Canada Lynx (Threatened)

Analysis Area and Information Sources

Previously established analysis units, in accordance with the Lynx Conservation and Assessment Strategy (Ruediger et al. 2000), were used to assess the effects of proposed actions on lynx/habitat. These lynx analysis units (LAU) approximate the size of an area used by an individual lynx and may encompass both habitat and non-habitat. Proposed Soldier Addition Project treatment units would occur within three LAUs (Map 3-3). These form the analysis area for direct/indirect effects. Because of their relatively large sizes, the combined area of these three LAUs form the cumulative effects analysis area. In addition, a multi-scale assessment was conducted to compare LAU-scale findings against findings at larger scales (Project Record).

Data used in the analysis were from existing resource information sources, research literature, aerial photos and field surveys of existing conditions of proposed units. The Forest’s GIS “forest structure” coverage, which is a LANDSAT vegetation layer recoded to structure classes, was used to help determine lynx habitat components (Project Record). This 1994 data source was updated based on known vegetation changes due to recent fire or timber harvest. ArcGIS and ArcView geographic information systems were used for quantification of various habitat characteristics; Google Earth was used for gaining insight into spatial relationships.

Affected Environment

Depending on ecological conditions, a landscape can either be “non-lynx habitat” or habitat for lynx. Non-lynx habitat includes features such as water bodies, large rock outcrops, and dry forest types. Some lynx habitats are not used for either foraging or denning due to their current condition. Examples include: forest land that has not fully regenerated 5-10 years after a stand replacing burn; recent clearcut, seed tree, or shelterwood timber harvest; older logged or burned stands (typically 25+ years) that no longer provide snowshoe hare foraging opportunities; and pole-sized forest stands with little to no coniferous understory. Generally, forest openings are avoided by lynx. Pole-sized forests may be used to travel/maneuver through the landscape to reach foraging and/or denning sites.

Examples of habitats that provide feeding/cover for lynx include land that 1) has regenerated with conifers, typically 7-10 years after a stand replacing fire (this varies widely depending on site conditions); and 2) timber harvest areas that have been regenerated with conifers, have not been thinned, and are densely stocked with trees. Mature forests that have sufficient woody concentrations on the forest floor can provide denning opportunities. Multi-storied conifer stands that have a relatively dense horizontal understory, as well as concentrations of down woody material, can provide both foraging and denning habitat.

Primary vegetation in the western Rocky Mountains and on the Flathead National Forest provides for snowshoe hare, a primary prey species. It includes lodgepole pine, subalpine fir, and Engelmann spruce forest types, generally between 4000-7000 feet. Secondary vegetation provides for red squirrels, an alternate prey when snowshoe hare populations are low. It includes cool, moist Douglas-fir, grand fir, western larch, and aspen forests (Ruediger et al 2000).
Map 3-3. Lynx Analysis Units for the Soldier Addition Project.
The proposed Soldier Addition Project occurs within three LAUs: Kah Soldier, Jungle Addition and Bunker Creek (Map 3-3). There are no private or State owned lands in any of these LAUs. Much of the existing condition of lynx habitat in the LAUs is a result of wildland fires that occurred in the late 1800s and early 1900s and now consists of 80 to nearly 100-year old pole or small sawtimber- sized forest stands; however, past timber harvesting has also substantially contributed to the existing conditions (see Vegetation section for thorough discussion of existing forest stand conditions).

The process used for modeling the different lynx habitat components can be found in the Project Record. The results of this effort are shown in Table 3-33, which uses categories for lynx habitat structure described in the US Fish and Wildlife Service Biological Opinion on the effects of the Northern Rocky Mountains Lynx Amendment (NRLA, also known as the NRLMD, 2007).

**Table 3-33. Estimated Snowshoe Hare Habitat Components and Proportions within the Kah Soldier, Stony Jungle and Bunker Creek LAUs.**

<table>
<thead>
<tr>
<th>Lynx Habitat Structure</th>
<th>Kah Soldier</th>
<th>Stony Jungle</th>
<th>Bunker Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand initiation structural stage that may provide snowshoe hare habitat during any season</td>
<td>3,618 18%</td>
<td>3,239 14%</td>
<td>1,911 6%</td>
</tr>
<tr>
<td>Stand initiation structural stage that likely does not yet provide snowshoe hare habitat.</td>
<td>1,609 8%</td>
<td>503 2%</td>
<td>2,463 8%</td>
</tr>
<tr>
<td>Forested multi-storied structural stage that may provide snowshoe hare habitat during any season.</td>
<td>1,901 10%</td>
<td>4,014 17%</td>
<td>50 &lt;1%</td>
</tr>
<tr>
<td>Other. Vegetative conditions that do not fit other categories (such as stem exclusion structural stage).</td>
<td>10,571 54%</td>
<td>13,815 58%</td>
<td>20,000 61%</td>
</tr>
<tr>
<td>Non-lynx habitat: includes water bodies, extensive rock outcrops, dry habitat types, etc.</td>
<td>1,918 10%</td>
<td>2,180 9%</td>
<td>8,296 25%</td>
</tr>
<tr>
<td><strong>TOTAL ACRES in LAU</strong></td>
<td><strong>19,617</strong></td>
<td><strong>23,751</strong></td>
<td><strong>32,720</strong></td>
</tr>
</tbody>
</table>

| % of lynx habitat on National Forest lands regenerated within a 10 year period as a result of Soldier Addition Project timber harvest (harvest acres/total acres lynx habitat). The standard is for 15% maximum. | **614/17,699** 3% | **241/21,571** 1% | **144/24,424** <1% |
| % of lynx habitat in a stand initiation structural stage that does not yet provide snowshoe hare habitat (acres stand initiation/total acres lynx habitat). The standard is for 30% maximum. | **2223/17,699** 13% | **744/21,571** 3% | **2607/24,424** 11% |

**Environmental Consequences**

**Introduction**

Direct and indirect effects of proposed activities on lynx/habitat were considered for each LAU; previously implemented and ongoing land management actions within the three LAUs were considered for potential cumulative effects.
Potential denning habitat is not considered a limiting factor for lynx and the Soldier Addition Project area and it is not within or near a linkage area, therefore, potential effects on lynx considered effects on snowshoe hare habitat, including:

- Tree harvesting and hauling activities) on approximately 762 – 870 acres, depending on alternative.
- Thinning/pruning of sapling stands on approximately 822 acres.
- Post tree-harvest activities: broadcast burning/pile and burn on approximately 800 – 1000 acres, depending on alternative; reforestation by hand on approximately 333 or 465 acres.
- Prescribed burning on approximately 1,784 acres.
- Temporary road construction and/or historic road reconstruction and implementation of “Best Management Practices” (BMP) on roads.

The effects indicator included the comparison of the various management activities of the Soldier Addition Project with the foraging needs of snowshoe hares/lynx (i.e. dense sapling stands and/or multi-storied stands) and overall habitat changes at the LAU scale of analysis.

The Soldier Addition Project was evaluated using the Northern Rockies Lynx Management Direction (NRLMD; USDA Forest Service 2007) standards and guidelines.

**Direct and Indirect Effects**

**Alternative 1 (No Action)**

Under this alternative there would be no vegetation management or associated activities within the three LAUs used for this analysis. Suitable lynx habitat components would undergo natural processes. Existing sapling stands that are functioning as hare habitat could a) grow into stem exclusion conditions, no longer providing forage for snowshoe hares unless there was a new disturbance event, or b) develop into older age stands where dying trees create openings that becomes suitable as lynx/hare foraging habitat. Other sites would continue to function as travel and/or potential denning habitat. All applicable NRLMD standards and guidelines would be met; therefore, there would be no direct or indirect effects to lynx under this alternative.

**Effects Common to All Action Alternatives**

Large areas of denning habitat would be available in portions of the project area which are not proposed for treatment. Within harvest units, denning habitat would be provided by meeting Forest Plan standards for coarse woody debris and snags. Proposed activities would not increase snow compaction and are not expected to alter lynx behavior patterns. Habitat connectivity would not be impaired.

**Sapling Thinning and Pruning Treatments**

Each of the action alternatives proposes to thin and/or prune the same number acres of dense stands of coniferous saplings and in the same locations. One group of units (I, N, O, P and R)
would have standard thinning applied (refer to Chapter 2 description of alternative activities). These units would not adversely affect lynx because they are not lynx habitat (O, R), are not hare habitat (I, P) or will be in the stem exclusion stage by the time thinning occurs (N).

The other units (A-E, G, H, L and M) currently function as snowshoe hare habitat and would have “daylight’ thinning applied, where the intent is to release individual western white pine (see Chapter 2 and Forest Vegetation section for thorough discussion). The net result would be that approximately 80% of each of these units would be retained as winter snowshoe hare habitat and so would qualify for an exemption under the NRLMD standards and guidelines. Therefore, the direct effect of implementing the proposed thinning on sapling stands that currently function as suitable hare habitat is that there would be 138 acres of hare habitat rendered unsuitable. Indirectly, the thinned portions of each of the thinning units would once again function as dense sapling foraging habitat in approximately 10-15 years. This may allow 20% of the area to continue to function as hare foraging habitat when the rest of the unthinned (i.e. 80%) sapling stands grow/phase out of providing hare habitat due to canopy closure/stem exclusion forest stand conditions.

Prescribed Burning Treatments

Each of the action alternatives proposes to burn the same seven sites. Two are on the southerly facing slopes in lower Bunker Creek; one is in the headwaters of Addition Creek; one is in upper Bruce Creek; two are in Stony Creek; one is in the Soldier Creek drainage. The units that have implications for lynx foraging habitat are #1, #4 and #5.

Burn Unit #1 contains approximately 39 acres on the north end that appear to be older aged, multi-story forest; the rest of the unit is classified in the “other” habitat category. Burn Unit #4 appears to have a small portion (~13 acres) on the eastern end in an older aged multi-storied conifer stand that could function as hare/lynx foraging habitat, but the majority is mapped as “other” lynx habitat; Burn Unit #5 is located in a high elevation older aged, multi-storied spruce-fir stand; it is possible that the entire stand could function as foraging habitat for hare.

Burning these units with a target of 80-90% mortality in all conifer species would render the portions of the units that appear to be multi-storied hare foraging as unsuitable foraging habitat. These unsuitable conditions would last longer than average because of the high elevation (~5,800-6,500 feet); a reasonable estimate would be about 15-20 years for the site to once again begin to provide foraging conditions. The non-multi story portions of the above units would also become unsuitable; however, because of their current conditions they would have relatively little effect on overall lynx habitat use. These burn units will be ground verified prior to implementation to verify presence/absence of old growth (which may function as multi-story hare foraging habitat also). If Units 1 and 5 prove to contain old growth, all or portions of them would be dropped or modified to avoid impacting old growth and to avoid reductions of snowshoe hare habitat within moist, multi-storied or late successional forests (refer to Chapter 2 Design Criteria and Forest Vegetation section).

For the other burn units, Burn Unit 2 is mapped half non-habitat and half in the “other” habitat category. Burn Unit 3 is on a southerly dry-facing slope in Bruce Creek and is in mapped non-
habitat. Burn Units 6 & 7 (Bunker Creek) are proposed as understory burns, are on dry south facing slopes, and are mapped as non-habitat. Therefore, implementing any of these burns would have no effect on hare or lynx foraging habitat.

**Stony Fuels Reduction**

Each of the action alternatives proposes to reduce vegetation/fuels within 200 feet of the Stony communications site. Most of the area in the radius around this site is mapped as non-habitat; however, there is a portion of this area that is in a multi-story potential lynx/snowshoe hare foraging habitat condition. This area amounts to approximately 1.3 acres and is bordered by non-habitat. The direct/indirect effect of this proposed fuels reduction would be that a relatively minor amount of lynx/snowshoe hare foraging habitat would be eliminated for the purpose of providing a 200-foot fuel free buffer around the Stony communications site. At the LAU scale, this is an insignificant effect and is not expected to have an adverse affect on lynx. In addition, this is an administrative site that would meet the criteria for an exemption under NRLMD direction.

**Direct and Indirect Effects**

**Tree Harvest**

*Alternatives 2, 3 & 4*

All proposed tree-harvest treatments would occur in areas either not mapped as hare habitat or in the “other” habitat component (Table 3-33). This “other” habitat category is one that “does not provide the vegetation structural characteristics to provide for an adequate density of snowshoe hares to attract lynx”. This category includes 50-120 year old forest stands that have progressed to a stem exclusion structural stage where there is not a high density of understory conifers and/or shrubs that provide food for snowshoe hares. Over half of each of the three LAUs in this analysis consists of lynx habitat in this condition (Table 3-33). Treating these stands will not have much of a direct effect on lynx foraging potential.

The indirect effect of harvest treatments is that dense stands of saplings will begin to appear within 10 years and snowshoe hare densities would be expected to increase to levels that will provide foraging habitat for lynx. These conditions would be expected to last for approximately 20-30 years. Once the stem exclusion structural phase begins (at age 40-50, depending on site conditions) snowshoe hare populations would be expected to decrease as would lynx use. In the longer term (120 years+), should these forested stands survive fires and/or diseases, they would again begin to function as foraging habitat. At this stage saplings begin to grow and cone production increases, producing decreases in snowshoe hare and red squirrel populations.

**Temporary Road Construction**

*Alternatives 2 and 3*

There would be 6.3 miles of temporary road construction for Alternatives 2 and 3.
Altemative 4

There would be 2.9 miles of temporary road construction for Alternative 4.

There is some suggestion that roads can indirectly affect lynx by facilitating increased competition for snowshoe hares from other predators if snow compaction occurs from activities such as snowmobiling. Considering the locations and lengths of the temporary road segments, it is unlikely that human induced snow compaction will occur on them. Further, each of the temporary road segments would be rehabilitated and they would have a relatively short life as roads. The direct effect of temporary road construction on lynx is not expected to influence overall habitat use at the local landscape and the new temporary road segments proposed in alternatives 2, 3, and 4 will not reduce snowshoe hare habitat.

Cumulative Effects

Just as past fires in the early 1900’s produced the general forest conditions present in the analysis area, to a certain extent so has past and ongoing fire suppression. It is possible that in the absence of fire suppression, the analysis area could have provided more of a mosaic of forest age classes, as opposed to the more or less single-aged forests that now dominate LAUs. Past, ongoing and future fire suppression efforts will continue to affect lynx/snowshoe hare habitat by minimizing stand initiation structural phases of forest succession.

The filling of Hungry Horse Reservoir in the early 1950’s affected lynx habitat by creating a movement barrier between the Swan and Flathead Mountain ranges; however, only about a quarter of the Soldier Addition Project area is bordered by the reservoir and lynx are readily able to cross the river. Since most of the reservoir is below 3,600 feet elevation, suitable habitat was affected to a lesser extent.

Past forest management actions such as timber harvest/salvage, and to a lesser extent prescribed burning, has generally been favorable for lynx because, in the absence of the natural process of fire creating a mosaic of forest age classes, timber harvesting has created vegetation diversity. The Soldier Addition Project will harvest trees in the stem exclusion structural stage. Prescriptions are planned to recruit a high density of conifers, hardwoods, and shrubs. All LAUs are well below the threshold of 30% in a stand initiation structural stage. All LAUs are well below the threshold of regenerating 15% of lynx habitat within a 10 year period.

Past pre-commercial thinning of conifer plantations was not a management activity that was favorable to lynx. However, this occurred prior to the general understanding of the lynx/hare relationship to dense coniferous sapling stands. Thinning proposed in the Soldier Addition Project would meet current lynx standards.

Past Forest Service road construction, and maintenance of some of these roads, has had the effect of allowing humans relatively easy access into the area; past use of these roads by humans may have facilitated more efficient trapping of lynx, when it was legal. More recently, (in the last 10 years) additional closures to motorized use on Forest Service roads have provided better lynx
Soldier Addition Project

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habitat security. The Soldier Addition Project would continue the trend of increasing lynx habitat security and would have no cumulatively adverse affects relative to roads in lynx habitat.

Ongoing actions such as forest products gathering, noxious weed control, and recreational activities are unlikely to produce cumulative effects on lynx because of the relatively low level of these activities in the project area’s lynx habitat and because they are part of the environmental baseline which lynx have already made adjustments to.

The sum total of effects on lynx/habitat from past human habitat alterations has been mixed: some beneficial and some not. Overall, the Soldier Addition Project would create a net increase in the diversity of lynx habitat in the analysis area; however, it will also reduce the amount of suitable lynx foraging habitat by approximately 138 acres (daylight thinning), 1.3 acres of fuels reduction, and prescribed burning (384 acres) of potential multi-storied lynx habitat. This will be cumulative to the diversification of lynx habitat that has occurred from past timber harvesting and recent fires.

Multi-Scale Assessment

The Regional, multi-scale lynx habitat assessment (Hillis et al. 2002) was used to compare LAU-scale findings against the findings at increasingly larger scales including the South Fork Flathead River 4th Code Hydrologic Unit, Flathead National Forest, Planning Zone (Flathead, Lolo, and Bitterroot National Forests), and Region One scales.

In summary, lynx are a disturbance-dependent species (Ruggiero et al. 2000). Disturbed forest stands that have not yet regenerated to suitable hare forage conditions, while unsuitable to lynx in the short run, are needed to provide foraging habitat in the future. While other factors outside of the Forest Service’s control (non-target trapping mortality, high competing predator populations, global warming, etc.) may impede lynx recovery, in the context of the NRLMD most of the actions proposed in the Soldier Addition Project are compatible with conserving lynx to a non-listed status and consistent with maintaining habitat for viable populations of lynx at the Regional scale. There are boreal forests containing dense understories of young trees and shrubs, deep, fluffy winter snow conditions, denning sites with abundant coarse woody debris, and matrix habitat that provides for travel.

Regulatory Framework and Consistency

There is a three part system of looking at lynx habitat:

1) In the Biological Opinion on the Northern Rocky Mountain Lynx Amendment (NRLA) of March 19, 2007 the US Fish and Wildlife Service designated the Flathead Forest as core occupied lynx habitat.

2) On March 27, 2009 the rule designating lynx critical habitat became effective (Federal Register/Vol. 74, No. 36/Wednesday, Feb. 25, 2009/Rules and Regulations). Map 3-3 shows the boundary of lynx critical habitat within the Soldier Addition Project Area.

3) The Endangered Species Act determinations for lynx are also based on an additional analysis at the Flathead Forest scale (Project Record). The Flathead Forest has mapped
lynx habitat on a more site specific level. Areas such as water, large rock outcrops, and dry habitats were not included as lynx habitat. Areas of lynx habitat are also evaluated to determine whether they are currently in a vegetative condition that is suitable for use by lynx and their primary prey, snowshoe hare, or not suitable.

The Biological Assessment will address the potential effects of the proposed action and determine if the proposed action results in the destruction or adverse modification of lynx critical habitat. Destruction or adverse modification as defined by the FWS is based on whether, with implementation of the proposed action, the affected critical habitat would remain functional (or retain the ability for the Primary Constituent Element (PCE) to serve the intended conservation role for the Canada lynx to support viable populations (USDI FWS 2008).

The Proposed Rule (USDI 2008 p. 10867) identified the PCE essential to the conservation of lynx as:

1) Boreal forest landscapes supporting a mosaic of differing successional forest stages and containing:

   (a) Presence of snowshoe hares and their preferred habitat conditions, including dense understories of young trees or shrubs tall enough to protrude above the snow;
   (b) Winter snow conditions that are generally deep and fluffy for extended periods of time;
   (c) Sites for denning having abundant, coarse, woody debris such as downed trees and root wads;
   (d) Matrix habitat (e.g. hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.

All proposed harvest and thinning units meet the lynx standards and guidelines or would qualify for exemptions. If proposed burning unit #5 or portions of burn units #1 and #4 prove (through ground verification) to be old growth and/or multi-storied lynx habitat, they will be eliminated from consideration for treatment. The proposed alternatives would then meet the current management direction contained in the NRLMD (USDA Forest Service 2007) and Flathead Forest Plan management standards and guidelines for lynx.

The alternatives would comply with NFMA direction that wildlife habitat be managed to maintain diversity of existing native and desired non-native species well distributed across the planning area. In addition, the analysis for Flathead National Forest’s Forest Plan Amendment 21 assessed the forest-level viability of Canada lynx (USDA Forest Service 1999).
**Gray Wolf (Sensitive)**

Sensitive wildlife species are those species identified by the Regional Forester for which population viability is a concern. The gray wolf was previously listed as Endangered, but is now considered a Sensitive species.

**Analysis Area and Information Sources**

The boundaries of the proposed Soldier Addition Project treatment units were used for analysis of direct and indirect effects. An area from Sullivan Creek to Bunker Creek and west of the Hungry Horse Reservoir/South Fork Flathead River (up to an elevation of 7,000 feet) was used for cumulative effects analysis (Map 3-4). This cumulative effects analysis area is approximately 35,000 acres in size. It was deemed appropriate because: a) it encompassed most of the known (radio) locations of the Spotted Bear pack west of the South Fork Flathead River; and b) it encompassed all of the proposed project activities (Figure 3).

Data used for the description and analysis of effects was from existing resource information sources, research literature, aerial photography and field reconnaissance (Project Record). The Arcview geographical information system was used for quantification of various habitat characteristics; a GIS shapefile containing radio-collared wolf locations between 2000 and 2003 was used to aid in the analysis.

**Affected Environment**

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, 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 a sufficient prey base is present.

The project area is within habitat that was designated in the Flathead Forest Plan as Management Zone 1 (contains key habitat components in sufficient abundance and distribution on an annual basis to sustain a viable wolf population) (Forest Plan page II-43) and is in the Northwest Montana Gray Wolf Recovery Area.

Gray wolf pack activity has been documented in portions of the South Fork of the Flathead River (South Fork) drainage for many years. Most of these observations were of dispersers traveling through the area. In 2000, the Spotted Bear Pack was established as a result of two relocation efforts initiated by the US fish and Wildlife Service and coordinated with the Flathead National Forest. This pack has remained in the Spotted Bear area since 2000 with varying levels of pup production. In December of 2007, the Spotted Bear pack had 4 adults and 4 pups (http://fwp.mt.gov/wildthings/wolf/ar2007.html).

Ungulates are the primary prey species for wolves and wolf distribution is generally related to ungulate density. However, other physical habitat attributes can also be used to predict wolf presence. Boyd-Heger (1997) found that wolves she studied (in the North Fork) appeared to
select for landscapes with relatively low elevation, flatter terrain, closer to water and closer to roads at both smaller and larger scales in the central Rocky Mountains.

Elk, mule deer, white-tailed deer and moose all occupy the Soldier Addition Project area. White-tailed deer and moose occupy areas yearlong, while elk and mule deer tend to move to higher elevations during summer; however, some elk are resident in the lower elevations of the Soldier Addition Project area year round.

Approximately 30% (7,784 acres) of the cumulative effects analysis area consisted of GIS-modeled potential wolf denning habitat. Recent timber harvesting within the analysis area has diversified vegetation age classes and this diversity generally has provided seasonal foraging for ungulates, mostly during spring and fall. Some portions of the cumulative effects analysis area (South Fork River bottom; Bunker Creek) provide early winter range potential for ungulates.

Relative to habitat security, besides the main Westside Reservoir and Bunker Creek Roads (#895/2826), only two roads are open to motorized use during the non-winter season: Kah Mountain and Cedar Creek roads. This appears to provide a reasonable level of habitat security for wolves. During winter, human presence is essentially absent from the Spotted Bear area and the Spotted Bear wolf pack experiences a relatively high level of security.

**Environmental Consequences**

There were no significant issues related to the gray wolf. However, because the gray wolf was a federally listed wildlife species and is now considered a Sensitive species, the potential effects of the proposed action on habitat were assessed.

Potential effects to wolves are primarily related to the potential effects of the Soldier Addition Project on 1) spring denning and pup rearing activities, 2) ungulates (wolf prey base) and 3) security/mortality risk. Potential denning and rendezvous habitats are not considered to be limiting across the Forest and implementation of most Soldier Addition Project activities would not occur prior to July 1. Therefore, the effects indicator used for assessing effects on gray wolf was limited to ungulate habitat and habitat security.

**Direct and Indirect Effects**

**Alternative 1 (No Action)**

This alternative would have no effects on ungulate habitat or denning/rendezvous sites and would leave the project area’s biological resources in its existing condition, subject to natural processes. The project area is apparently in an adequate condition to sustain wolves as evidenced by the continued occupation and breeding of the Spotted Bear pack. The completion of implementation activities of the 2001 Spotted Beetle Resource Management Project’s motorized access restrictions (USDA Forest Service 2001) in 2008 has created a habitat security landscape condition that is better for wolves than what had existed. The selection of this alternative would result in no effect on the gray wolf or its habitat; since there would be no direct/indirect effects there would also be no cumulative effects.
Map 3-4. Gray wolf cumulative effects analysis area.
**Direct and Indirect Effects Common to All Action Alternatives**

For effects to the wolf prey base, see the section of chapter 3 on elk effects.

There would be no effect on potential denning because no major project activities would be allowed during the denning or spring seasons and denning for the Spotted Bear Pack has been documented east of the South Fork.

The appearance of new temporary roads in the Soldier Addition Project area may cause some short-term level of loss of habitat security, but the duration of the presence of these roads on the landscape will probably be too short for any long-lasting effect on wolves. During project implementation, there may be some short-term displacement of wolves if they are in the area during the summer and fall, but wolves are likely to go where prey animals are available. Abundant, secure summer/fall habitat is available in the project area (see Grizzly Section). Project activities are not expected to result in any significant disturbance, loss of long-term habitat security, or mortality to wolves.

Other aspects of the Soldier Addition Project such as implementation of best management practices on haul routes and post harvest treatments would have little to no effects on ungulates/wolves.

**Direct and Indirect Effects of Action Alternatives 2, 3, and 4**

The proposed forest management/treatment units (i.e. harvesting and thinning) for these alternatives are distributed on the mid to lower slopes from Sullivan to Bunker Creek. Their locations on the landscape generally coincide with the known resident (Spotted Bear) pack’s use area west of the South Fork. For effects to the wolf prey base, see the section of chapter 3 on elk effects.

**Cumulative Effects – Alternatives 2, 3 & 4**

Past fires in the early 1900’s produced the general forest conditions present in the analysis area; so has past and ongoing fire suppression. Past fire suppression has led to build up of fuels, affecting the size and severity of wildfires. Ongoing and future fire suppression efforts will continue to affect ungulate/wolf habitat. Limited past and proposed prescribed burning creates and maintains forage openings.

The construction of the Hungry Horse Dam and resulting Hungry Horse Reservoir in the early 1950’s affected wolf habitat primarily by creating movement difficulty between the Swan and Flathead Mountain ranges on the north end of the analysis area. The Soldier Addition Project is not expected to be additive in creating movement barriers.

Past forest management activities (e.g. timber harvesting, post-fire salvaging, firewood cutting, recreational activities, etc.) within the cumulative effects analysis area apparently have not been detrimental to wolf recovery, as evidenced by the continued occupancy of the area by the Spotted Bear Pack. For effects to the wolf prey base, see the section of chapter 3 on elk effects.
In terms of wolf habitat security, the trend of the past, when road building and increasing road densities was common, has been reversed. The objectives of A19 have been achieved and habitat security is probably as good as it has been since the road construction era of a few decades ago. In addition, relatively few humans get to the Soldier Addition Project area (because of its relative remoteness) during the December to April period of time. Cumulatively, the net result of the Soldier Addition Project would be the maintenance of the relatively good level of habitat security for ungulates/wolves.

Other ongoing and foreseeable management actions (e.g. tree planting, gathering forest products, road maintenance, the vast array of recreational activities, etc.) in the cumulative effects analysis area are not expected to adversely affect wolves, unless they occur near denning or rendezvous sites. Denning/rendezvous sites are generally known for the Soldier Addition Project area and the Spotted Bear pack is not expected to be adversely affected.

In general, wolf packs in the South Fork and the rest of the Recovery Area have benefited from the protections provided by the Endangered Species Act. Additionally, the Flathead Land and Resource Management Plan contains standards for management of gray wolf habitat. Because these standards have been consistently applied, including for this project, no adverse cumulative effects to gray wolves are expected from implementation of the Soldier Addition Project.

**Regulatory Framework and Consistency**

The gray wolf has been taken off the Endangered Species list, but the decision is under appeal. The wolf is now considered a Sensitive Species on the Flathead National Forest and the Northern Rocky Mountain Wolf Recovery Plan (US Fish and Wildlife Service1987) will continue to be followed for recovery goals and objectives. The Soldier Addition Project area lies within gray wolf Management Zone 1 as designated by the Flathead National Forest Plan. It contains habitat components, particularly ungulate populations, necessary to support wolves. The FNF Forest Plan provides management direction and standards to guide project planning. The effects of proposed actions upon the wolf are also based on an additional analysis at the forest scale (Project File). The gray wolf population is believed to be at the recovered level and proposed project activities will not affect population viability or contribute toward a trend that would lead to federal listing of wolves or their habitat.
Sensitive Wildlife

Fisher (Sensitive)

Introduction

Of the 12 Sensitive wildlife species known or suspected to occur on the Flathead National Forest (http://fsweb.r1.fs.fed.us/wildlife/wwfrp/TESnew.htm; 2009 + now, the gray wolf) the fisher is taken through the full effects analysis process because it was determined that potential fisher habitat either exists or has the potential to exist and the proposed Soldier Addition Project may effect it. Rationale for not taking the other species through the full analysis is provided in Tables 3-29 and 3-30.

Analysis Area and Information Sources

The analysis of direct/indirect effects on fisher and its habitat used the proposed treatment sites within each of the alternatives. For cumulative effects, an area was delineated that encompassed streams (perennial and intermittent) that drained through the area where proposed vegetation treatments were located. Data used in the analysis were from existing information sources, aerial photos, and field surveys of proposed treatment sites. A larger-scale assessment was also conducted to address population viability concerns (Project Record).

Affected Environment

Fishers are found in forested habitats that display extensive physical structure, including snags for dens, multilayered canopies to protect against predation, and course woody debris to provide prey (Douglas and Strickland 1987, Buskirk and Powell 1994, Powell and Zielinski 1994). Moist forested habitats with continuous overhead cover and riparian zones are frequently utilized (Arthur et al. 1989, Jones 1991, Weir 1995). The fisher has a strong affinity for forested riparian habitats (Witmer et al. 1998). Such areas are vulnerable to habitat fragmentation due to factors such as fire, timber harvest, and timber salvage (Powell and Zielinski 1994). Fishers avoid insular patches of forested habitat and may require forested riparian travelways between feeding and denning sites (Heinemeyer and Jones 1994; Witmer et al. 1998). They rarely stray far from streams or other wet sites. Areas of otherwise suitable habitat can be isolated when cover in travelways between home ranges is removed leaving gaps 150 feet or wider.

In the Northern Rockies, fishers evolved under a disturbance regime that created numerous openings in a matrix of mature forested habitats. The conversion of some percentage of older age classes to younger age classes can promote a diversity of prey species and thus have long-term benefits for fisher populations (Jones 1991). A pulse of large logs on the ground due to fire or insect epidemics can provide denning structures and cover for fisher and several prey species, but these areas are likely to be avoided until the living canopy cover again exceeds 40 percent. Fishers would likely avoid stands up to 50 years old and probably not select them until 80 to 100 years for lodgepole pine or 120 to 160 years for mixed conifers (Jones 1991). Fishers are

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apparently tolerant of human activity, but the ease of human access into an area is correlated with fisher mortality through direct or incidental trapping (Claar et al. 1999).

Potential primary fisher habitat for this analysis was defined as intermediate (pole-sized and immature) and older forests (mature and old growth) within 300 feet of streams (Map 3-5). The intermediate sized forests conservatively approximate winter habitat, while the older forests are likely summer habitat. Of approximately 159 miles of streams in the analysis area, 82 miles were perennial. Modeling showed that approximately 10,906 acres of potential primary habitat existed adjacent to both intermittent and perennial streams within the analysis area. Of this, approximately 52% and 48% was along perennial and intermittent streams, respectively. Most of this habitat was in a pole sized or larger forested condition. With the exception of approximately six miles of the Hungry Horse Reservoir on the north end of the analysis area, which poses a movement barrier, connectivity of fisher habitat in the heavily forested Soldier Addition Project area appeared adequate to facilitate fisher movements across the South Fork (Map 3-5).

**Environmental Consequences**

No significant issues related to the fisher were identified. The number of acres of potential primary fisher habitat affected by the Soldier Addition Project was used as an indicator to focus the fisher analysis and disclose relevant environmental effects. The larger landscape is important to fisher, however, of special concern is primary habitat adjacent to streams.

**Direct and Indirect Effects**

**Alternative 1 – No Action**

This alternative would have no impact on existing potential fisher habitat or populations. Forested stands targeted for treatment in the “action” alternatives would undergo natural processes and if they escape fire and/or insect and disease outbreaks, would progress to mature and older-aged forest conditions. This could allow expansion of fisher foraging habitat. However, in general, this alternative would have no direct/indirect or cumulative effects to fisher/habitat and would have no implications on population viability.
Map 3-5. Potential primary fisher habitat within stream-adjacent buffers.
Effects Common to All Action Alternatives

The comparison of proposed treatment units in the alternatives and potential primary fisher habitat showed that some units would affect fisher habitat. The direct effect of sapling thinning for units C, E, G & H (that overlap potential primary fisher habitat) would be that sapling trees would more widely spaced in 30% of the units. This is not expected to affect the fisher’s potential to breed, den or forage. Indirectly, these sapling stands would likely develop into suitable breeding habitat sooner with thinning than without.

Estimates were made of how much habitat would be affected by timber harvest and burn treatments (refer to complete analysis in Project Record). For all harvest units, an untreated buffer of 50 to 300 feet (depending upon stream type) would be retained adjacent to stream channels to meet INFISH standards (refer to Fisheries section and to Design Criteria in Chapter 2). Maintenance of these buffers would help to protect fisher habitat.

Most of the acres occur within the proposed prescribed burn units at the upper elevations. During the ignition of the prescribed burn units, direct application of fire in the riparian areas would be avoided. These measures would adequately protect fisher habitat within the project area. Other aspects of the proposed Soldier Addition Project are not expected to have discernible effects on potential fisher presence in the Soldier Addition Project area.

Cumulative Effects

The fisher’s status in the Western United States is thought to be “precarious and declining” (Witmer et al. 1998), apparently due to habitat alteration and overexploitation (trapping). Witmer identified four issues of conservation concern in the interior Columbia River basin: 1) conservation of late successional forests at mid to lower elevations; 2) maintenance of links between populations; 3) maintenance of riparian corridors for use by individuals and populations; and 4) trapping pressure and human disturbance.

Past large fire events, such as the 1929 Sullivan Fire, reduced late successional forests substantially. This may have had the effect of creating mortality sinks in the form of trapping in adjacent unburned habitats. Nevertheless, the local fisher population in the past has had to adjust to landscape perturbations. Fisher numbers undoubtedly decreased when quantity of habitat was reduced by large fire events and increased as suitable habitat re-developed after fires. Past and ongoing fire suppression actions may have initially delay the impacts of wild land fires upon fisher habitat, however, in the longer term they may actually cause more severe/larger fires to occur on the landscape. This could have the unintended consequence of increasing the amount of early seral habitat in the long term. Current land management strategies are making progress toward dealing with this impact.

Past forest management activities on Forest Service lands have been varied and extensive and have had cumulative impact implications on fisher conservation. Intensive past timber harvesting of mature and old aged forests at mid to low elevations caused temporary habitat fragmentation, produced temporary barriers to fisher movement, reduced riparian prey patches, and resulted in long term loss of critical maternal and natal denning habitat features such as large diameter logs.
and snags. The extensive road building effort of the past provided relatively easy access into fisher habitat and may have facilitated efficient trapping pressure on fisher populations.

All action alternatives would convert mid-seral habitat to openings, affecting fisher habitat use for up to 50 years. Cumulatively, these openings will add to young forest age classes that have recently been produced by relatively recent projects such as the Kah Mountain and Spotted Beetle Timber Sales as well as the 2003 Ball fire. However, large areas of mid to late seral habitat will be available in the vast majority of the project area and in adjacent Wilderness and Roadless areas. Protection of riparian corridors would help to maintain potential fisher presence in the area and would help connect other key habitats.

Recreational activities that have and will continue to occur within the analysis area -- such as river floating, camping, and hunting, do not appear to affect fishers. However, activities such as firewood cutting of large diameter snags, especially if they occur in riparian areas, can reduce fisher denning opportunities. Roads that have been closed to promote grizzly habitat security (A19) will benefit fisher by helping to protect snags.

The construction of the Hungry Horse Dam/Reservoir in the early 1950’s permanently eliminated potential fisher habitat adjacent to the northern/eastern 4-5 miles of the Soldier Addition Project area and may have caused a movement obstacle between fisher populations on the Flathead and Swan Mountain Ranges. However, the southern 15 miles of the Soldier Addition Project boundary are not inundated with a reservoir and fisher movements are likely unimpeded. The Soldier Addition Project is not expected to cumulatively add to the effect that the reservoir has had on the fisher.

Considering the analysis of direct/indirect/cumulative effects and the precarious status of fisher populations (Powell and Zielinski 1994), it is likely that implementation of Soldier Addition Project, under any action alternative, “may impact individual fisher and/or habitat” but is not likely to contribute to a trend towards federal listing or loss of viability to the population or species. This determination was based upon Witmer’s four issues of conservation concern: 1) no low elevation late successional forests would be treated; 2) riparian forest buffers for the protection of streams/fish (e.g. INFISH guidelines) would help protect important riparian habitats and 3) maintain connections between populations; and 4) roads that have been closed to promote grizzly habitat security would reduce disturbance and access for trapping.

**Regulatory Framework and Consistency**

**Regulatory Framework Common to all Sensitive Wildlife Species**

Federal laws and direction applicable to sensitive species include the NFMA and Forest Service Manual 2670. Amendment 21 to the Flathead's Forest Plan has standards to conduct analyses to review programs and activities, to determine their potential effect on sensitive species, and to prepare a biological evaluation. It also states "adverse impacts to sensitive species or their habitats should be avoided. If impacts cannot be avoided, the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole would be analyzed. Project decisions would not result in loss of species viability or create
significant trends towards federal listing." Future conservation strategies for each species would present direction on maintaining habitat diversity and managing for population viability, as required by the NFMA and Forest Plan Amendment 21. The USDA Forest Service is bound by federal statutes (Endangered Species Act, NFMA), regulation (USDA 9500-4), and agency policy (FSM 2670) to conserve biological diversity on national forest system lands. A goal in Forest Plan Amendment 21 is to "ensure that Forest Service actions do not contribute to the loss of viability of native species.” The proposed Soldier Addition Project, based on this analysis, is not expected to contribute to loss of population viability of the fisher.

**Regulatory Consistency Common to all Sensitive Wildlife Species**

In accordance with FSM 2673.42, determinations have been made as to the degree of impact the proposed Soldier Addition Project may have on sensitive species (Table 3-34). These determinations are based on available information on the distribution, presence/absence from the project area, habitat requirements, and management strategies for these species, as well as the project design and location. These determinations are for the segment of the population potentially using the Soldier Addition Project area, not the entire population; they are also based on an additional analysis that assessed viability at the Forest scale (Project Record). All alternatives would comply with NFMA direction that wildlife habitat be managed to maintain viable populations of existing native and desired non-native species well distributed across the planning area. In addition, the analysis for Flathead National Forest’s Forest Plan Amendment 21 assessed the forest-level viability of sensitive wildlife species.

**Table 3-34. Biological Evaluation Determinations for Sensitive Wildlife Species.**

<table>
<thead>
<tr>
<th>Sensitive Wildlife Species</th>
<th>Alternatives and Determinations(^\circ)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bald Eagle</td>
<td>NI</td>
</tr>
<tr>
<td>Black-backed woodpecker</td>
<td>NI</td>
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<tr>
<td>Boreal toad</td>
<td>NI</td>
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<tr>
<td>Common loon</td>
<td>NI</td>
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<td>Fisher</td>
<td>NI</td>
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<tr>
<td>Flammulated owl</td>
<td>NI</td>
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<tr>
<td>Harlequin duck</td>
<td>NI</td>
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<tr>
<td>Northern bog lemming</td>
<td>NI</td>
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<tr>
<td>Northern leopard frog</td>
<td>NI</td>
</tr>
<tr>
<td>Peregrine falcon</td>
<td>NI</td>
</tr>
<tr>
<td>Western big-eared bat</td>
<td>NI</td>
</tr>
<tr>
<td>Wolverine</td>
<td>NI</td>
</tr>
</tbody>
</table>

\(^\circ\) NI = "No Impact"; MIIH = "May Impact Individuals or Habitat but would not likely result in a trend toward federal listing or reduced viability for the population or species".