migratory birds when combined with the Proposed Action.

4. Regulatory Framework

NFMA requirements include maintenance of viability of populations.

Executive Order 13186 provides direction for conservation of migratory birds.

5. Regulatory Consistency

All alternatives are consistent with NFMA and Executive Order 13186. Since all alternatives either have no effect or maintain habitat for migratory birds at the forest scale, all alternatives would not detract from maintaining viable populations of migratory birds.

VI. Fisheries

1. Analysis Area and Information Sources

At the broadest scale, the fisheries analysis area for this project encompasses virtually the entire area of the Flathead National Forest (FNF); a scope necessitated by the inter-connected and migratory nature of native fish populations. The primary effects analysis will, however, concentrate on fish populations in watersheds directly affected by this proposed amendment, particularly those watersheds where snowmobile use is greatest.

Information for this analysis has been gathered from a variety of sources. The Flathead National Forest and Montana Department of Fish, Wildlife, and Parks have conducted site-specific fish habitat condition and population status inventories within the Flathead basin for more than twenty years. The Flathead Basin Commission has sponsored several studies that bear either directly or indirectly upon water quality in the area affected by this proposal. Forest Service biologists prepared a baseline Biological Assessment (BA) on the status of bull trout (*Salvelinus confluentus*) in the Flathead National Forest in 1998, as required by Section 7 of the Endangered Species Act. Finally, peer-reviewed scientific literature has been used as the primary source of information regarding the life histories and habitat requirements of the aquatic organisms that call the Flathead home, and the effect of natural and human-caused disturbance upon those organisms.

2. Affected Environment

This section describes the current condition of the aquatic environment within the Flathead National Forest, and the principal species that are part of that environment. The waters of the Flathead are still home to the native fish community that was present when Lewis and Clark made their historic journey across Montana. However, populations of native fish, most notably bull trout and westslope cutthroat trout (*Oncorhynchus clarki lewisi*), have declined in the past century. The principal cause of this decline is a complex interaction resulting from habitat alteration and the introduction of non-native species. The bull trout was listed as a threatened species throughout its Montana range in 1998. The westslope cutthroat is considered to be a sensitive species in Region One of the Forest Service; however, the U. S. Fish and Wildlife Service (USFWS) recently determined that the status of the westslope cutthroat trout did not warrant listing under ESA.

Fish Habitat Status

Nearly 50 percent, or more than one million acres, of the Flathead National Forest is set aside as Designated Wilderness, including the headwaters of both the Middle and South Forks of the Flathead River. The streams, rivers and lakes within the Wilderness have suffered very little degradation from human management and use, and are functioning today very much as they have historically in providing quality fish habitat. Motorized access, including by snowmobile, is prohibited in Wilderness areas; and while violations do occur, they are not widespread. Consequently, this proposed amendment would have no impact on fisheries habitat in the Wilderness portion of the forest.

The quality of aquatic habitat in the non-wilderness areas of the Flathead National Forest ranges from excellent to poor, with most water bodies exhibiting some evidence of past management impact. The most common effects observed in forest streams are increased sediment levels, unstable channel morphology, and reduced abundance of large woody debris (LWD). Historical silvicultural practices, including especially road building and timber harvest, are primarily responsible for these effects. Livestock grazing has also impacted fish habitat in some areas of the Flathead National Forest, most notably on the Tally Lake and Swan Lake districts.

Water quality

In general, water quality of the streams and lakes within the Flathead National Forest is excellent. There are, however, 14 streams and one lake located wholly or in part on FNF lands that have been listed on the Montana Department of Environmental Quality 303d list of water quality-impaired water bodies. In almost all cases, the beneficial use that is only partially supported is *aquatic life support/cold water fisheries*, and silviculture is indicated as the probable cause of the impairment (see Project Record I-1). Grazing/agriculture has been identified as a partial cause of impairment on two streams located partially on National Forest land. The primary pollutant associated with logging and grazing is fine sediment that enters streams as a result of increased erosion, both upland and in-channel. Fine sediment can settle in spawning areas and fill the spaces between gravels, which serve as incubation chambers for trout eggs. No water body on the Flathead National Forest has been impaired as a result of chemical or metal contamination.

Species Status and Ecology

Bull Trout

Two basic life history forms of bull trout are known to occur: resident and migratory. Resident bull trout spend their entire lives in their natal streams, while migratory bull trout travel downstream as juveniles to rear in larger rivers (fluvial types) or lakes (adfluvial types). The Flathead bull trout population is largely an adfluvial migratory group, with juveniles typically moving down to Flathead and Swan Lakes or Hungry Horse Reservoir at age 2-3, and returning at about age 6 to spawn. Bull trout spawning occurs in the fall, and the eggs incubate in the stream gravel until hatching in January (Fraley and Shepard 1989). The alevins remain in the gravel for several more months and emerge as fry in early spring. Unlike many anadromous salmonids, which spawn once and die, bull trout are capable of multi-year spawning (Fraley and Shepard 1989). The historic range of the bull trout stretched from California, where the species is now extinct, to the Yukon Territory of Canada (Hass and McPhail 1991).

As noted above, several factors have contributed to the decline of bull trout in the Flathead. Habitat degradation, interaction with exotic species, and fragmentation of habitat by dams and diversions have all been implicated (Rieman and McIntyre 1995). Bull trout are highly sensitive to environmental change (Rieman and McIntyre 1993) and are particularly intolerant of water temperatures above 15º C (Fraley and Shepard 1989). Substrate size and quality, the availability of cover, and stream channel stability are other habitat requirements linked to bull trout abundance (Rieman and McIntyre 1993). Bull trout embryo and fry survival decreases with increasing fine sediment levels in spawning gravels (Fraley and Shepard 1989). Juvenile

bull trout are especially dependent upon stable cobble and boulder substrate for daytime cover and over-winter survival (Thurow 1997). Adult bull trout utilize pool habitats and under-cut stream banks, often in conjunction with large woody debris cover (Rieman and McIntyre 1993). Where bull trout are sympatric with non-native eastern brook trout (*Salvelinus fontinalis*), hybridization between the species has resulted in displacement of bull trout (Leary *et al*. 1993).

A change in the species composition of Flathead Lake is perhaps the single factor most responsible for the decline of the upper Flathead bull trout subpopulation (McIntyre 1998). Flathead Lake has gone through a major change over the last two decades. Opossum shrimp (*Mysis relicta*) first showed up in Flathead Lake in 1981 after being stocked into three lakes between 1968 and 1975. These lakes have tributaries that feed into Flathead Lake, allowing the shrimp to migrate down to the lake. *Mysis* numbers peaked in 1986. Two non-native species, lake trout (*Salvelinus namaycush*) and lake whitefish (*Coregonus clupeaformis*), expanded as juveniles benefited from the addition of *Mysis* to the prey base. The expansion of these species has contributed to the decline of bull trout (McIntyre 1998). The mechanisms for the decline are not well understood since only a few bull trout have shown up in lake trout stomachs, so competition appears likely. This conclusion is substantiated by the fact that bull trout populations remain healthy in Swan Lake and Hungry Horse Reservoir where lake trout are absent. Bull trout in the Flathead system have declined equally in wilderness and managed areas, suggesting that habitat degradation may not be the primary factor in their decline. Lake trout and bull trout competition has been documented elsewhere. Donald and Alger (1993) looked at 34 lakes in the distributional overlap of the species and found that in 28 cases, only one species was present. In the lakes where they were sympatric, lake trout were the dominant species and three case histories were documented where lake trout completely displaced bull trout.

Bull trout numbers in Flathead Lake have been estimated based upon redd counts. In 1982, the highest bull trout redd count year, about 13,000 adult bull trout were estimated in Flathead Lake (Weaver 1998). The lowest redd count year was 1996 and adult bull trout were estimated at 916 fish (Weaver 1998). It is important to note that these are gross estimates based on complex assumptions, but these numbers do provide an indication of the precipitous rate of decline the population suffered in less than two decades. The status of the upper Flathead River subpopulation of bull trout appears to be slowly recovering from the low levels of the early 1990's (Tom Weaver MDFWP personal communication). This rebound in bull trout numbers probably is the result of fishing restrictions, improving habitat conditions, and a new, and more favorable equilibrium developing in the greater Flathead Lake ecosystem. Redd counts in most index streams have increased for several years, indicating a higher population of adult bull trout. The bull trout populations in the Swan River and South Fork Flathead River remain among the healthiest anywhere within the current range of the species.

Westslope Cutthroat Trout

Westslope cutthroat trout exhibit the same life history forms as bull trout, and the resident as well as both migratory forms are likely present in the Flathead National Forest. Cutthroat spawn in the spring when temperatures rise to about 10º C, and fry typically emerge from the spawning beds in late July. Migratory juveniles leave the natal streams at age 2 or 3 and travel downstream as high water levels begin to recede. Westslope cutthroat generally utilize substrate less, and pools more, than bull trout.

Westslope cutthroat co-existed with bull trout throughout their historic range with the exception of a small area east of the Continental Divide in the Missouri River drainage (Duff 1996). The sympatric range of the two species indicates that habitat suitable for bull trout is equally suitable for the westslope. The westslope cutthroat tended to be more widely distributed throughout this range than the bull trout, possibly because more streams have suitable water levels for spring versus fall spawning, or because the cutthroat will tolerate warmer temperatures than bull trout (McIntyre and Rieman 1995).

The population status of the westslope cutthroat is difficult to monitor in part because redd counts are virtually impossible to obtain for spring-spawning species. Electrofishing surveys conducted in the North Fork Flathead River since 1990 by Montana Department of Fish, Wildlife, and Parks indicated that cutthroat numbers were declining in the river (Deleray *et al*. 1999). Catch-and-release regulations for cutthroat trout in the North Fork were implemented in 1998 in response to the decline.

The decline of westslope cutthroat can largely be attributed to the same factors that have impacted bull trout. The cutthroat has been especially affected by the introduction of non-native species, most notably brook and rainbow trout. Brook trout appear to competitively exclude the cutthroat, while rainbow trout hybridize with cutthroat, resulting in a loss of genetically pure populations. One recent study suggests that the rate of genetic introgression between cutthroat and rainbow populations in the North Fork is increasing (Nathaniel Hitt, 2002, Master's Thesis, University of Montana,).

Other Fish Species, Amphibians and Reptiles

Relatively little is known about the populations of the other aquatic species native to the streams of the FNF. Native species include mountain whitefish (*Prosopium williamsoni*), and one or more species of sculpin (*Cottus* sp.). One study of sculpin distribution found both slimy sculpins (*Cottus cognatus*) and presumed shorthead sculpins (*C. confusus*) in allopatric populations in the North Fork (Gregg *et al.* 1995). A more recent study, however, suggests that the second species was not the shorthead sculpin but the common species mottled sculpin (*C. bairdi*) (Baker *et al.* 1999). The shorthead sculpin was removed from the regional list of sensitive species in 1999, owing largely to this new information.

Recent herpetological surveys in the Flathead National Forest have identified long-toed salamanders (*Ambystoma macrodactylum*), tailed frogs (*Ascaphus truei*), western toads (*Bufo boreas*), Pacific chorus frogs (*Pseudacris regilla*), Columbia spotted frogs (*Rana luteiventris*), painted turtles (*Chrysemys picta*), and both common (*Thamnophis sirtalis*) and western terrestrial garter snakes (*T. elegans*) (Marnell 1997, Maxell *et al.* 2003). Populations of these species appear to be stable in the area, while another native amphibian, the leopard frog (*Rana pipiens*) has suffered significant population declines throughout its range west of the Continental Divide. The reasons for this decline are unknown, and the frog remains abundant east of the Continental Divide.

All species of reptiles and amphibians in Montana hibernate during the winter, and begin to reappear in spring as snowmelt progresses.

3. Environmental Consequences

Direct and Indirect Effects

From a fisheries perspective, the only issue of significance related to snowmobile use identified during public scoping is the potential for degradation of water quality in the analysis area. There are two ways that snowmobile use could possibly impact water quality: through chemical contamination from fuels and by causing soil disturbance with resultant sedimentation.

Gasoline contains an assortment of organic and inorganic compounds, many of which have been identified as posing health risks to humans and various aquatic organisms under specific exposure conditions. The hazardous organic compounds include benzene, toluene, ethylbenzene, and xylene, collectively referred to as BTEX; methyl tertiary butyl ether or MTBE; and a group of polycyclic aromatic hydrocarbons or PAHs. Some PAHs (there are over 100) have also demonstrated high levels of phototoxicity, i.e., exposure to UV radiation alters the chemical structure and increases the deleterious effect of the substance (Irwin *et al.* 1997). The inorganic compounds of greatest concern are ammonium and sulfate, compounds that have been linked to acidification of waters in industrialized regions of the United States (USGS 1998).

The toxic compounds found in snowmobile fuel and lubricants may travel several pathways to reach a water body. They may be deposited onto the snow surface either by spillage or exhaust emission resulting from incomplete combustion. The contaminants may be carried to a stream or lake during snowmelt in the spring. They may enter the groundwater and travel sub-surface to a water body. Volatized pollutants may be deposited directly from the atmosphere into open waters adjacent to snowmobile trails. Two cycle snowmobiles are especially prone to incomplete combustion, producing approximately 100 times the concentration of exhaust pollutants as comparable four stroke snowmobiles (Lela and White 2002). As the production and use of four stroke snowmobiles increases, the pollution of snow related to snowmobile use should decline substantially.

The most recent and comprehensive studies regarding the environmental impact of snowmobile use have been conducted in and around Yellowstone National Park in conjunction with proposed changes to the park management plan. The west entrance of the park hosts the greatest number of snowmobiles during the winter, and has been the location for several studies that have been used in this analysis. In general, although the levels of snowmobile use in the area are much greater than any documented here on the Flathead National Forest, research has not demonstrated any negative effects upon aquatic organisms. A recent Yellowstone study found that levels of toluene, the most abundant organic compound among those tested, were many times lower than the EPA-approved drinking water standard in samples of snow taken directly from the groomed snowmobile trail and in a nearby stream (Ingersoll 1998)(see Hydrology and Soils section).

The Flathead National Forest has received anecdotal reports of soil disturbance caused by the use of snowmobiles in an area with insufficient snow depths. If such disturbance were to occur adjacent to a perennial stream, it could potentially contribute sediment to the stream or result in rill and gully erosion. However, there is currently no evidence that the use of snowmobiles on bare ground is a widespread or common occurrence on the Flathead. Based on professional

judgment as well as current and past monitoring of snowmobile use on the Flathead National Forest, sediment resulting from snowmobile use does not pose a threat to native fish or aquatic habitats at the present time or in the foreseeable future (see Hydrology and Soils section).

Direct and Indirect Effects Common to All Alternatives

All alternatives, including the no-action Alternative 1, would permit snowmobile use in specific areas of the Flathead National Forest. There is no evidence that past snowmobile use has affected fisheries or aquatic habitat within the forest, a conclusion supported by research in Yellowstone National Park, where levels of snowmobile use are much greater. Snowmobile use occurs primarily in high elevation areas where a deep snow layer provides a protective buffer to aquatic habitats and resident fish during winter months. Amphibians are hibernating during snowmobile season and likewise would not interact with snowmobiles. Snowmobile recreation may increase in the future, but improving engine technology also promises to reduce the effect of individual snowmobiles upon the environment. Based upon the current available science, professional judgment, and ongoing monitoring of snowmobile use on the Flathead National Forest, there would be no direct or indirect effects to aquatic resources resulting from implementation of any alternative considered in this document.

Cumulative Effects

Because there are no direct or indirect effects associated with selection of any alternative in this proposal, there can be no cumulative effects upon fisheries and other aquatic resources.

4. Regulatory Framework and Consistency

The Forest Plan is the primary document that codifies management standards and guidelines governing activity on national forest system lands. Originally adopted in 1986, the Flathead Forest Plan was amended in 1990 (Amendment No.3) to better define the standards for protection of fish populations.

The Forest Plan was again amended on August 30, 1995, by the Inland Native Fish Strategy (INFISH) (USDA Forest Service 1995). This interim strategy was designed to provide additional protection for existing populations of native trout, outside the range of anadromous fish, on 22 National Forests in the Pacific Northwest, Northern and Intermountain Regions. Implementing this strategy was deemed necessary as these species were at risk due to habitat degradation, introduction of exotic species, loss of migratory forms and over-fishing. As part of this strategy, the Regional Foresters designated a network of priority watersheds. Priority watersheds are drainages that still contain excellent habitat or assemblages of native fish, provide for metapopulation objectives, or are watersheds that have excellent potential for restoration

INFISH also established Riparian Management Objectives (RMOs) and Riparian Habitat Conservation Areas (RHCAs). RMOs are habitat parameters that describe good fish habitat. Where site-specific data is available, these RMOs can be adjusted to better describe local stream conditions. These RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of riparian goals is measured. RHCAs are portions of watersheds where riparian dependent resources receive primary emphasis. The RHCAs are defined for four categories of stream or water body dependent on flow conditions and presence

of fish. The RHCAs are within specific management areas and are subject to standards and guidelines in INFISH in addition to existing standards and guidelines in the Flathead Forest Plan.

The Endangered Species Act (ESA) is responsible for the protection and recovery of listed species such as the bull trout. The bull trout was listed as threatened under ESA in 1998. Another native resident of the Flathead National Forest is the westslope cutthroat trout. The westslope cutthroat trout is on the Regional Forester's "sensitive species" list and is currently being considered for listing under ESA.

Sensitive Species Determinations

The Flathead Forest Plan provides specific guidance for the protection of fisheries and other aquatic resources, including the riparian zone around still and flowing water. The planned actions proposed under Alternatives 1-6 comply with all relevant Forest Plan requirements including INFISH.

The determination of effect for bull trout for all alternatives is *"no effect".* Likewise, there would be no effect to proposed bull trout critical habitat as a result of implementation of any alternative.

The determination for westslope cutthroat trout for all alternatives is *"no effect."*

VII. Hydrology and Soils

1. Analysis Area and Information Sources

The analysis area for this proposal is the Flathead National Forest boundary. This watershed analysis is structured to address the soil and water resources within the analysis area. This entails describing the existing condition of those resources and determining whether the proposed activities may affect soil productivity, wetlands and/or riparian areas, stream channels, water quantity, and water quality.

The primary sources of information used in this document are data gathered by personnel from the Flathead National Forest. Scientific literature pertinent to the topic based upon similar physical, chemical, biological or issue parameters, was used and cited.

The surface erosion potential from snowmobile use on bare ground was estimated using the Water Erosion Prediction Project computer model (WEPP). The WEPP model estimates the runoff, erosion and potential sedimentation from a hill-slope or a road.

2. Affected Environment

General Watershed Characterization

There has been and/or proposed to be snowmobile use in portions of all the major tributary drainages of the Flathead River, in Northwestern Montana. These basins includes the Swan River, Stillwater River, Whitefish River, Ashley Creek, Stoner Creek, Dayton Creek, Ronan Creek, the North Fork, the Middle Fork, and the South Fork of the Flathead River. Areas where the Forest Plan has prohibited snowmobiling include but are not limited to the Great Bear, Mission Mountains, and Bob Marshall Wilderness Areas, Jewel Basin Hiking Area, primitive recreation allocations, and wild segments of the Wild and Scenic River corridors. The area historically restricted to snowmobile use is approximately 1.2 million acres (see Alternative 1 Maps, Figures 1-2 through 1-7).

Proterozoic meta-sedimentary rocks structurally controlled by block faulting form the major mountain ranges and inter-mountain valleys that make up the Flathead National Forest. The elevation ranges from 3000 feet in the valley bottoms, to mountaintops of 9000 plus feet.

The average annual temperature at Kalispell is 42.8 degrees Fahrenheit. This average temperature decreases as the elevation increases in the mountainous area surrounding Kalispell. The average annual precipitation ranges from approximately 20 inches in the lowest elevation portions of the Flathead N. F. to near 100 inches at the highest elevations of the Flathead N. F. The low elevation valleys receive about 50 percent of this precipitation as rain and 50 percent as snow. The high elevation mountain ridge-tops receive about 20 percent of the precipitation as rain and 80 percent falls as snow, which results in a snow pack in excess of 100 inches on some mountain tops. Snow cover in the alpine areas usually occurs earlier in the season than in the foothills. Typically the foothills have sufficient snow for snowmobile use by late November to early December, depending on the timing of earlier snows that year. The

snow pack remains later into the springtime on the higher elevation northerly/easterly aspect basins, for example the basins along the east flank of the Whitefish Range.

Streamflow begins to increase in April as the snow pack melts with warming spring temperatures. The stream flows typically peak in late May or June as the snow pack melts. Not all snowmelt or rainfall in the study area becomes surface runoff, at least not immediately. Some may infiltrate the ground to become groundwater that percolates downward in the soil and bedrock and resurfaces in wet areas, small ponds, and perennial streams at various elevations below the point of infiltration. Slow release of groundwater provides the stream base flow starting in mid July to mid September. The Flathead National Forest watersheds provide approximately 7,000,000 acre-feet of water per year to the Columbia River.

Flood flows rarely overtop the channel banks of the majority of stream channels in the Flathead River Basin. High flows that erode the upper banks of the channel typically occur every three to five years. The highest flood flow event on record within the Flathead River Basin occurred in June 1964. That event caused flooding and erosion on the floodplains and low elevation stream terraces of the North Fork, Middle Fork, South Fork, and main stem of the Flathead River.

Geology/Landform/Stream Type Characterization

Landform and vegetation are the dominant physical features that affect watershed processes in most watersheds. Landforms regulate how and where water flows across the landscape. Vegetation influences the erosion processes that occur within the landscape.

The dominant landforms in these river basins include structural breaklands, stream breaklands and steep alpine glaciated lands on slopes in excess of 60 percent. Glaciated lands, mountain slopes and ridges and valley bottoms are on the gentle to moderately sloping portions of the watershed. Landforms along with other landscape characteristics were used to delineate landtypes and the soils within them.

The typical stream types found in this area are described in Applied River Morphology (Rosgen 1996). These include: A Streams = Gradients from 4% to 10%; characterized by straight (non-sinuous), cascading reaches, with frequently spaced pools. B Streams = moderately steep streams with gradients from 2% to 4%; usually occupy narrow valleys with gently sloping sides. C Streams = low gradient systems (<2%), with moderate to high sinuosity and low to moderate confinement.

Table 3-19 describes the predominant landform groups found across the Flathead National Forest and the dominant stream types associated with them.

Table 3-19: Landforms and Associated Stream Types of the Flathead National Forest

Landform Class	Most Common Stream Type*
Valley Bottoms	C
Structural Breaklands	A
Steep Alpine Glaciated Lands	B
Gently to Moderately Sloping Glaciated Lands	A or B
Mountain Slopes and Ridges	A

The Soil Survey of Flathead National Forest Area, Montana (1998) was used to describe effects to the soil resource. This document describes the soils and their characteristics within the Flathead National Forest. As described in the soil survey document, most soils in the area have a surface layer of silt loam volcanic ash material originating from volcano eruptions on the west coast of the United States. These eruptions occurred from 6600 years to as recently as 23 years ago. The volcanic ash material is consistent in its characteristics and its location throughout the snowmobile area. It has silt loam textures, high organic matter content ranging from two to more than five percent, and has high ability to hold and store nutrients (cation exchange capacity). These chemical and physical characteristics are displayed in the Summary of the Soil, Chemical and Physical Analysis Data (1982). The characteristics of the volcanic ash surface soils were used in the effects analysis for soils.

Land Use Activities

The watersheds of the Flathead National Forest have had a variety of historical and ongoing land management activities since the establishment of the national forest. The major human activities that have occurred over time and space on the Flathead National Forest include the following: wildfire suppression, forest stand thinning, timber harvest, tree planting, road and trail construction/maintenance, grazing, as well as various motorized and non-motorized recreational activities.

The majority of land and water-affecting management activities occurred following World War II. The construction of roads (approximately 3950 miles) and logging skid trail networks associated with timber harvest on the national forest system lands have impacted water quality primarily through increases in sediment yield in the watershed where these activities occurred. The post-WWII timber harvest has ranged from approximately 8000 acres in the 1940s to approximately 47,000 acres in the 1980s. Timber harvest has indirectly increased sediment yields due to increased water yield following timber harvest in these same watersheds. Very localized impacts to water quality are associated with livestock grazing and heavy recreation uses.

In the past two decades implementation of water quality and soil protection Best Management Practices (BMP's), as well as other watershed restoration activities (e.g. road decommissioning) have reduced anthropogenic sediment increases to the streams on the Flathead National Forest.

The Montana Department of Environmental Quality's 1996 and 2000 - 303(d) Reports - *Water bodies in need of Total Maximum Daily Load (TMDL) Development* lists several water bodies that are in part or are totally on the Flathead National Forest. These include: Elk Creek, Goat Creek, Jim Creek, Piper Creek, Swan Lake, Big Creek, Coal Creek, South Fork of Coal Creek, Red Meadow Creek, Whale Creek, Swift Creek, East Fork of Swift Creek, Fish Creek, Granite Creek, Morrison Creek, Sinclair Creek, and the South Fork of the Flathead River below Hungry Horse Dam. The majority of these water bodies are listed as partially supporting the beneficial uses of aquatic life support and cold-water fishery. The dominant probable causes of this impairment on both 303(d) lists is linked to siltation, with the common probable source listed as silviculture practices. The exception to this general rule is the South Fork of the Flathead River, which is listed due to hydro-modification caused by the flow alterations effects of hydropower dams.

Many of these water bodies are in the process of having a TMDL developed for them at this time. (Project Record N-1)

3. Environmental Consequences

Water and Soil Concerns

Several interested members of the public along with Flathead N.F. personnel have posed questions regarding whether or not any environmental effects to the soil and water resource may be attributable to snowmobile use: 1) Snowmobile exhaust contains various chemical compounds; could these chemicals potentially affect soil or water nutrient and/or hazardous chemical levels? 2) If heavy snowmobile use retards the rate of tree seedling and shrub regeneration growth, is there an affect to water yield over time? 3) Can snowmobile use on bare ground potentially increase soil erosion potential? These questions are discussed in the following four sections.

The primary characteristicts of the water resource that are typically analyzed to describe the effects of a proposed action are changes to water quantity (water yield increase or decrease), and water quality (a sediment, nutrient, or chemical pollutant increase). Significant changes to any of the characteristics can potentially affect the beneficial uses of water resource.

The primary soil characteristics analyzed to describe the effects of proposed action on soils are changes in soil erosion rates and soil productivity.

Water Quantity - Water Yield

McCaughey and Farnes (2001) monitored snow water equivalent for seven years in a natural dense canopy lodgepole stand and in an open meadow on the Lewis and Clark National Forest. They reported that there was 23 percent more snow water equivalent in the open meadows. The melt rate under the canopy was 47 percent of that in the open meadow setting; and the meadow site final melt-out was approximately ten days earlier than the dense forest canopy site. The relationship between removal of vegetation (timber harvest) and increases in water yield are well established (USDA 1976). The reduction in tree density i.e. canopy cover, results in a reduction in the amount of transpiration of groundwater and also the amount of canopy interception of rainfall/snowfall which increases the amount of the precipitation available for runoff as stream flow, or water yield increase above natural watershed. The amount of water yield declines as the tree canopy recovers with regrowth. The amount of water yield increase due to snowmobile use, even in the highest use areas would be immeasurable using the current models applied in this area to predict water yield increase due to vegetation canopy removal.

Casual observation reveals that snowmobiles can damage small trees (saplings), somewhat retarding their growth rates. The forest vegetation habitat types that primarily occur in snowmobile use areas would normally be expected to have full vegetative-hydrologic recovery in approximately 90 years after a clearcut or stand replacement fire (USDA, Northern Region 1976) (Galbraith 1973). In the heaviest snowmobile use areas, that recovery period may be increased slightly due to foliage damage of the sapling size trees. This interpretation is based upon the hydrologist's field observations of foliage damage to sapling trees in high use

snowmobile areas. Because the vegetation-hydrologic recovery time is slightly extended where heavy snowmobile use occurs, there is a potential for slightly more water yield increase over time on a site where forest vegetation removal has occurred (e.g. timber harvest, wildfire). However, this effect is immeasurable within the natural variation of stream flows for the average size perennial watershed on the Flathead National Forest. This is due to the small amount of area in a watershed where snowmobiles could typically affect the regeneration rate of vegetation.

The compaction of snow on groomed snowmobile trails would have no measurable effect on the water yield coming from that watershed. Typically a groomed snowmobile trail will melt a little slower than the surrounding snow pack; this would slightly reduce (immeasurably) the amount of peak flow runoff during the height of the snowmelt.

Water Quality and Soil Quality – Nutrient Levels and Sediment Levels

Water Quality is characterized by the amount of additional chemical and physical constituents that occur in a water sample in addition to the pure water. In the Flathead Lake Basin the two primary nutrients of concern are nitrogen and phosphorus. These two nutrients are primarily found in the soil where they can be used by plants. Some portion of the nitrogen and phosphorus occur in groundwater and stream flow, which ultimately end up in Flathead Lake, which was a state priority for the establishment of a total maximum daily load (TMDL). The best available information on the level of nutrients in the waters at a river basin scale is published in the Joint Water Quality and Quantity Committee Report – Flathead River International Joint Commission Study (1987). That report documents the majority of the nutrient studies done on the North Fork of the Flathead River. Herein are some quotations from that report that describe the nutrient relationships in the Flathead River: "waters of the Flathead River system contain very low amounts of the major nutrients, nitrogen and phosphorous. Autotrophic production in most lotic and lentic waters in the basin appear to be phosphorous limited, although nitrogen may not be present in sufficient quantity or in the required forms to support much productivity during late summer in some waters." Or in other words, the production of algae in lakes and streams is generally limited by phosphorous and not nitrogen.

The relationship between suspended sediment and nitrogen and phosphorous levels was addressed. "Clearly, particulate forms of nitrogen and phosphorus are an order of magnitude higher when streams are in spate and carrying a large mass of suspended sediment. Stanford reported a significant, positive correlation between suspended sediments solids and TP (total phosphorus) and TKN (total Kjeldahl nitrogen) at the Holt site on the Flathead River immediately upstream of the confluence with Flathead Lake. "The soluble forms of phosphorus are also generally more concentrated during periods of high flow. Presumably, soluble phosphorus compounds (i.e., SP (soluble phosphorus) and SRP (soluble reactive phosphorus)) are leached or desorbed from particles suspended in the water column or flushed from groundwater." (Joint Water Quality and Quantity Committee Report – Flathead River International Joint Commission Study, 1987).

The relationship between total phosphorous and biologically available phosphorous was described. "Bio-availability was estimated by a kinetic approach, using radioactive tracers, and by algal assays (Ellis and Stanford 1986a,b,c, 1987). Both methods demonstrated that only

about ten percent of the sediment phosphorus (i.e., 10 percent of particulate P measured as total phosphorus minus soluble phosphorous) was bio-available (BAP - bio-available phosphorous). Thus, the rivers in the Flathead Basin carry a substantial load of biologically inert phosphorus during spring run-off." Joint Water Quality and Quantity Committee Report – Flathead River International Joint Commission Study, 1987).

Table 3-20 reports the phosphorus and nitrogen summary data for the North Fork of the Flathead River at the Canadian Border, and the Flathead River near Columbia Falls, derived from the International Commission Report, 1987. Note that the Flathead River at Columbia Falls is slightly downstream of the confluence of the North, Middle, and South Forks of the Flathead River. The lower station is reported in Table 3-20 to give some perspective of the cumulative addition of nutrients from the headwaters area of a basin to the pour point. In the North Fork data there is an increase in the nitrogen concentration as the one goes downstream. That increase in phosphorus concentration does not occur in the North Fork data.

Table 3-20. Phosphorous and nitrogen water quality monitoring data from the North Fork of the Flathead River at the Canadian Border, and the Flathead River near Columbia Falls.

River Monitoring Site /Nutrient Parameter (milligrams/liter)	Mean	Number of Samples	Minimum	Maximum
North Fork of Flathead River at the Canadian Border				
Total Phosphorus	29.74	106	2.33	236.67
Soluble Reactive Phosphorus	1.75	47	1.00	7.90
Total Nitrogen	62.01	35	18.00	114.08
Ionic Reactive Nitrogen (nitrate, nitrite, ammonium)	20.55	38	4.00	76.94
Flathead River near Columbia Falls				
Total Phosphorous	17.31	28	2.00	151.00
Soluble Reactive Phosphorus	1.48	29	1.00	7.60
Total Nitrogen	166.70	9-29	58.20	589.00
Ionic Reactive Nitrogen (nitrite, nitrate, ammonium)	35.53	27-29	15.20	95.00

Snowmobile use in the watersheds of the Flathead National Forest could potentially have an effect on the nutrient levels in the streams from two differente scenarios. First, when gasoline is burned there are some amounts of ammonia, nitrogen, and sulfur compounds produced. Ammonia is a gas that can be deposited by precipitation to the snow/soil surface. There were 4 to 24.5 microequivalents per liter of ammonia detected in the snow on the snowmobile road by Ingersoll (1998) in Yellowstone National Park. During snowmelt the ammonia in the snow would enter the soil profile. The ash topsoil present on virtually all of the soils on the Flathead National Forest has a high cation exchange capacity (Summary of the Soil, Chemical and Physical Analysis Data, Flathead National Forest. 1982). Buckman (1969, p. 96) describes cation exchange capacity as the ability of a soil to adsorb nutrients. In other words, how effectively the soil captures and holds nutrients. Harvey and others (p. 10, 1994) state that organic matter in and on the forest floor has substantial cation exchange capacity and supports most of the N-fixing activities in the soil. Nutrients held by cation exchange are slowly made available to plants rather than being leached into ground water.

Ammonia and nitrogen ions are among the nutrients readily absorbed by soils with high cation exchange capacity. Bacteria or fungi convert these ammonia/nitrogen compounds into nitrite and nitrate ions, during the nitrification process. At the same time sulfur compounds are converted into sulfate ions. Because of the generally low amounts of nitrogen and sulfur present in the forest soils of this area and the significant plant biomass competing for these available nutrients, typically there are only very small amounts of nitrogen leached beyond the root zone in these soils. The exception to this rule is when a wildfire occurs killing the vegetation for a short period of time. Typically the first year or two after a stand replacement fire there are increased amounts of nitrogen leached beyond the root zone. In conclusion the small amounts of ammonia and nitrogen compounds produced by snowmobiles would be rapidly absorbed by the topsoil/vegetation, thereby causing no measurable effect to the nutrient content of the water.

The amount of phosphorus yield in the streams is primarily related to amount of sediment produced from sources in either upland settings or the stream channels of each watershed. Snowmobiles have been anecdotally reported as causing areas of disturbed vegetation/bare ground when used during times of shallow snow pack. These areas of bare ground could possibly erode; if they were close enough to a stream channel, the eroded soil materials could become suspended sediments, with attached phosphate ions. Most of the named creeks on the Flathead National Forest naturally produce many tens to hundreds of tons of sediment per day during the spring snowmelt periods that produce the peak flow events in these streams. For example the measured spring-flow suspended sediment amounts in Big Creek for the years 1986 to 1993 varied between 10 and 1,285 tons per day (Project Record N-2). Potential areas of disturbed vegetation/soil caused by snowmobile use would likely be of no more than few hundred square feet. Using the WEPP soil erosion model an area of totally bare ground 10 feet wide 250 feet long (worst case scenario), on a typical mountain slope (35%) could produce 15.2 pounds of sediment per year if it were 100 feet away from a stream channel. If the bare area was 50 feet away from the stream, 189.8 pounds of sediment per year could potentially be produced (Project Record N-2). Assuming that 20 of these areas were created, they could produce sediment amounts ranging from 314 pounds to 3,730 pounds (.16 to 1.9 tons). Therefore the amount of potential sediment, produced in a worst case situation, from snowmobile-caused erosion is very small in comparison to the natural sediment load transported each spring in the area streams. Unless a very large area of bare ground close to a stream channel were to be developed from snowmobile use (which has not occurred to date), the sediment produced from typical snowmobile use patterns could not be measured, when compared to the variation in the natural levels of suspended sediment in the local streams. Traveling over bare ground can damage snowmobiles, which represents a substantial investment; very few persons are likely to blatantly damage their snowmobile.

Water Quality – Chemical Pollution Levels

There were 13 identified snow parks (snowmobile parking lots/trailhead areas) on the Flathead National Forest that are located within 200 to 300 feet to some type of water body, stream, lake, or reservoir (Project Record N-4). These sites have the most potential for some type of gasoline or oil spillage to occur, and the spillage to be transported to a water body. The soils in these stream terrace type settings are usually composed of sands and gravels. Therefore, if a significant volume of gasoline were to be spilled at this type of site, these soils have less

potential for the hydrocarbons to be bound-up within the soil matrix. Rather, with this type of porous soils there is some potential for hydrocarbons to enter the groundwater and be transported to a surface water body. This is a remote possibility for two reasons: 1) The Flathead N.F. recreation personnel observations are that very few people put gasoline or oil in their snowmobiles at the snow parks; rather they do that prior to transporting the snowmobiles to the snow parks; and 2), The volume of gasoline spilled at a site that would not be absorbed by the snow and soil matrix, and then to move through the soil profile and down gradient 100 plus feet in the groundwater to a surface water body would require a significant amount of gasoline. However, because there is a remote chance of this type of event, all action alternatives includes a requirement to place signs at the snow parks instructing the public to: 1) fuel the snowmobiles at lease 300 feet away from any water body, and 2) to report any fuel spillage to the local Ranger Station so that a gasoline spill can be managed per the Montana Department of Environmental Quality spill reporting policy (Project Record N-3). Note under the DEQ spill policy up to 25 gallons of gasoline spill is "not required to be reported provided the spilled material does not enter or threaten to enter state water." However, a spill of any size must be contained if it threatens to pollute state waters.

Ingersoll (1998) studied the levels of various inorganic and organic compounds in the snow pack and snowmelt runoff to assess any increased levels due to snowmobile emissions in Yellowstone National Park. He found that there were increased levels of ammonium, nitrate, sulfate, benzene, and toluene associated with snowmobile use areas (snowmobile trails). He reported that emission deposition rapidly diminished with distance from the snowmobile trails. Sample sites 50 meters away from the snowmobile trails were compared to sites 1000 meters away and other measured background levels. Ingersoll states "contamination from snowmobiles is less likely than 50 meters from highway corridors".

There are several organic compounds that are by-products of a gasoline internal combustion engine that have been detected in snowmobile emissions. These include but are not limited to benzene, toluene, and xylene, all VOC's (volatile organic carbons). The VOC's all tend to volatilize into the atmosphere when snowmelt occurs, with the exception of toluene. Toluene persisted in the sampled snowmelt runoff waters in Yellowstone Park ranging from <25 to 252 nanograms/liter (parts per billion) Ingersoll (1998). Toluene in drinking water can be a concern because toluene is classified as a toxic chemical in drinking water. The Montana Department of Environmental Quality (2001) have set a maximum contaminate level for drinking water of less than 1,000 micrograms per liter (parts per million) of toluene. The concentration of 252 nanograms/liter (ppb) of toluene occurring in snow melt water as measured in Yellowstone National Park is approximately 4000 times less than the EPA drinking water standard of 1000 micrograms/liter (ppm).

Tyler (2000) reported in a study in Yellowstone National Park that n-alkanes, n-organic acids, and polycyclic aromatic hydrocarbons (PAH's), occurred in the snow pack next to snowmobile roads. These chemicals were primarily attributable to snowmobile emissions. The samples were taken near the West Entrance of Yellowstone Park. This study reported that at 17 meters from the road the n-alkanes reduced by 89 percent, the n-organic acids by 90 percent, and the PAH's by 80 percent. The Tyler (2000) report states, "Because of the concentration of organic pollutants dropped rapidly a few meters of the road, the impact on the overall watershed is likely to be minimal but local impact may still be significant."

There is information on four PAH's in the aquatic environment: anthracene, naphthalene, benz (a) anthracene, and benzo (a) pyrene. Naphthalene is a common PAH (used in moth balls) that can be toxic to aquatic invertebrates and fish at high concentrations. Naphthalene is a phytotoxic chemical; the toxicity is photo-enhanced in the presence of ultraviolet and other wavelengths of light. (Irwin *et al*. 1997) The PAH's naphthalene, fluorene, and phenanthrene were detected in the snow samples at the West Entrance by Tyler (2000). Fluorene and phenanthrene were detected at levels less than 0.1 nanograms/liter (parts per billion) on the road, and was undetectable off the road surface. Naphthalene was measured at 25.8 parts per billion on the road and 20 percent of that at 17 meters from the road. Naphthalene in drinking water is a concern because naphthalene is classified as a carcinogenic chemical. The Montana Department of Environmental Quality (2001) has set a maximum contaminate level for naphthalene in drinking water of less than 100 micrograms per liter (parts per million). The concentration of 25.8 parts per billion of naphthalene occurring in the road associated snow is approximately 3900 times less than the EPA drinking water standard of 100 parts per million. That concentration drops off rapidly away from the snowmobile trail.

The Canyon Creek watershed in the North Fork of the Flathead River has had season long snowmobile use monitoring done for several years. There are an average of 8,000 snowmobile trips *per season* into this watershed, which receives some of the heaviest snowmobile use on the Flathead National Forest. This compares to the peak traffic level of over 1,000 snowmobiles *per day* at the busiest entrance of Yellowstone National Park. Based on the low levels of these compounds found in the Yellowstone study with high levels of snowmobile use and the current and foreseeable snowmobile use levels on the Flathead, there should not be any effect to water quality from toluene or naphthalene specifically, or any other chemicals due to snowmobile emissions.

Soil Quality

Soil disturbance due to snowmobile use would not result in measurable detrimental soil disturbance. In a modeled worst-case situation on slopes of 35 percent, an area that is 10 feet wide and 250 feet long could lose 176 pounds of soil or .095 pound per square foot. Ash soils have a bulk density of about .75 g/cc, which equates to about .025 inch of soil lost over the disturbed area. On slopes of 20 percent or less there would be no soil erosion from the disturbed snowmobile areas. Soil loss was determined by WEPP runs (Project Record N-2). Therefore, this worst-case scenario for erosion rates immeasurable and would not cause detrimental soil disturbances.

Another concern was brought up about the acidification of soil in high mountain basins as a result of snowmobile emissions. The commentor mentioned the potential for this problem on soils with low buffering capacity. Soils in high mountain basins on the Whitefish divide have been sampled for their cation exchange capacity. Buckman (1969 pg. 392) states that a soil's buffering capacity increases with increasing cation exchange capacity. The Summary of the Soil, Chemical and Physical Analysis Data, Flathead National Forest (1982) shows that the ash surface of high mountain basin soils have cation exchange capacity ranging from 23 to 33. These high exchange capacities enable the soils to hold cations and buffer the soil from changes in pH.

Direct and Indirect Effects Common to all Alternatives

Alternative 1 – No Action

Water Yield Effects

The existing Forest Plan direction (Alternative 1) for snowmobile use would not have any measurable effect to the water quantity of the streams and rivers flowing on the Flathead National Forest. Nor would there be stream channel erosion resulting from a water yield increase in any of the streams and rivers flowing on the Flathead National Forest caused by the existing Forest Plan direction for snowmobile use.

Nutrient Yield Effects

The existing Forest Plan direction (Alternative 1) for snowmobile use would have no measurable effect to the nutrient levels of soils or the water flowing in the streams and rivers on the Flathead National Forest.

Sediment Yield Effects

Some areas of disturbed vegetation/soil caused by snowmobile use have been anecdotally reported. The amounts of soil erosion/sedimentation resulting from these acts would be very small and would not have any measurable effect to the sediment yield (suspended/bedload) levels for the streams and rivers on the Flathead National Forest. Nor would there be measurable effects on the soil productivity caused by soil erosion.

Chemical Pollution Effects

Under the existing Forest Plan direction there are very small inputs of chemicals from the emissions of snowmobiles into the snowpack. These levels of emissions do not impair the water quality based upon the Montana Department of Environmental Quality water quailty standards. Therefore there is not a significant effect from the snowmobile use under the current Forest Plan direction.

Soil Quality Effects

There would be no effects to the nutrient status of soils (productivity) caused by addition of chemicals from snowmobile exhaust. There would be no change in soil erosion caused by soil disturbance caused by snowmobile operation.

Alternatives – 2, 3, 4, 5 and 6 (Action Alternatives)

Water Yield Effects

There are no effects, the same as described for Alternative 1.

Nutrient Yield Effects

There are no effects, the same as described for Alternative 1.

Sediment Yield Effects

The action alternatives (Alternatives 2 through 6) proposed direction for snowmobile use would not have any measurable effect to the sediment yield (suspended/bedload) levels for the streams and rivers on the Flathead National Forest. However, as compared to Alternative 1 there would be less risk of snowmobilers to create any sediment sources because the snowmobile use is restricted to the roads, snowmobile trails and play areas in many portions of the Flathead National Forest.

Chemical Pollution Effects

There are no significant effects, as described for Alternative 1. Under all the action alternatives (Alternatives 2 through 6) there would be less potential for hydrocarbon pollution due to gasoline spillage in snow parks that are near riparian areas than with Alternative 1. This is due to the signing requirement common to all action alternatives.

Soil Quality Effects

There would be no measurable effects to the nutrient status of soils (productivity) caused by addition of chemicals from snowmobile exhaust under the action alternative (Alternatives 2-6). On slopes of 20 to 35 percent there would be a decrease in potential soil erosion resulting from soil disturbance caused by snowmobile operation on bare ground, which is infrequently observed. The effect of the soil erosion would be immeasurable in terms of soil productivity in the areas where soil disturbance occurred and would not be considered a detrimental soil impact. Soil erosion would not occur on slopes of 20 percent or less.

Table 3-21 is a summary of the results of the effects indicators for each Alternative.

Table 3-21. Summary of the Issue Indicators and Effect Indicators for Alternative 1 thru 6

Effect Indicators	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Potential Water Yield Increase	No Measurable Effect	No Measurable Effect	No Measurable Effect	No Measurable Effect	No Measurable Effect	No Measurable Effect
Potential Water Nutrient Yield Increase	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Potential Sediment Yield Increase	No Measurable Effect – Highest Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk

Effect Indicators	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Potential Chemical Pollution Increase	No Measurable Effect – Highest Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Least Risk	No Measurable Effect – Least Risk	No Measurable Effect – Least Risk
Potential change in Soil Nutrient Status from Emissions	No Measurable Effect	No measurable Effect.	No measurable Effect.	No measurable Effect.	No measurable Effect.	No measurable Effect.
Potential change in Soil Erosion/Soil Productivity	No Measurable Effect	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk	No Measurable Effect – Decreased Risk

Cumulative Effects, Water

The project cumulative effects area for considerations of water quantity and water quality effects are all the watersheds on the Flathead National Forest, and the streams and rivers that flow from them.

The Code of Federal Regulations defines a cumulative impact as follows: "Cumulative Impact … the impact on the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7).

As described earlier in the direct effects analysis and description of direct effects by each alternative, there are no measurable effects to water quantity, and therefore the stream channels. Also, there is no measurable effect to the nutrient yield, sediment yield, or chemical pollution yield in the stream and rivers on the Flathead National Forest from any of the proposed alternatives. There is also no effect to the soil productivity from any of the proposed alternatives. Because of the situation of no direct effects, there can be no cumulative effects from any of the proposed alternatives.

Cumulative Effects, Soil

As described earlier, there are no direct effects from snowmobile exhaust on the nutrient state of the well-buffered soils where snowmobiles operate. Small amounts of soil erosion are theoretically possible where bare soil is exposed on slopes of 20 to 35 percent. These effects would not be considered detrimental soil disturbances. The cumulative effects across the entire Flathead National Forest would be immeasurable when compared to natural background erosion rates.

4. Regulatory Framework (Water and Soils)

Clean Water Act

Section 313 of the Clean Water Act requires that Federal agencies comply with all substantive and procedural requirements related to water quality. Under Section 303 of the Clean Water Act, States have the primary responsibility to develop and implement water quality programs, which include developing water quality standards and Best Management Practices (BMPs). State water quality standards are based on the water quality necessary to protect beneficial uses.

Environmental Protection Agency policy requires each state to implement a Non-degradation Policy. Under this policy, water quality must be maintained to fully support existing beneficial uses. Existing water quality that is higher than the established standards must be maintained at the existing level unless the board of health and environmental sciences determines that a change in water quality is justifiable due to social and/or economic reasons (CFR Vol. 48, No. 217, 131.12, Nov, 8, 1983; Montana Water Quality Act, Section 75-5.)

Montana State Water Quality Law

As listed in ARM 17.30.608 (1) the State of Montana has classified the waters in Swan River (except for Swan Lake), Stillwater River (above Logan Creek), North Fork, South Fork and the Middle Fork of the Flathead River as B-1 water-use classification. Waters classified as B-1 are to be maintained suitable for drinking, culinary, and food processing purposes after conventional treatment. Water quality must also be suitable for bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply. Additional criteria specific to sediment are found within Section 17.30.623(2)(f) of Montana Water Quality Standards where it is stated that "(N)o increases are allowed above naturally occurring concentrations of sediment, settleable solids, oils, or floating solids, which would or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife". Naturally occurring is as defined by MCA 17.30.602 (17), includes conditions or materials present during runoff from developed land where all reasonable land, soil, and water conservation practices (BMPs) have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses.

The exceptions of the B-1 classification for waters within the Flathead National Forest boundary are Essex Creek to the Essex water supply, which is an A-closed water-use classification. Also, Haskill Creek drainage to the Whitefish water supply, Whitefish Lake and its tributaries are an A-1 water-use classification. The A-closed classification requires that waters be maintained suitable for drinking, culinary, and food processing purposes after simple disinfection. (ARM 17.30.621) The A-1 water-use classification requires that waters be maintained suitable drinking, culinary, and food processing after conventional treatment for the removal of naturally present impurities. (ARM 17.30.622)

The state water quality law relates to the Clean Water Act and the maintenance of beneficial water uses through the use of BMPs. The BMPs are designed to prevent soil erosion and protect water quality, as well as help prevent soil damage. In a memorandum of Understanding with the State of Montana, the Forest Service has agreed to implement the Best Management Practices for Forestry in Montana – 1997. Also any applicable Forest Service - Soil and Water Conservation Practices (FSH 2509.22) would be combined with Montana State BMPs for incorporation into the implementation of the chosen alternative to ensure that soil and water resources are protected. Most of the Montana forestry BMP's are not directly applicable to the Amendment 24 proposed alternatives. However, the philosophy of Montana - BMP VII A. (dealing with hazardous substances) and Soil and Water Conservation Practice 12.11 (protection of water quality within developed and dispersed recreation areas), were used to develop the mitigation requirement common to all alternatives of restriction signing to limit the areas in the snow parks where snowmobile fueling can occur (no fueling near riparian zones).

Wetlands

Wetlands are protected under Executive Order 11990. This act directs federal agencies to "minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands...". There are no activities proposed in any of the alternatives of the Winter Recreation Amendment that directly affect any lotic (riparian wetland) or lentic (still water) wetlands on the Flathead National Forest. Therefore all alternatives would meet Executive Order 11990.

5. Regulatory Consistency

Consistency With Forest Plan Standards

Water - The Flathead Forest Plan directs under Forest-wide Management Direction that: 1) Develop watershed activity schedules for key watersheds. 2) Maintain an inventory of non-wilderness areas needing soil and water restoration. Complete restoration projects as funds permit. 3) Best Management Practices would be applied during Forest Plan implementation to ensure that Forest water quality goals are met. And under Management Area specific water and soils direction to: 1) Maintain long-term water quality to meet or exceed State water quality standards. To ensure meeting these standards, surface-disturbing activities would be monitored where this need is identified. 2) Refer to Forest-wide standards under Water and Soils for Best Management Practices, Landtype Guidelines, and standards applicable to projects or activities within this Management Area. 3) All project proposals would be analyzed and evaluated to determine the potential water quantity and quality impacts. Mitigation measures would be developed to minimize adverse impacts.

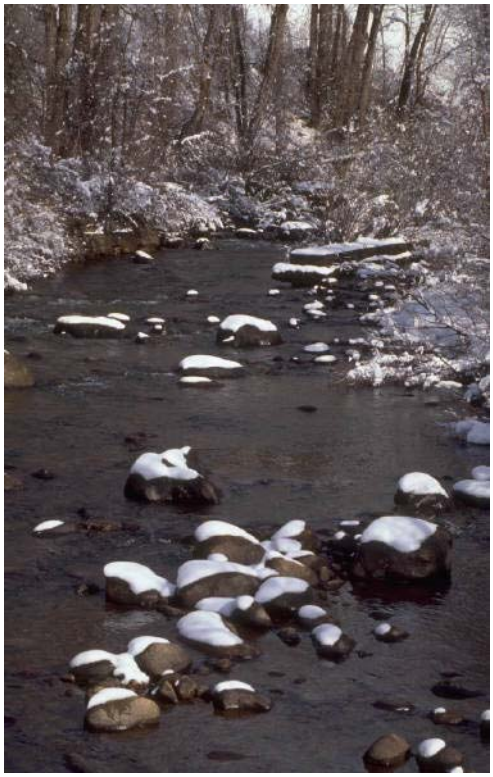
These water and soils standards were reviewed for Alternative 1 thru 5 and it was determined that all the alternatives meet these forest plan standards. All of the proposed alternatives would meet the intent and be consistent with the Clean Water Act, Montana State Water Quality Standards, Montana Streamside Management Zone (SMZ) Law, Wetlands Protection Executive Order, and Forest Plan Water and Soil Standards.

Soils - *Region 1 Soil Quality Standards* - All proposed activities are designed to meet the Region 1 Soil Quality Standards. These standards require that soil properties and site characteristics be managed in a manner consistent with the maintenance of long-term soil productivity, soil hydrologic function, and ecosystem health.

Forest Plan Management Direction – Forest-wide standards for soil resources in the Forest Plan, page II-46, are:

1) "Ensure that all resource management activities will maintain soil productivity and minimize erosion through implementation of:
    a) Management direction presented in the Landtype Guidelines (Appendix Q); and
    b) Erosion Prevention Standards (Engineering Handbook Supplement).
2) "Design or modify all management practices as necessary to protect land productivity".

The soil analysis indicates that all alternatives and all activities proposed by the alternatives would meet the Region 1 Soil Quality Standards through the implementation of management practices outlined in Chapter 2. All Forest Plan management direction would be met by the proposed alternatives.



VIII. Vegetation

1. Analysis Area

The area considered for effects to vegetation is the Flathead National Forest.

2. Affected Environment

Winter motorized recreation in northwestern Montana is generally understood to occur when the ground and vegetation are covered, and thereby protected, by snow. There are a few instances, however, when that is not the case. Where vegetation and snowmobiles meet are usually in areas where trees are in the seedling stage, and their tops may be exposed to runners and tread of snow machines. In years or areas of very deep snow, this can also apply to trees in the sapling stage. In the management scenario prior to the settlement agreement, snowmobiles had access to thousands of acres considered to be in regeneration for forest tree growth. Since that time, the Moose Fire occurred on the Glacier View District and set an additional 14,000 acres back to the stand regeneration phase. Several fires burned in the summer of 2003, creating temporary openings across the Forest.

Vegetation can also be affected when users of snowmobiles go to the forest either early in the season or very late in the season, when snow cover is inadequate to protect trees, shrubs, and herbs. Potential vegetative disturbance from snowmobiles depends greatly on the slope, that is, a snowmobile traveling across flat ground has much less disturbance than one trying to climb a hill. The Forest has received a report of riders crossing up to a half mile of vegetation to reach remaining snowfields in the spring, with associated disturbance to soil and vegetation. A Forest Service follow-up to this report failed to identify any extensive areas of disturbance to either vegetation or soil (Project Record M-2). It is unlikely that many individuals travel across bare ground with snowmobiles. Traveling over bare ground can damage snowmobiles, and because purchasing a modern snowmobile represents a substantial investment, it does not seem prudent to risk damaging the snow machine. An informal review of similar situations indicated that detrimental ground and vegetation disturbance related to snowmobiling in areas with inadequate snow cover are very rare. In fact, no known incidents were identified by Forest Service personnel on the Flathead National Forest (Project Record).

Boles of trees may be damaged by being directly hit with snowmachines, or continually abraded in narrow passageways. Trees with damaged boles are susceptible to invasion by fungi, and if the cambium is damaged completely around the circumference of the tree, the tree will die. The likelihood of girdling as a result of snowmobiling is extremely low.

Several species of noxious weeds prefer roadside habitat, such as spotted knapweed and orange hawkweed. Snowmobiles have the potential ability to pick up and redistribute seed from these species when the plants are not completely covered by snow.

3. Environmental Consequences

Seedling damage

Damage to seedlings from snowmobiling in plantations was investigated on the Forest in 1993 (Project Record M-1). While some damage to tops was discovered, the actual number of trees affected was inconsequential to tree productivity across the forest. The No Action alternative allows the greatest amount of snowmobiling to occur, so relatively speaking, it has the greatest potential to negatively impact tree seedlings. However, regularly conducted stocking surveys have not identified seedling damage from snowmobiles as a factor in retarding the rate of stocking in plantations and past harvest units. Any damage that may occur is inconsequential.

Bole damage

This particular damage is not possible to quantify at the forest scale. Again, because the No Action alternative allows the greatest amount of snowmobiling to occur, it has the greatest potential to damage the boles of young trees. Little riding occurs amongst trees; in fact most use occurs along roads or in open "play areas". Alternative 4 allows the least amount of acres for snowmobiling, and therefore has the least potential to damage tree boles. Again, any damage that may occur is having no discernable effect on seedling survival or stocking levels.

Herb and shrub damage

The potential for herb and shrub damage increases with length of season of use of snowmobiles. Under Alternatives 1, 2, and 5, within the Northern Continental Divide Ecosystem (NCDE), the season of use ends March 15. One exception is the special use permit for the backside of Big Mountain, which allows snowmobiling on routes and play areas until April 1, and then only on the groomed routes until April 15. There is very little risk of herb and shrub damage from snowmobiles with the snowmobile season ending on either early spring date. Alternative 4 would have a season ending date within the NCDE of April 1. There is little to no risk of shrub or herb damage when snowmobiling stops at this date, as snow coverage is still complete during an average season of snowfall.

Alternative 3 would allow over the snow activity through April 30, when snow coverage may begin to become patchy in some areas still usable for snowmobiling. The activity is generally self-limiting due to damage to snowmobiles when used in areas without snow coverage. The alternative with the highest potential for damage to herbs and shrubs would be Alternative 3, although the magnitude of effect forest-wide is still expected to be inconsequential.

Alternative 6 would allow spring snowmobiling at a variety of season ending dates in discrete areas. In the Lost Johnny area of Hungry Horse Ranger District, approximately 31,800 acres would be open until May 31. The Challenge area near Marias Pass would be open until May 15, across an area of about 17,500 acres. An area of 3137 acres would be open at Sixmile on the Swan Lake District until April 30. The remainder of the Forest within the NCDE would be closed to snowmobiling off of open forest roads on March 31. Lost Johnny and Challenge have the potential to have exposed vegetation during the later spring dates. Traditional use has been occurring in these locations without enough damage to the herb or shrub component to be

concerned about soil holding capabilities or the risk of fool's huckleberry (*Menziesia ferruginea*) brush becoming one of the Forest's "sensitive species".

Noxious weed spread

The risk of noxious weed spread by snowmobiles is directly proportional to the acres available for their use. The risk may also be increased as snowmobiles are used later in the season and snow coverage decreases. Alternative 1 affords the most acreage, and therefore would have the greatest potential for weed seed spread. However, Alternative 1 would also require the cessation of snowmobiling on March 15 within the NCDE, a time when snow coverage is still generally quite good during average climatic conditions on the Flathead. Areas outside the NCDE do not have limiting dates, but snowmobiling activity is self-limiting due to lower elevations and snow going off those sites early in spring. Alternative 2 would allow 357,630 less acres of snowmobiling, and would therefore seemingly reduce the risk of weed spread by corresponding acreage, however, not all of those acres are actually physically accessible by snowmobile. It also would require snowmobiling to stop on March 15 in the NCDE. Alternative 3 would allow slightly more area for snow machine use than Alternative 2, and would allow activity to continue until April 30. The potential for seed heads to be exposed above the snow cover increases as snow cover decreases. Alternative 4 would programmatically allow snowmobile use on 717,055 acres, and require snowmobiling to stop on March 31. Snow coverage is beginning to diminish along road corridors on lower elevations at this date, but coverage remains good at higher elevation play areas. Noxious weed spread risk would be fairly low with Alternative 4. Alternative 5 would allow snowmobiling on 989,086 acres, but require snowmobiling to stop on March 15, therefore having a low risk of noxious weed spread.

Approximately 49,000 acres would be at higher risk for noxious weed spread with Alternative 6, due to the later season ending dates at Lost Johnny and Challenge. These dates are similar to traditional use times, and snowmobiling has not been shown to cause a significant increase in weeds in these places.

4. Regulatory Framework and Consistency

The National Forest Management Act requires that regeneration harvest units be certified as stocked or capable of regeneration within five years of harvest. Snowmobiling will not prevent the Flathead National Forest from meeting this requirement.

Threatened and Endangered Plants

1. Introduction

Under provisions of the Endangered Species Act (ESA) 1973, federal agencies are directed to conserve endangered and threatened species, and to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of their critical habitats.

Water howellia (*Howellia aquatilis*), a vascular plant species in the family Campanulaceae was listed as threatened under the ESA by the U. S. Fish and Wildlife Service (USFWS) on June 14, 1994 (FR 59(134): 35860-35864). No critical habitat has been identified for the species. A draft recovery plan has been issued, but as of yet, no recovery plan has been finalized.

Spalding's catchfly (*Silene spaldingii*), a vascular plant species in the family Caryophyllaceae, was listed as threatened under the ESA by the U. S. Fish and Wildlife Service (USFWS) on November 9, 2001 (FR 66(196): 51598-51606). Although the USFWS intends to identify critical habitat for this species, critical habitat designation was precluded at the time of listing due to a lack of funding. No recovery plan has yet been drafted.

2. Affected Environment

Spalding's catchfly - This species is only known to occur in grassland plant communities that are typically dominated by rough fescue (*Festuca scabrella*), bluebunch wheatgrass (*Elymus spicatus,* or *Agropyron spicatum*), and/or Idaho fescue (*Festuca idahoensis*). There may be scattered ponderosa pine (*Pinus ponderosa*) trees. Although there are numerous mountain grasslands on the Flathead National Forest with these species, it appears that Spalding's catchfly prefers mesic sites within a matrix of drier grassland communities in the foothill and valley floor zones. Range-wide, none of the known occurrences for this species are above 5100 feet in elevation.

On the FNF, small isolated suitable habitats exist in along the North Fork of the Flathead River floodplain from the Canadian border to Polebridge; in very small isolated grasslands in the Swan Valley; and in larger open fescue bunchgrass prairies in the South Fork Flathead and Danaher Creek Drainages within the Bob Marshall Wilderness. There may be suitable grasslands in the Hog Heaven Range of the Swan Island Unit and on the south slopes near Ashley Lake as well.

A Biological Assessment was prepared to evaluate the effects of Winter Motorized Recreation Forest Plan Amendment to determine whether this project may jeopardize the continued existence of water howellia or Spalding's catchfly (Project Record M-3).

3. Environmental Consequences

Alternatives 1, 2, and 5

The season of use, in accordance with Amendment 19 to the Forest Plan, would allow snowmobiling in the Northern Continental Divide Ecosystem grizzly bear recovery area from November 15 through March 15. Special use permits for grooming until April 1 would still continue. The amendment would change goals, objectives and standards in the Forest Plan as shown in Appendix A to this document.

The proposal is a programmatic amendment to the Forest Plan that involves winter motorized activities such as snowmobiles, and similar tracked vehicles. The direction provided by this amendment relates solely to those activities that take place on the snow.

Because this project only relates to those activities that regulate winter activities on the snow, and there are no ground disturbing activities proposed, there would be no direct or indirect effects to water howellia or its habitat.

There would be no direct or indirect effects Spaulding's catchfly or its habitat because these alternatives will only regulate winter activities when complete snow cover exists.

Alternatives 3, 4 and 6

The season of use would allow snowmobiling in the Northern Continental Divide Ecosystem grizzly bear recovery area from December 1 through March 31 in Alternative 4 and from December 1 to April 30 in Alternative 3. Alternative 6 would allow snowmobiling in discrete areas as late as May 31. Allowing snowmobiling later in the spring will not affect these plants due to the fact that use occurs at higher elevations, where habitat is not known to exist for water howellia or Spalding's catchfly.

4. Determinations

Water howellia – Because the proposed action is a programmatic amendment to the Forest Plan and only relates to regulation of winter motorized activities on the snow, I determine that the implementation of this project will have **"no effect"** on water howellia, its habitat, or potential habitat for the species.

Spalding's catchfly – Because the proposed action is a programmatic amendment to the Forest Plan and only relates to regulation of winter motorized activities on the snow, I determine that the implementation of this project will have **"no effect"** on Spalding's catchfly, its habitat, or potential habitat for the species.

5. Regulatory Framework and Consistency

A Biological Assessment has been prepared based on present available information. If the final project design is changed so as to have effects on water howellia or Spalding's catchfly, or if new information becomes available that reveals impacts not considered in this biological assessment, a revised, or new biological assessment will be required.

A letter was received on December 4, 2001 from the U.S. Fish and Wildlife Service, identifying threatened, endangered, and proposed species that may occur on the Flathead National Forest. The letter states that the range of Spalding's catchfly includes the upper Flathead River System. The letter also identifies that areas below 5,000 feet are considered within the range of water howellia.

Because of the "no effect" determination on water howellia and Spalding's catchfly, formal consultation with the U.S. Fish and Wildlife Service is not required (50 CFR 402.14).

Sensitive Plants

1. Analysis Area and Information Sources

The area to be analyzed for sensitive plants is defined as Flathead National Forest land displayed in the Winter Recreation Amendment Map that accompanies this document. Within the Flathead National Forest, nearly 1.1 million acres are designated as part of the National Wilderness Preservation System, where motorized use is prohibited. Snowmobile use is prohibited on approximately an additional 350,000 acres, which is not included in the analysis.

The information used to perform this assessment includes the list of sensitive plant species with their current status recognized for the Flathead National Forest. This list is included as an Appendix to this document. The Flathead National Forest also has a database of occurrences of sensitive species that was reviewed as a part of this analysis. In addition, all plant surveys that have been conducted on the Forest are kept on file in the Supervisors office and were used as a source of information.

2. Affected Environment

The affected environment for the plants listed as sensitive is the area where snowmobiles or winter motorized vehicles will be allowed to recreate within the analysis area described above. In most cases this is roads, but includes open, unroaded areas as well.

3. Environmental Consequences

Due to the nature of this type of activity, a layer of snow is necessary. Winter motorized activity is inherently dependent on the layer of snow and ice that protects plant parts and seed. As discussed previously in the vegetation section, reports of snowmobile use across areas without a layer of snow are anecdotal and rare. Therefore, snowmobile activities are not expected to affect sensitive plants or their habitat.

Decisions to permit or prohibit snowmobiling will not change the population of any of the listed sensitive plant or the habitat upon which it is dependent.

4. Regulatory Consistency and Determination

While there are numerous occurrences of sensitive plant species within the analysis area and habitat for these species also exists, there will be **no impact** on these species or its habitat from the proposed action or alternatives. Due to the nature of winter motorized activity occurring on snow, no ground disturbance will occur or change in vegetative structure and composition.

Table 3-22. Status of sensitive plant species on the Flathead National Forest.[1]

SCIENTIFIC NAME[2]	COMMON NAME	GLOBAL STATUS*	STATE STATUS*
Amerorchis rotundifolia	round-leaved orchis	G5	S2S3
Astragalus lackschewitzii	leadville milkvetch	G2	S2
Bidens beckii	water marigold	G4	SU
Botrychium ascendens	upward-lobed moonwort	G3	S1
Botrychium crenulatum	wavy moonwort	G3	S2
Botrychium hesperium	western moonwort	G3	S2
Botrychium montanum	mountain moonwort	G3	S3
Botrychium paradoxum	peculiar moonwort	G3	S2
Brasenia schreberi	water-shield	G5	S2
Carex chordorrhiza	creeping sedge	G5	S2
Carex livida	pale sedge	G5	S3
Carex paupercula	poor sedge	G5	not tracked
Carex rostrata	beaked sedge	G5	S1
Cetraria subalpina		G3?	S2
Collema curtisporum		G3	S2
Corydalis sempervirens	pink corydalis	G4G5	S1
Cypripedium fasciculatum	clustered lady's-slipper	G4	S2
Cypripedium parviflorum	yellow lady's-slipper	G5	S3
Cypripedium passerinum	sparrow's egg lady's-slipper	G4G5	S2
Diphasiastrum sitchense	Sitka Club-moss	G5	S3
Drosera anglica	great sundew	G5	S2
Drosera linearis	linear-leaved sundew	G4	S1
Dryopteris cristata	buckler fern	G5	S2
Eleocharis rostellata	beaked spikerush	G5	S2
Epipactis gigantea	giant helleborene	G4	S2
Erigeron lackschewitzii	Front Mountain erigeron	G3	S3
Eriophorum gracile	slender cottongrass	G5	S2
Grimmia brittoniae		G1	S1
Grindelia howellii	Howell's gumweed	G3	S2S3
Heteranthera dubia	water star-grass	G5	S1
Idahoa scapigera	scalepod	G5	S1
Kalmia polifoila	pale laurel	G5	S1
Lathyrus bijugatus	pine woods peavine	G4	S1
Liparis loeselii	fen orchid	G5	S1
Lycopodiella inundata	northern bog clubmoss	G5	S1

1 Last updated September 2001

2 Nomenclature follows *Flora of North America,* 1993*,* otherwise *Flora of the Pacific Northwest*, 1973, Hitchcock and Cronquist.

SCIENTIFIC NAME[2]	COMMON NAME	GLOBAL STATUS*	STATE STATUS*
Lycopodium dendroideum	prickly-tree clubmoss	G5	S1
Meesia triquetra		G5	S2
Mimulus patulus subsp. montanus	spreading monkeyflower	G2Q	S1
Ophioglossum pusillum	adder's tongue	G5	S2
Oxytropis campestris var. columbiana	Columbia crazyweed	G5T3	S1
Oxytropis podocarpa	stalked-pod crazyweed	G4	S1
Petasites fragilis var. nivalis	sweet coltsfoot	G5T?	S1
Phegopteris connectilis	northern beechfern	G5	S2
Polygonum douglasii ssp austinae	Austin's knotweed	G5T4	S2S3
Potamogeton obtusifolius	blunt-leaved pondweed	G5	S2
Potentilla quinquefolia	snow cinquefoil	G5T4	S2
Salix barrattiana	Barratt's willow	G5	S1
Scheuchzeria palustris	pod grass	G5	S2
Scirpus cespitosus	tufted clubrush	G5	S2
Scirpus subterminalis	water bulrush	G4G5	S2
Scorpidium scorpoides		G4G5	S2
Utricularia intermedia	mountain bladderwort	G5	S1
Viola renifolia	kidney-leaf white violet	G5	not tracked

*Global and State Status Definitions

G1 S1	Critically imperiled because of extreme rarity (5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction.
G2 S2	Imperiled because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction.
G3 S3	Either very rare and local, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 to 100 occurrences.
G4 S4	Apparently secure, though it may be quite rare in parts of its range, especially at the periphery.
G5 S5	Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.
GU SU	Possibly in peril, but status uncertain; more information needed. This is the rank assigned all species on the list of plants of undetermined status and small number of plants being tracked under select circumstances.
GH SH	Historically known only from records before 1940; may be rediscovered.
GX SX	Believed to be extinct; known only from records at sites where systematic relocation efforts have been unsuccessful. Note: There are no Montana plant species assigned the GX or SX rank at present.

Other Codes:

Q	Taxonomic questions or problems involved, more information needed;
T	Rank for a subspecific taxon (subspecies or variety); appended to global rank for the full species.