# Lower Herrig Timber Sale
## Checklist Environmental Assessment

**March 2013**

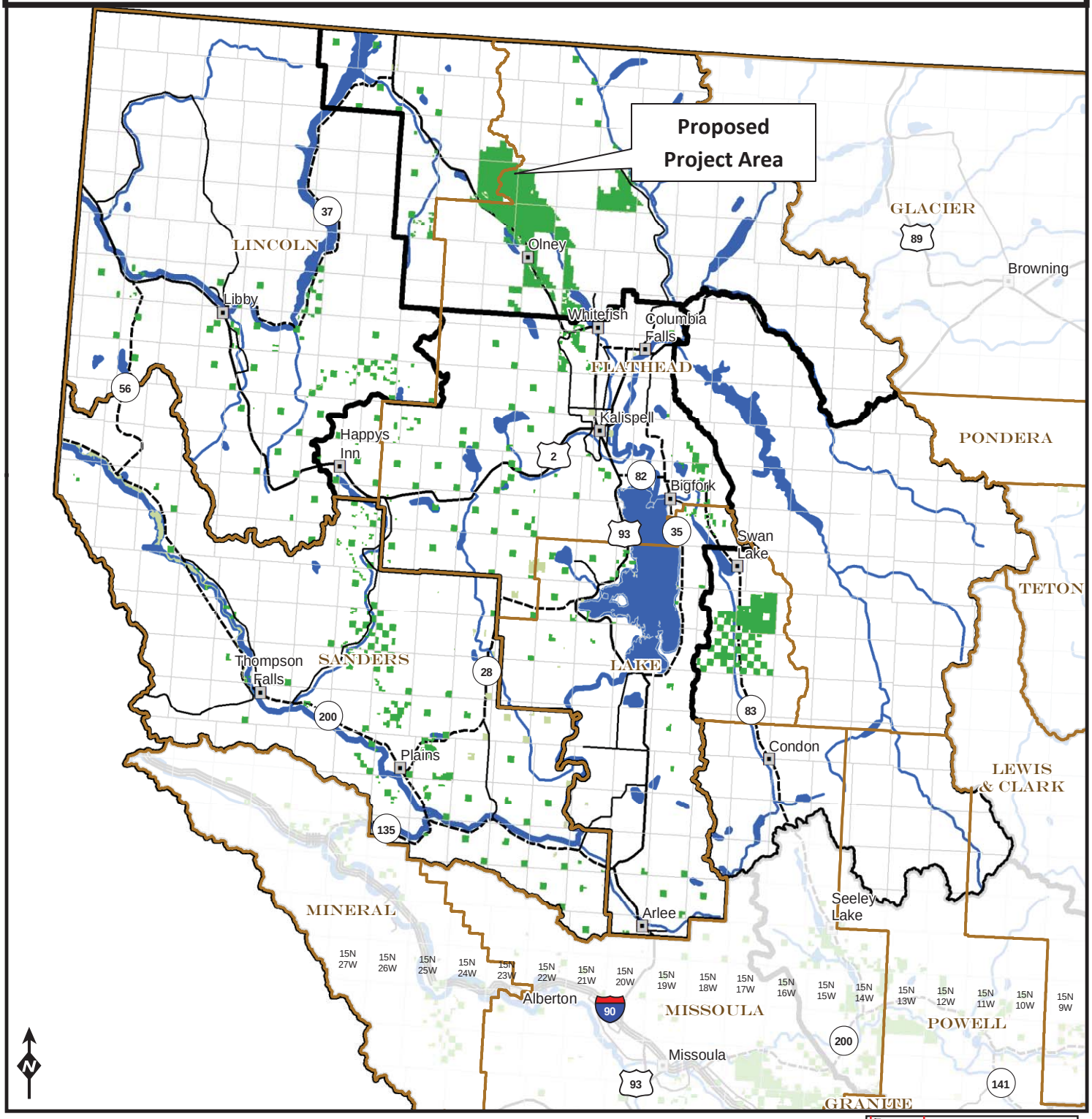
Department of Natural Resources and Conservation
Northwestern Land Office—Stillwater Unit

# Lower Herrig Timber Sale Vicinity Map

Sections 1,2,10,11,12,13,14,15,22,23,24 of T34N R24W

Sections 18,19 of T34N R23W

Lincoln and Flathead Counties

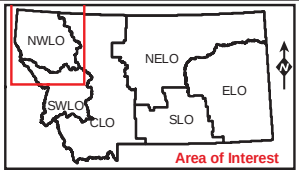



Interstate Highway
U.S. Route
State Highway
Secondary Roads

County
DNRC other
DNRC managed for timber

City
Township/Range
Management Unit

0 5 10 20 30 40 50 Miles




6 December 2010
Montana DNRC
Technical Services Section/dr

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## CHECKLIST ENVIRONMENTAL ASSESSMENT

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| **Project Name:** | **Lower Herrig Timber Sale** |
| **Proposed Implementation Date** | Summer 2013 |
| **Proponent:** | Montana Department of Natural Resources (DNRC), Northwestern Land Office, Stillwater Unit |
| **Location:** | Sections 1,2,10,11,12,13,14,15,22,23,24 of Township 34 north, Range 24 west; Sections 18 &19 of Township 34 north, Range 23 west |
| **County:** | Lincoln and Flathead |

## I. TYPE AND PURPOSE OF ACTION

Montana Department of Natural Resources and Conservation (DNRC), Stillwater Unit, proposes to harvest approximately 5 to 6 million board feet of timber from the Stillwater State Forest (*see Vicinity Map*). The proposed activities would regenerate new stands of healthy trees and would also promote biodiversity by managing for appropriate stand structures and species compositions. If implemented, site improvements on existing roads would be completed to improve drainage, water quality, and safety. Long-term water quality and soil conservation would be promoted during logging and road construction operations by applying Best Management Practices (BMPs). Following these site improvements on the Herrig road system, DNRC would be able to execute several road management plans identified in the Stillwater Transportation Plan as described in the Habitat Conservation Plan (HCP).

The lands in this project are held in trust by the State of Montana for the support of specific beneficiary institutions (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners (Land Board) and DNRC are legally required to administer these trust lands to produce the largest measure of reasonable and legitimate long-term return for the trust beneficiaries (Montana Code Annotated 77-1-202). This project would produce an estimated $891,300 in revenue for the Common Schools Trust.

This project was developed in compliance with the State Forest Land Management Plan (SFLMP), the Administrative Rules for Forest Management (Forest Management Rules; ARM 36.11.401 through 471), and conservation commitments contained in the Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP), as well as other applicable state and federal laws.

## II. PROJECT DEVELOPMENT

### 1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

*Provide a brief chronology of the scoping and ongoing involvement for this project. List number of individuals contacted, number of responses received, and newspapers in which notices were placed and for how long. Briefly summarize issues received from the public.*

In August 2012, DNRC solicited public participation on the Lower Herrig Timber Sale Project. Scoping notices were advertised in the Daily Inter Lake (Kalispell) and the Whitefish Pilot newspapers, and posted at the Olney Post Office. The Initial Proposal with maps was sent to neighboring landowners, individuals, agencies, industry representatives, and other organizations that have expressed interest in DNRC's management activities. The mailing list of parties receiving the Initial Proposal, and the comments received, are located in the project file at the Stillwater Unit Headquarters. The public comment period for the Initial Proposal was open for 30 days. DNRC received one letter and one email, both supporting the project.

Overall, soils, wildlife, vegetative, hydrological, recreation, visual, and cultural resource concerns were identified by DNRC resource specialists and field foresters as elements to be addressed on this project. With all this

information, the Interdisciplinary (ID) Team determined that the issues raised by the public and DNRC resource specialists directly related to the proposed actions could be addressed in one Action Alternative.

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**2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:**
*Examples: cost-share agreement with U.S. Forest Service, 124 Permit, 3A Authorization, Air Quality Major Open Burning Permit.*

**Montana Department of Environmental Quality (DEQ)**

DNRC, classified as a major open burner by DEQ, is issued a permit from DEQ to conduct burning activities on state lands managed by DNRC. As a major open-burning permit holder, DNRC agrees to comply with the limitations and conditions of the permit.

A Short-term Exemption From Montana's Surface Water Quality Standards (318 Authorization) may also be required from DEQ if activities such as if removing a native log-sill crossing on a stream would introduce sediment above natural levels into streams, and if Montana Department of Fish, Wildlife and Parks (DFWP) recommends it.

**Montana/Idaho Airshed Group**

DNRC is a member of the Montana/Idaho Airshed Group, which regulates prescribed burning, including both slash and broadcast burning related to forest-management activities performed by DNRC. As a member of the Airshed Group, DNRC agrees to only burn on days approved for good smoke dispersion as determined by the Smoke Management Unit in Missoula, Montana.

**Montana Department of Fish, Wildlife and Parks (DFWP)**

A Stream Protection Act Permit (124 Permit) is required from DFWP for activities that may affect the natural shape and form of a stream's channel, banks, or tributaries. Such activities include the installation and/or replacement of numerous stream crossing culverts.

**United States Fish and Wildlife Service (USFWS)**

In December 2011, the U.S. Fish and Wildlife Service issued an Incidental Take Permit under Section 10 of the Endangered Species Act. The Permit applies to select forest management activities affecting the habitat of grizzly bear, Canada lynx, and three fish species — bull trout, westslope cutthroat trout, and Columbia redband trout — on project area lands covered under the HCP. DNRC and the USFWS will coordinate monitoring of certain aspects of the conservation commitments to ensure program compliance with the HCP.

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**3. ALTERNATIVE DEVELOPMENT:**
*Describe alternatives considered and, if applicable, provide brief description of how the alternatives were developed. List alternatives that were considered but eliminated from further analysis and why.*

The No-Action and Action Alternatives are described in this section. The decisionmaker may select a modification or combination of these alternatives.

**Alternatives Considered**

- ***No-Action Alternative***

Under this alternative, no timber would be harvested and therefore no revenue would be generated for the Common Schools Trust at this time. Segments of the Herrig Road would not be seasonally open to public motorized use as planned for in the Stillwater Transportation Plan. Salvage logging, firewood gathering, recreational use, fire suppression, noxious-weed control, additional requests for permits and easements, and

ongoing management requests may still occur. Natural events, such as plant succession, tree mortality due to insects and diseases, windthrow, down fuel accumulation, in-growth of ladder fuels, and wildfires, would continue to occur.

The No-Action Alternative is used as a baseline for comparing the effects that the Action Alternative would have on the environment and is considered a possible alternative for selection.

- ***Action Alternative***

The Action Alternative was designed to meet (1) the current Forest Management Rules that govern the forest management program; (2) all applicable conservation commitments contained in the selected alternative in the Final EIS/HCP and associated Record of Decision; as well as (3) begin to execute a portion of the Stillwater Transportation Plan that is common to the road improvements required by this timber sale proposal. The Action Alternative was developed to address current forest resource conditions and the transportation system within the Herrig Basin project area. A full reconnaissance of the entire Herrig Basin was accomplished with the primary focus looking at the transportation system and timber stand conditions.

Road improvements and/or harvesting or thinning have not been implemented in the Herrig Basin since the last harvest took place in the mid 1980's. Therefore, road reconstruction is extensive due to the condition of the infrastructure (bridges and culverts) and amount of brush within the existing road system. The reconnaissance of timber stands helped define potential harvest areas based upon additional access needs and use of conventional ground based and skyline harvest systems. This assessment also noted that there are areas where the dense brush has out-competed the regenerating trees as well as areas where the growth and vigor of mature timber stands was tapering off.

As a result of the above considerations, specifically the repair costs of the transportation system, amount of available timber, and timber stand improvement opportunities, it was decided to focus efforts on the northern portion of the project area and set aside the southern portion for a future project.

**Details of the Action Alternative**

Under this alternative, the silvicultural and harvest treatments would:

- Harvest approximately 5 to 6 million board feet of timber from approximately 256 acres.
- Regenerate new stands of healthy trees with the use of cable harvesting equipment on approximately 104 acres with the implementation of clear cut with reserves treatments, broadcast burning or herbicide site preparation, and planted regeneration.
- Regenerate new stands of healthy trees with the use of ground-based harvesting equipment on approximately 89 acres with the implementation of clear cut with reserves treatments, site scarification, and both natural and/or planted regeneration.
- Regenerate new stands of healthy trees as well as commercially thin existing stands with the use of ground-based harvesting equipment on approximately 63 acres with the implementation of an improvement harvest, site scarification and both natural and planted regeneration.
- Plant 127 acres with Engelmann spruce, western larch and Douglas-fir.

The road work associated with this project would:

- Improve 4.6 miles of road within the Herrig Basin by stabilizing sloughs and slumps off the road cuts and installing approximately 30 culverts.
- Construct and reconstruct 0.4 miles of temporary road.
- Update 13.3 miles of existing road leading up to the project area by installing surface drainage improvements as necessary to protect water quality.
- Remove two collapsing wooden bridges and replace one with a steel bridge.

Additional mitigations measures and project design concepts applied include:

- Feathering harvest unit edges to improve aesthetics visible from open roads.
- Leaving all larger-diameter, live whitebark pine due to the minor amount existing in the project area.
- Designing harvest boundaries to provide for wildlife corridors of mature timber.
- Applying dust abatement when necessary near residential areas along the haul route.

Detailed descriptions of the harvesting methods and silvicultural prescriptions can be found in *Attachment III – Prescription Table*. A more detailed description of mitigation measures can be found in *Attachment VI - Stipulations and Specifications*.

## III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

### 4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

*Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify direct, indirect, and cumulative effects to soils.*

The following issue statements were compiled from internal discussions regarding the effects of the proposed timber harvesting:

- *Ground based harvest techniques can displace and compact soils which can adversely affect the hydrologic function, soil structure and long-term productivity of the impacted area.*
- *Removal of both coarse and fine woody material off-site during timber harvest operations can reduce nutrient pools required for future forest stands and can affect the long-term productivity of the site.*

This analysis will qualitatively assess the risk of negative effects to soils from erosion, compaction, and displacement from each alternative.

**Existing Conditions**

The analysis area, which is where timber harvesting and road construction/reconstruction are proposed, contains six (6) landtypes (21-8, 26A-8, 28-7, 57-8, 73 and 74). Past monitoring on DNRC timber sales from 1988 to 2011 has shown an average of 12.2 percent soil impacts due to compaction, displacement or severe erosion across all parent materials. Stratifying the results by soil texture that are similar to the majority of the proposed harvesting shows an average of approximately 16.9 percent of the harvest areas impacted from erosion, displacement or severe compaction on ground-based harvesting operations and an average of 6.8 percent on cable yarding harvesting operations (*DNRC 2011*).

Cumulative effects from past forest management in the proposed harvest units are a result of roads, skid trails and landings. Records show evidence of harvest from the 1950's to the early 1980's. Impact from skid trails and landings from older sales have been reduced through freeze-thaw cycles and root mass penetrating the soil. While many of the impacts have ameliorated over time, some skid trails are still visible in the proposed harvest units and elsewhere in the project area. Skid trails within proposed harvest units do not appear to be eroding more than the surrounding un-trailed areas, but reduced tree density and vigor is present on these areas as is more brush. The average amount of coarse woody debris found within proposed harvest areas is 24 tons per acre while the recommended levels range from 7 to 24 tons per acre (*Graham et.al., 1994*).

**Environmental Effects**

- ***Direct, Indirect, and Cumulative Effects of the No Action Alternative***

Since no additional activities would occur under this alternative, skid trails from past harvesting would continue to recover from compaction. Coarse woody debris would gradually increase over time. No additional cumulative effects would occur.

- ***Direct, Indirect, and Cumulative Effects of the Action Alternative***

As BMPs and mitigations are applied (see *Attachment VI - Stipulations and Specifications*), the extent of expected impacts would be similar to those reported in the DNRC Soil Monitoring Report (*DNRC, 2005*) or approximately 12.2 percent for ground-based harvesting and 6.8 percent for cable yarding operations. Erosion would potentially result from implementation of the project, but the magnitude and area would remain low and duration of erosion would be short. Due to BMP implementation, the risk of unacceptable adverse impacts to physical soil properties would be low. Because coarse woody debris would be left on site in amounts recommended by *Graham (1994)* and fine debris would be maintained as much as practicable, the risk of measureable adverse impacts to nutrient cycling would be low. Cumulatively, by designing the proposed harvesting operations with soil-moisture and season of use restrictions, utilizing appropriate harvesting methods, and reusing existing skid trails that meet BMPs, the risk of unacceptable long-term impacts to soil productivity from compaction, displacement and nutrient pool losses would be low.

***Additional information can be found in the Project File: Soils, located at the Stillwater Unit office.***

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**5. WATER QUALITY, QUANTITY AND DISTRIBUTION:**
*Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify direct, indirect, and cumulative effects to water resources.*

DNRC developed the following issue statements regarding the potential effects of the proposed timber harvesting:

- *Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality.*
- *Cumulative effects from timber harvest may affect channel stability and fisheries habitat by increasing annual water yields and by decreasing the amount of recruitable woody debris into streams and /or increasing stream temperatures.*

**Existing Conditions**

The project area is located in the West Fork Swift Creek watershed which is a 6th-code watershed, also referred to as a HUC (Hydrologic Unit Code). This HUC encompasses approximately 12,819 acres of land that combines with the East Fork Swift Creek to form the main channel of Swift Creek. Several small first and second order streams are tributary to this channel. Other streams in the watershed have discontinuous surface flow. Larger, named tributaries of the West Fork Swift Creek include Herrig and Johnson creeks.

**Sediment Delivery**

A field review of the haul route identified potential sediment sources from roads. Past timber sale projects and the Stillwater State Forest road maintenance contracts resulted in adequate surface drainage on most roads proposed for hauling, however limited or no road maintenance has been implemented on the Herrig road system since the 1980's, and as a result erosion and sediment delivery has occurred. All of the resulting stream channels observed during field reconnaissance were stable except for the lower reach of West Fork Swift Creek where the stability was rated as poor. The poor rating is due to downcutting, headcutting and recent bank erosion as a result of the channel adjusting to rotting large woody debris which has stored sediment for several decades. The erosion risk for landtypes in the project area with proposed timber harvest proposed is generally

moderate, however approximately three acres of high erosion risk landtype is proposed for harvest. No mass wasting sites or unstable soils were observed in any of the proposed harvest areas.

**Water Yield**

The existing annual water-yield increase for the West Fork Swift Creek watershed is estimated at 5.9 percent annual water yield increase over fully forested conditions.

After reviewing the beneficial uses, existing channel conditions, and existing watershed condition per ARM 36.11.423, the threshold of concern for the West Fork Swift Creek watershed threshold was set at 10 percent. These threshold values expect a low degree of risk of adverse impacts to beneficial uses due to water-yield increases, as described in ARM 36.11.423(f)(iv).

**Environmental Effects**

- ***Direct, Indirect, and Cumulative Effects of the No-Action Alternative***

**Sediment Delivery**

Under this alternative, no timber harvesting or related activities would occur. Sediment from all sources would continue as described in Existing Conditions.

**Water Yield**

No increased risk of increases or reductions in annual water yield or equivalent clearcut acres (ECA) would result from this alternative.

- ***Direct, Indirect, and Cumulative Effects of the Action Alternative***

Existing roads would have drainage improvements and BMP upgrades implemented under this alternative to maintain a low risk of sediment delivery to streams. Minor drainage improvements include reshaping drain dips and cleaning ditches.

Stream crossing structures to be replaced or removed under the Action Alternative include:

- Replacing a bridge across West Fork Swift Creek.
- Installing several CMPs on Class 1 and Class 2 streams. All of the streams are non-fish bearing.
- Installing surface drainage and ditch relief CMPs to ensure delivery of road surface runoff to streams is minimized.
- Removing a native log culvert.
- Remove a failing log bridge crossing that has the potential to obstruct the creek below.

**Sediment Delivery**

Although forestry BMPs would be followed to minimize sediment delivery, timber harvesting activities within the proposed project would lead to a short-term increase in sediment during and immediately following this work. Because DNRC would incorporate BMPs into the project design, the risk of long-term adverse direct or indirect effects to water quality or beneficial uses due to increased sediment would be low.

**Water Yield**

Cumulatively, this would increase the annual water yield over fully forested conditions to 6.6 percent, which is still well below the threshold of concern.

***Additional information can be found in ATTACHMENT V – Water Resources Analysis***.

**6. AIR QUALITY:**

*What pollutants or particulate would be produced (i.e. particulate matter from road use or harvesting, slash pile burning, prescribed burning, etc)? Identify the Airshed and Impact Zone (if any) according to the Montana/Idaho Airshed Group. Identify direct, indirect, and cumulative effects to air quality.*

- ***Direct, Indirect and Cumulative Effects of the No-Action Alternative***

Under this alternative, no timber harvest or related activities would occur. No dust associated with log hauling traffic and no burning of slash piles would occur from this proposed action.

- ***Direct, Indirect, and Cumulative Effects of the Action Alternative***

The project area is located in Airshed 2. Some particulate matter may be introduced into the airshed from the burning of logging slash. Broadcast and slash burning would be conducted when conditions favor good to excellent smoke dispersion and according to existing rules and regulations; therefore, direct, indirect, and cumulative impacts are expected to be minor and temporary. Thus, effects to air quality are expected to be minimal.

During dry periods of the year, road dust may be created on gravel and dirt (native-surfaced) roads, relative to the amount of use. The log-hauling traffic from this proposed sale may increase by 6 to 12 truckloads per day. Depending on the season of harvest and the weather conditions, road dust may increase. In cases where the Forest Officer considers the dust level unacceptable, the application of dust abatement, such as magnesium chloride, may be required.

**7. VEGETATION COVER, QUANTITY AND QUALITY:**

*What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify direct, indirect, and cumulative effects to vegetation.*

**Existing Conditions**

The Forest Management Rules direct DNRC to promote biodiversity by taking a coarse-filter approach that favors an appropriate mix of stand structures and composition on state lands (ARM 36.11.404). The two cover types present within the proposed harvest units are mixed conifer (166 acres) and subalpine fir (90 acres). The desired future cover type for these stands is the same, based on Stand Level Inventory (SLI) data or professional judgment.

Based on Stand Level Inventory (SLI) data and field surveys across the Stillwater Unit, approximately 11 percent (13,034 acres) of the Stillwater Unit analysis area can be classified as old growth using definitions by Green et al. (*Old-Growth Forest Types of the Northern Region, 1992*). There are 437 acres of old growth within the project area. To further describe the characteristics of old-growth stands, DNRC developed a tool called the Full Old-Growth Index (FOGI) that assigns an index value to describe the level of development of the attributes commonly associated with old-growth stands. These attributes include: number of live, large diameter trees per acre, amount of coarse woody debris, number of snags, amount of decadence, stand structure, gross volume, and crown cover. Each attribute is assigned a point value that describes the level of development of that attribute, and the sum of the point values provides an overall index value for the stand, which can then be grouped into high, medium, and low categories. High attribute old growth stands would be considered to have an increased level of attribute development (higher amounts of large live, trees, snags, coarse woody debris, crown cover, multi-storied canopy structure, etc.) compared to medium- and low-attribute old-growth stands. In the project area 166 acres (38 percent) of the old-growth stands are in the *high attribute* category, 222 acres (51 percent) of the old-growth stands are in the *medium attribute* category, and 49 acres (11 percent) are in the *low attribute* category. The project area contains 7% of the high attribute, 10% of the medium attribute and 4% of the low attribute old growth found across the Stillwater Unit.

Endemic levels of insects and diseases such as spruce budworm, spruce beetle, and white pine blister rust are.present in the project area. Bears are a threat to 6"-18" diameter trees as they strip the cambium or bark layers in the lower portions of trees.

Noxious weeds are present along the roads within the project area; these include oxeye daisy, spotted knapweed, and orange hawkweed.

Using the Natural Heritage Program (NHP) database, no sensitive, threatened, or endangered plant species have been documented within the project area.

**Environmental Effects**

- ***Direct, Indirect and Cumulative Effects of the No-Action Alternative***

Neither cover types nor age class distributions would be directly or indirectly affected. On the Stillwater Unit, the trend has been an increase in the amount of desired cover type conditions as well as an increase in the 0-39 year age class.

Cumulatively, old-growth levels on the Stillwater Unit would remain at approximately 11.0 percent. Stocking levels of shade-tolerant trees and downed woody debris would increase within those stands over time. Various factors such as insects, diseases, and weather events, would eventually cause more snags to occupy portions of the stands.

Additional mineral soil would not be exposed, and heavy tree canopies would continue to compete with weeds; therefore the risk of additional establishment of weed populations would not increase. Weed seed is primarily introduced via motor vehicle use; open roads could continue to be the pathway for new weeds to become established. Established infestations of noxious weeds are being addressed through herbicide spraying along the open roads but not behind road closures.

- ***Direct, Indirect, and Cumulative Effects of the Action Alternative***

Under the proposed action, four (4) acres in the 0-39 year age class, 6 acres in the 40-99 year age class, 3 acres in the 100-149 year age class, 103 acres in the 150+ year age class and 140 acres of old growth would change to the non-stocked classification until regeneration establishes, and then the stands would enter the 0-39 year old age class.

Cumulatively on the Stillwater Unit, the trend has been an increase in the amount of desired cover type conditions as well as an increase in the 0-39 year age class.

140 acres of old growth would be harvested thereby changing the cumulative level of old growth on the Stillwater Unit to 10.9%. Following harvest, the project area would contain 3% of the high attribute, 9% of the medium attribute and 4% of the low attribute old growth found across the Stillwater Unit.

Insects, diseases and bears that are causing damage in the project area would likely continue. Species composition within the project area will likely not change significantly enough to remove the threat of spruce budworm and spruce bark beetle. In the harvest areas, the preferred size of trees targeted by bears would be removed temporarily; however, bears may still pose a threat to established and regenerated trees between 4 and 15 inches dbh. Insects and diseases present in the project area would be expected to remain at the current low levels.

The risk of windthrow may increase post harvest resulting in the likelihood of endemic spruce bark beetle attacks on blown down as well as standing spruce trees; subsequent beetle attacks could continue for several years if there are blown down spruce trees.

The spread of noxious weeds from the use of mechanized equipment and ground disturbance would be minimized, but not completely eliminated, by the washing of equipment before entering the site, sowing grass seed on roads after road construction and harvesting (ARM 36.11.445), and applying herbicide on spots of weed outbreaks along approximately 10 miles of roadway including areas behind road closures.

***Additional information can be found in the Project File: Vegetation, located at the Stillwater Unit office.***

**8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:**
*Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify direct, indirect, and cumulative effects to fish and wildlife.*

**Existing Condition**

The project area provides habitat for a variety of wildlife species, including a host of species that require mature forests and/or use snags and coarse woody debris. Mature forest is abundant and well-connected within the project and cumulative effects analysis areas. Old-growth forest habitat is also present within the proposed project area.

Eastern brook trout, bull trout, westslope cutthroat trout and slimy sculpin are found in West Fork Swift Creek. Within the project area, many of the streams are not fish-bearing primarily due to steep gradient and intermittent surface flow.

**Environmental Effects**

- ***Direct, Indirect and Cumulative Effects of the No-Action Alternative***

Under this alternative, no timber harvesting or related activities would occur. Thus, no appreciable changes to existing wildlife or fisheries habitat would be anticipated.

- ***Direct, Indirect, and Cumulative Effects of the Action Alternative***

Under the Action Alternative, approximately 256 acres of subalpine fir and mixed-conifer forest habitat would be harvested. Regeneration and overstory removal silviculture prescriptions on 256 acres would lead to young, open stands likely not suitable for forest interior species. This Action Alternative would decrease habitat for wildlife species requiring interior forest conditions, while creating habitat for species preferring more open stands of younger forest. Present and future deadwood material would be altered during the proposed timber harvesting; however, snags, snag recruits, and coarse woody debris would be retained in all proposed harvest units. Overall, minor adverse direct, indirect, and cumulative effects would be anticipated on terrestrial and avian habitats.

Since most streams are located greater than 120 feet from harvest areas and these streams generally do not flow for more than 6 months each year, there are no foreseeable measureable or detectable direct or indirect impacts expected to occur to the fisheries resources (i.e. woody debris recruitment and stream temperature). Furthermore, because BMPs would be implemented during timber-harvesting and road-construction operations, the risk of adverse cumulative impacts to fisheries habitat would be low.

Refer to *Attachment IV - WILDLIFE ANALYSIS and Attachment V – WATER RESOURCES ANALYSIS* for an in-depth evaluation of wildlife and fisheries habitat and notes pertaining to species potentially present in the project area.

**9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:**
*Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify direct, indirect, and cumulative effects to these species and their habitat.*

Suitable habitat for grizzly bear and Canada lynx is present in the project area. Both of these species have been documented in their respective cumulative effects analysis areas in the past. Seasonal open roads are present within the area; serving as a source of disturbance for these species, should they be present.

The Northwestern Land Office "Sensitive Species List" as developed from the State Forest Land Management Plan, was also consulted. The following species were included for detailed study due to historical observations and habitat present within the proposed project area: (1) fisher and (2) gray wolf.

West slope cutthroat and bull trout are located within West Fork of Swift Creek although portions of the creek flow less than 6 months of the year. For more information on effects to these species see *Section 8* **--** *TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS*

**Environmental Effects**

- ***Direct, Indirect and Cumulative Effects of the No-Action Alternative***

Under this alternative, no timber harvesting or related activities would occur. Thus no appreciable changes to disturbance levels or existing grizzly bear, Canada lynx, or sensitive species' habitat conditions would be anticipated.

- ***Direct, Indirect, and Cumulative Effects of the Action Alternative***

Under the Action Alternative, harvesting would temporarily (15 to 20 years) reduce habitat quality for grizzly bears and Canada lynx on 256 acres. Reductions in hiding cover would be mitigated through vegetation retention patches within and between harvest units, vegetation retention along riparian corridors, and reduced sight distances associated with varied topography. Suitable habitat connectivity would remain as the project design retained corridors of mature timber. Short-term increases in open roads and potential disturbance would be expected. Hiding cover adjacent to open roads within the project area would not be affected, and no new open roads would be built; minimizing disturbance to bears and lynx. Overall, minor adverse direct, indirect, and cumulative effects would be anticipated that could affect grizzly bear and lynx.

Under the Action Alternative, suitable habitat for fisher and gray wolves would be altered. The proposed logging would remove trees, some snags, and reduce forest cover. The proposed activities could temporarily (1 to 4 years) disturb or displace these sensitive species should they be present in close proximity to harvest units. Mitigations and vegetation treatments outlined by the Action Alternative would minimize affects to these wildlife species and meet forest management goals. Minor adverse effects to fisher and grey wolves in the project area would be anticipated.

Refer to *Attachment IV - WILDLIFE ANALYSIS* for more detailed information.

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**10. HISTORICAL AND ARCHAEOLOGICAL SITES:**

*Identify and determine direct, indirect, and cumulative effects to historical, archaeological or paleontological resources.*

Within the areas that would likely be affected by the project, no documented cultural resource sites have be found by DNRC's Cultural Resource Specialist. DNRC has also conducted shovel testing on several locations within the project area; these efforts did not result in the location of additional cultural resource sites.

If previously unknown cultural or paleontological materials are identified during project related activities, all work will cease until a professional assessment of such resources can be made.

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**11. AESTHETICS:**

*Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify direct, indirect, and cumulative effects to aesthetics.*

- ***Direct, Indirect and Cumulative Effects of the No-Action Alternative***

Under this alternative, no timber harvesting or related activities would occur. No short-term changes in views would occur.

- ***Direct, Indirect and Cumulative Effects of the Action Alternative***

The project area is not located on a prominent topographic area or visible from a densely populated area but portions of the project's harvest units and road reconstruction would be visible from an open road approaching the project area. That view is between 0.5 to 1.5 miles from the harvest areas and the duration of the view is limited to less than ¼ mile along the West Fork Road.

Overall, timber sale design would minimize visual impacts from various views by randomly spacing the leave trees in the units and leaving additional trees along unit boundaries and open roads.

Increased noise would occur during short periods of time within the operating season. Operations may be active 16 to 24 months on the timber sale. Thus, direct, indirect, and cumulative effects to aesthetics are expected to be minimal.

**12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:**
*Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify direct, indirect, and cumulative effects to environmental resources.*

No demand for limited environmental resources or other activities demanding limited environmental resources were identified; therefore, no direct, indirect, or cumulative impacts would occur under either alternative.

**13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:**
*List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.*

- West Fork of Swift Creek Environmental Impact Statement (January 2005)
- Swedish Chicken Timber Sale Environmental Assessment (EA) (February 2011)
- Mystery Fish Timber Sale EA (March 2012)
- Upper Whitefish Lake Timber Sale Checklist EA (March 2012)
- Fish Bull Timber Sale Checklist EA (April 2012)
- Ewing Central Timber Sale Checklist EA (January 2013)
- Lazy Swift 2 Timber Sale Checklist EA (January 2013)

## IV. IMPACTS ON THE HUMAN POPULATION

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

**14. HUMAN HEALTH AND SAFETY:**
*Identify any health and safety risks posed by the project.*

No unusual safety considerations are associated with the proposed timber sale. Warning signs would be located along the Stillwater River Road, Fitzsimmons Road, and West Fork Road cautioning recreational and residential traffic of logging activities.

**15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:**
*Identify how the project would add to or alter these activities.*

The proposed timber harvest would provide continued industrial production in the region.

**16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:**

*Estimate the number of jobs the project would create, move or eliminate. Identify direct, indirect, and cumulative effects to the employment market.*

Based upon *Bureau of Business and Economic Research*, *2008,* an average of 10.0 jobs per million board feet (MMbf) of timber harvested are maintained annually in the logging and timber industry. Since the Action Alternative would harvest between 5 and 6 MMbf, an estimated 50 to 60 jobs would continue to be supported. Statewide, DNRC anticipates annual harvest levels at 56 MMbf, and applying the same job multiplier indicates the program supports an estimated 560 timber industry jobs.

**17. LOCAL AND STATE TAX BASE AND TAX REVENUES:**

*Estimate tax revenue the project would create or eliminate. Identify direct, indirect, and cumulative effects to taxes and revenue.*

Indirectly, the proposed action would contribute to the local and state tax base primarily through employment and equipment taxes.

**18. DEMAND FOR GOVERNMENT SERVICES:**

*Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify direct, indirect, and cumulative effects of this and other projects on government services*

Log trucks hauling to the purchasing mill would result in temporary increases in traffic on U.S. Highway 93. This increase is a normal contributor to the activities of the local community and would not be considered a new or increased source of traffic, therefore additional government service would not be required.

**19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:**

*List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.*

No locally adopted environmental plans are associated with the proposed timber sale.

**20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:**

*Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify direct, indirect, and cumulative effects to recreational and wilderness activities.*

**Existing Conditions**

A large tank trap at the junction with the West Fork of Swift Creek road prohibits access for any type of motorized travel except in the wintertime when heavy snow loads allow snowmobilers to cross. Multiple log sill bridges installed in the 1970's and 1980's have deteriorated and are now unsafe for passage of vehicles beyond this tank trap. Some culverts in the road system have become plugged with debris or broken, and the road has begun to wash out. Dense brush in some locations obstructs motorized and foot traffic.

**Environmental Effects**

- ***Direct, Indirect, and Cumulative Effects of the No-Action Alternative***

The Herrig Road would continue to be impassible and recreational potential would remain low. Road conditions would continue to worsen and become overgrown with vegetation. The log bridges would continue to deteriorate and pose a threat of falling into the stream and blocking flow.

- ***Direct, Indirect, and Cumulative Effects of the Action Alternative***

The Action Alternative would allow public motorized vehicles to access portions of the Herrig road system. The tank trap at the junction of the West Fork of Swift Creek Road would be removed and the bridge crossing the West Fork of Swift Creek would be replaced, allowing motorized traffic to access portions of the Herrig road system. In addition, multiple culverts would be installed assuring the road is drivable. Brushing portions of the road system accessing the harvest units would allow vehicular and pedestrian passage. As the road system is reconstructed to safe conditions, the first 1.3 miles of the Herrig Road would be open to public motorized use annually between July 1 and September 15 as defined in the Stillwater Transportation Plan included in the HCP.

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**21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:**
*Estimate population changes and additional housing the project would require. Identify direct, indirect, and cumulative effects to population and housing.*

No measurable direct, indirect, or cumulative impacts related to population and housing would be expected due to the relatively small size of the proposed timber sale project.

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**22. SOCIAL STRUCTURES AND MORES:**
*Identify potential disruption of native or traditional lifestyles or communities.*

No direct, indirect, or cumulative impacts related to social structures and mores would be expected under either alternative.

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**23. CULTURAL UNIQUENESS AND DIVERSITY:**
*How would the action affect any unique quality of the area?*

No direct, indirect, or cumulative impacts related to cultural uniqueness or diversity would be expected under either alternative.

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**24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:**
*Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify direct, indirect, and cumulative economic and social effects likely to occur as a result of the proposed action.*

- ***Direct, Indirect and Cumulative Effects of the No-Action Alternative***

No revenue would be generated for the Common Schools Trust at this time. Small timber permits could yield some additional revenue.

- ***Direct, Indirect and Cumulative Effects of the Action Alternative***

The timber harvest would generate approximately $891,300 for the Common Schools Trust and approximately $139,400 in Forest Improvement (FI) fees would be collected for FI projects. This is based on a stumpage rate of $31.67 per ton, multiplied by the estimated volume of tons. This stumpage rate was derived by comparing attributes of the proposed timber sale with the attributes and results of other DNRC timber sales recently advertised for bid. Costs related to the administration of the timber sale program are only tracked at the Northwestern Land Office (NWLO) and Statewide level. DNRC does not track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated Statewide and by the NWLO. From 2006 through 2010, revenue-to-cost ratio of the Northwestern Land Office was 2.51. This means that, on average, for every $1.00 spent in costs, $2.51 in

revenue was generated. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.

| | | | | |
|---|---|---|---|---|
| **EA Checklist Prepared By**: | **Name:** | Michael McMahon, Zachary Miller, Chris Forristal, Marc Vessar | **Date:** | 3/19/2013 |
| | **Title:** | Management Forester, Management Forester, Wildlife Biologist, Hydrologist | | |

## V. FINDING

**25. ALTERNATIVE SELECTED:**

An Interdisciplinary team (ID Team) has completed the Environmental Analysis Checklist (EAC) for the proposed Lower Herrig Timber Sale Project. Following a thorough review of the EAC, project file, public correspondence, and Department policies and rules, the decision has been made to select the Action Alternative.

The Action Alternative meets the intent of the project objectives as stated in Section I – *Type and Purpose of Action*. Specifically, the project would:

- Harvest 5 to 6 million board feet of timber from the Stillwater State Forest. The proposed activities would regenerate new stands of healthy trees and would also promote biodiversity by managing for appropriate stand structures and species compositions. Post harvest treatment is designed to address the shrub competition that has affected establishment and growth of trees in some of the harvest units.

- Generate approximately $891,300 in revenue for the Common Schools Trust. In addition, approximately $139,400 in Forest Improvement Fees would be generated for a total benefit value to the trust of $1,030,700.

- Update part of the road system in Herrig Basin that has not experienced any substantial maintenance since the mid 1980's. Road repairs are focused on installing surface drainage and replacing outdated damaged infrastructure (culverts & bridges), thereby protecting water quality. The transportation system repair designed for this project includes:

    1. Improving 4.6 miles of road within the Herrig Basin by stabilizing sloughs and slumps off the road cuts and installing approximately 30 culverts.
    2. Removing (2) collapsing wooden bridges and replacing (1) with a steel bridge.
    3. Updating 13.3 miles of existing road leading up to the project area by installing surface drainage improvements as necessary to protect water quality.

DNRC is required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run (*Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X Section 11;* and, *77-1-212 MCA*). The Action Alternative was designed to be in full compliance of State Forest Land Management Plan (SFLMP), the Administrative Rules for Forest Management (Forest Management Rules; ARM 36.11.401 through 471), and conservation commitments contained in the Selected Alternative in the Final EIS of the Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP) and associated Record of Decision (ROD), as well as other applicable state and federal laws.

**26. SIGNIFICANCE OF POTENTIAL IMPACTS:**

The identified resource management concerns have been fully addressed in the environmental analysis that was conducted. Specific project design features and various recommendations of the resource management specialists involved have been implemented to ensure that this project will fall within the limits of acceptable environmental change. For example, the project is designed to:

- Feather harvest unit edges to reduce visual impact from open roads.
- Leave all larger-diameter, live whitebark pine to promote the retention and regeneration of a species that has experienced high mortality over a large part of its natural range.
- Design harvest boundaries to provide for wildlife corridors of mature timber.
- Apply dust abatement when necessary along the haul route.
- Retain coarse woody debris to be left on site in amounts recommended by Graham (1994) and fine debris as much as practicable, maintaining nutrient cycling in harvest units.
- Reduce sediment delivery to streams by improving surface drainage and ditch relief on existing roads.

Taken individually and cumulatively, the proposed activities are common practices, and no project activities will be conducted on important fragile or unique sites. Therefore, I find there will be no significant impacts to the human environment as a result of implementing the Action Alternative. In summary, I find that the identified adverse impacts will be controlled, mitigated, or avoided by the design of the project to the extent that the impacts are not significant.

**27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:**

| | | | | | |
|---|---|---|---|---|---|
| [ ] | EIS | [ ] | More Detailed EA | [X] | No Further Analysis |

| | | |
|---|---|---|
| **EA Checklist Approved By**: | **Name:** | Brian Manning |
| | **Title:** | Unit Manager, DNRC Stillwater |
| **Signature:** /s/ Brian Manning | | **Date**: March 28, 2013 |

Attachment I:
**REFERENCES**


Aney, W. and R. McClelland. 1985. Pileated Woodpecker Habitat Relationships (revised). Pages 10-17 in Warren, N. eds. 1990. Old Growth Habitats and Associated Wildlife Species in the Northern Rocky Mountains. USFS, Northern Region, Wildlife Habitat Relationships Program R1-90-42. 47pp.

Arjo,W. M., D. H. Pletscher, and R. R. Ream. 2002. Dietary Overlap between Wolves and Coyotes in Northwestern Montana. Journal of Mammalogy 83:754-766.

Bower. 2010. Stream Temperature Monitoring Reports and Summary. Unpublished. Montana Department of Natural Resources and Conservation. Missoula, MT

Bull, E. L., and J. A. Jackson. 1995. Pileated woodpecker: Dryocopus pileatus. American Ornithologists' Union. Washington DC. 24pp.

Bull, E.L., C. G. Parks, and T. R. Torgersen. 1997. Trees and Logs Important to Wildlife in the Interior Columbia River Basin. General Technical report PNW-391. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon. 55pp.

Buskirk, S.W., and R.A. Powell. 1994. Habitat ecology of fishers and American martens. Pages 283-296 *in* Buskirk, S.W., A. Harestad, M. Raphael, eds. Biology and conservation of martens, sables and fishers. Cornell University Press, Ithaca, New York.

Croskery, P. R. 1991. Common Loon, Gavia immer, nesting success and young survival in northwestern Ontario. Canadian Field-Naturalist 105:45-48.

DFWP 2008. Maps of moose, elk, mule deer, and white-tailed deer distribution in Montana. Individual GIS data layers. August 12, 2008. Montana Fish, Wildlife and Parks. Helena, MT. http://fwp.mt.gov/gisData/imageFiles/distributionElk.jpg.
http://fwp.mt.gov/gisData/imageFiles/distributionMoose.jpg.
http://fwp.mt.gov/gisData/imageFiles/distributionMuleDeer.jpg.
http://fwp.mt.gov/gisData/imageFiles/distributionWhiteTailedDeer.jpg

DNRC, 2004. DNRC compiled soils monitoring report on timber harvest projects. Missoula, Montana.

DNRC. 2005. West Fork Swift Creek Timber Sale Project Final Environmental Impact Statement. Montana Department of Natural Resources and Conservation, Olney, MT.

DNRC, 2005a. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects, 1988-2004. Prepared by J. Collins, Forest Management Bureau, Missoula, MT .

DNRC 2010. DNRC Canada lynx habitat mapping protocols for implementation of the HCP. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan Final EIS. September 2010. Vol. II, Appendix B, pp. B-5 to B-19.

Ferruzzi, C. 2012. Biologist, Fortine Ranger District, Kootenai National Forest, USDA Forest Service, Fortine, Montana. Phone discussion regarding loon nesting and biology in the vicinity of Fish and Bull lakes, Stillwater State Forest. February, 2012. DNRC Northwest Land Office. Kalispell, MT.

Fischer, W.C., and A.F. Bradley. 1987. Fire ecology of western Montana forest habitat types. USDA Forest Service, General Technical Report INT-223. 95pp.

Foresman, K.R.. 2001. The wild mammals of Montana. Special Publication 12. American Society of Mammalogists. Allen Press, Kansas. 278pp.

Fuller, T. K.,W. E. Berg, G. L. Radde, M. S. Lenarz, and G. B. Joselyn. 1992. A History and Current Estimate of Wolf Distribution and Numbers in Minnesota. Wildlife Society Bulletin 20:42-55.

Garrott, R., S. Creel, and K. Hamlin. 2006. Monitoring and Assessment of Wolf-Ungulate Interactions and Population Trends within the Greater Yellowstone Area, SW Montana and Montana Statewide. Unpublished report at: *http://www.homepage.montana.edu/~rgarrott/wolfungulate/index.htm*

Graham, R.T., A.E. Harvey, M.F. Jurgensen, T.B. Jain, J.R. Tonn, and D. S. Page-Dumroese. 1994. *Managing Coarse Woody Debris in Forest of the Rocky Mountains.* USDA Forest Service Research Paper. INT-RP-447. 13 pp.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old Growth Forest Types of the Northern Region. R-1 SES. USDA Forest Service, Northern Region, Missoula Montana 60pp.

Harger, R. 1978. Old-growth forests: managing for wildlife. USDA Forest Service, Northern Region, Missoula, Montana. 58pp.

Harrelson, C.C., C.L. Rawlins, J.P. Potyondy. 1994. Stream channel reference sites: an illustrated guide to field technique. General Technical Report RM-245. U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.

Harris, R.B. 1999. Abundance and Characteristics of Snags in Western Montana Forests. General Technical report RMRS-GTR-31. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT. 19pp.

Haupt, H.F., et al. 1974. Forest hydrology part II: hydrologic effects of vegetation manipulation. USDA Forest Service, Region 1. Missoula, Montana.

Hejl, S. J. and R. E. Woods. 1991. Bird assemblages in old-growth and rotation-aged Douglas-fir/ponderosa pine stands in the Northern Rocky Mountains: a preliminary assessment. Pages 93-100 *in* D. M. Baumgartner and J. E. Lotan, eds. Proc. Symposium: Interior Douglas-fir: the species and its management. Washington State University, Pullman, Washington. 306pp.

Heinemeyer, K. S., and J. L. Jones. 1994. Fisher biology and management in the western United States: A literature review and adaptive management strategy. USDA Forest Service, Northern Region, Missoula, Montana. 108pp.

Hillis, J.M., and M.J. Thompson, J.E. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan, and D.W. McCleerey. 1991. Defining elk security: the Hillis paradigm. Pages 38-43 in A.G. Christensen, L.J. Lyon, and T.N. Lonner, comps., Proc. Elk Vulnerability Symp., Mont. State Univ., Bozeman, Montana. 330pp.

Johnson, S. 1984. Home range, movements, and habitat use of fishers in Wisconsin. M.S. Thesis, University of Wisconsin, Stevens Point, Wisconsin. 78pp.

Jones, J.L. 1991. Habitat use of fisher in north-central Idaho. M.S. Thesis, University of Idaho, Moscow, Idaho. 147 pp.

Kelly, L. 1992. The effects of human disturbance on Common Loon productivity in northwestern Montana. MS Thesis, Montana State University, Bozeman, Montana.

Koopal, M., Chadwick, A., Sawtelle, C. 2008. Fisheries Resource Summary Report. Unpublished. Prepared for Montana Department of Natural Resources and Conservation, Northwestern Land Office. Kalispell, MT.

Kuennen, Louis J. and Marci L. Nielsen –Gerhardt. 1995. Soil survey of Kootenai National Forest area, Montana. USDA Forest Service, Kootenai National Forest, Libby, Montana.

Kunkel, K.E., D.H. Pletscher, D.K. Boyd, R.R. Ream, and M.W. Fairchild. 2004. Factors Correlated with Foraging Behavior of Wolves in and near Glacier National Park, Montana. Journal of Wildlife Management 68(1): 167-178.

Laudon, K. 2011. Region 1 Wolf Management Specialist, Montana Fish, Wildlife and Parks, Wildlife Division, Kalispell, Montana. Email exchange with DNRC wildlife biologist regarding the current status and denning/rendezvous sites of the Murphy Lake wolf pack. February, 2011. DNRC Northwest Land Office. Kalispell, MT.

Losensky, J.B. 1997. Historical vegetation of Montana. Prepared for DNRC. Unpublished report on file at DNRC Forest Management Bureau, Missoula, MT. 100 pp.

MDEQ, 2007. Montana Nonpoint Source Management Plan. Montana Department of Environmental Quality, Water Quality Planning Bureau, Watershed Protection Section. Helena, MT. 136 pages.

MFISH, 2012. Montana Fisheries Information System. Fisheries database managed by Montana Fish, Wildlife and Parks, Information Services Division, Helena, MT. http://fwp.mt.gov/fishing/mfish/

MNHP. 2011. Tracker data. Montana Natural Heritage Program online database query for the Selow Valley Timber Sale project area. http://mtnhp.org/Tracker/NHTMap.aspx

MNHP. 2013. Tracker data. Montana Natural Heritage Program online database query for the Lower Herrig Timber Sale project area. http://mtnhp.org/Tracker/NHTMap.aspx

Mace, R. and L. Roberts. 2011. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2009-2010. Montana Fish, Wildlife & Parks, 490 N. Meridian Road, Kalispell, Montana. Unpublished data.

Mace, R.D., J.S. Waller, T.L. Manley, L.J. Lyon, and H. Zuuring. 1997. Relationships among Grizzly Bears, Roads, and Habitat in the Swan Mountains, Montana. Pages 64-80 *in* Mace, R.D., and J.S. Waller. 1997. Final Report: Grizzly Bear Ecology in the Swan Mountains, Montana. Montana Fish, Wildlife and Parks, Helena, Montana. 191pp.

Martinson, A. H. and W. J. Basko. 1998. Soil Survey of Flathead National Forest Area, Montana. USDA Forest Service, Flathead National Forest, Kalispell, Montana.

McCallum, D.A. 1994. Flammulated Owl (*Otus flammeolus*). In: The birds of North America. No. 93. Philadelphia, PA: American Ornithologists' Union; Washington, DC: Academy of Natural Science. 23 pp.

McClelland, B.R. 1979. The pileated woodpecker in forests of the Northern Rocky Mountains. Pages 283-299 *in* Role of insectivorous birds in forest ecosystems. Academic Press.

Oakleaf, J.K., D. L. Murray, J. R. Oakleaf, E. E. Bangs, C. M. Mack, D. W. Smith, J. A. Fontaine, M. D. Jimenez, T. J. Meier, and C. C. Niemeyer. 2006. Habitat Selection by Recolonizing Wolves in the Northern Rocky Mountains of the United States. Journal of Wildlife Management 70:554-563.

Parks, C.G. and D.C. Shaw. 1996. Death and decay: A vital part of living canopies. Northwest science. Vol. 70, special issue: 46-53.

Pfister, R., B. Kovalchik, S. Arno, and R. Presby. 1977. Forest habitat types of Montana. USDA For. Serv. Gen. Tech. Rep. INT-34. Intermountain Forest and Range Experiment Station Ogden, Utah. 174pp.

Powell, R. 1982. The fisher: National history, ecology, and behavior. University of Minnesota Press, Minneapolis, Minnesota. 217pp.

Raskin, Edward B., Casey J. Clishe, Andrew T. Loch, Johanna M. Bell. 2006. Effectiveness of timber harvest practices for controlling sediment related water quality impacts. Journal of the American Water Resources Association 42 (5), 1307–1327.

Rosgen, D. L.1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

Ross, C. P., Andrews, D. A., and Witkind, I. J., 1955, Geologic map of Montana: U. S. Geol. Survey. Accessed through Natural Resource Information System at http://nris.mt.gov/.

Ruggiero, L. F., Aubry, K. B., Buskirk, S. W., Koehler, G. M., Krebs, C. J., McKelvey, K. S., and J. R. Squires. 1999. Ecology and conservation of lynx in the United States. General Technical Report RMRS-GTR-30WWW. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Fort Collins, Colorado. 473 pp.

Ruediger, B., J. Claar, S. Mighton, B. Nanaey, T. Tinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S. Gniadek. 2000. Canada Lynx Conservation Assessment (2nd Edition). USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, Montana. 122 pp.

Servheen, C., S. Herrero, and B. Peyton (compilers). 1999. Bears. Status survey and conservation action plan. IUCN/SSC Bear and Polar Bear Specialist Groups, IUCN, Gland, Switzerland and Cambridge, U.K. 309 pp.

Sime, Carolyn A., V. Asher, L. Bradley, N. Lance, K. Laudon, M. Ross, A. Nelson, and J. Steuber. 2011. Montana gray wolf conservation and management 2010 annual report. Montana Fish, Wildlife & Parks. Helena, Montana. 168 pp.

Squires, J.R., N.J. DeCesare, J.A. Kolbe, and L. F. Ruggiero. 2010. Seasonal resource selection of Canada lynx in managed forests of the Northern Rocky Mountains. Journal of Wildlife Management 74:1648-1660.

Titus, J. R., and L. W. VanDruff. 1981. Response of the common loon to recreational pressure in the Boundary Waters Canoe Area, northeastern Minnesota. Wildlife Monographs 79:5-59.

Troendle, C.A., Nankervis, J.M., Peavy, A. 2007. The Herger-Feinstein Quincy Library Group Project—Impacts of Vegetation Management on Water Yield Final Report. 23pp.

USFWS and DNRC. 2010. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan, Final Environmental Impact Statement, Volumes I and II. U.S. Department of Interior, Fish and Wildlife Service, Region 6, Denver, Colorado, and Montana Department of Natural Resources and Conservation, Missoula, MT. September 2010.

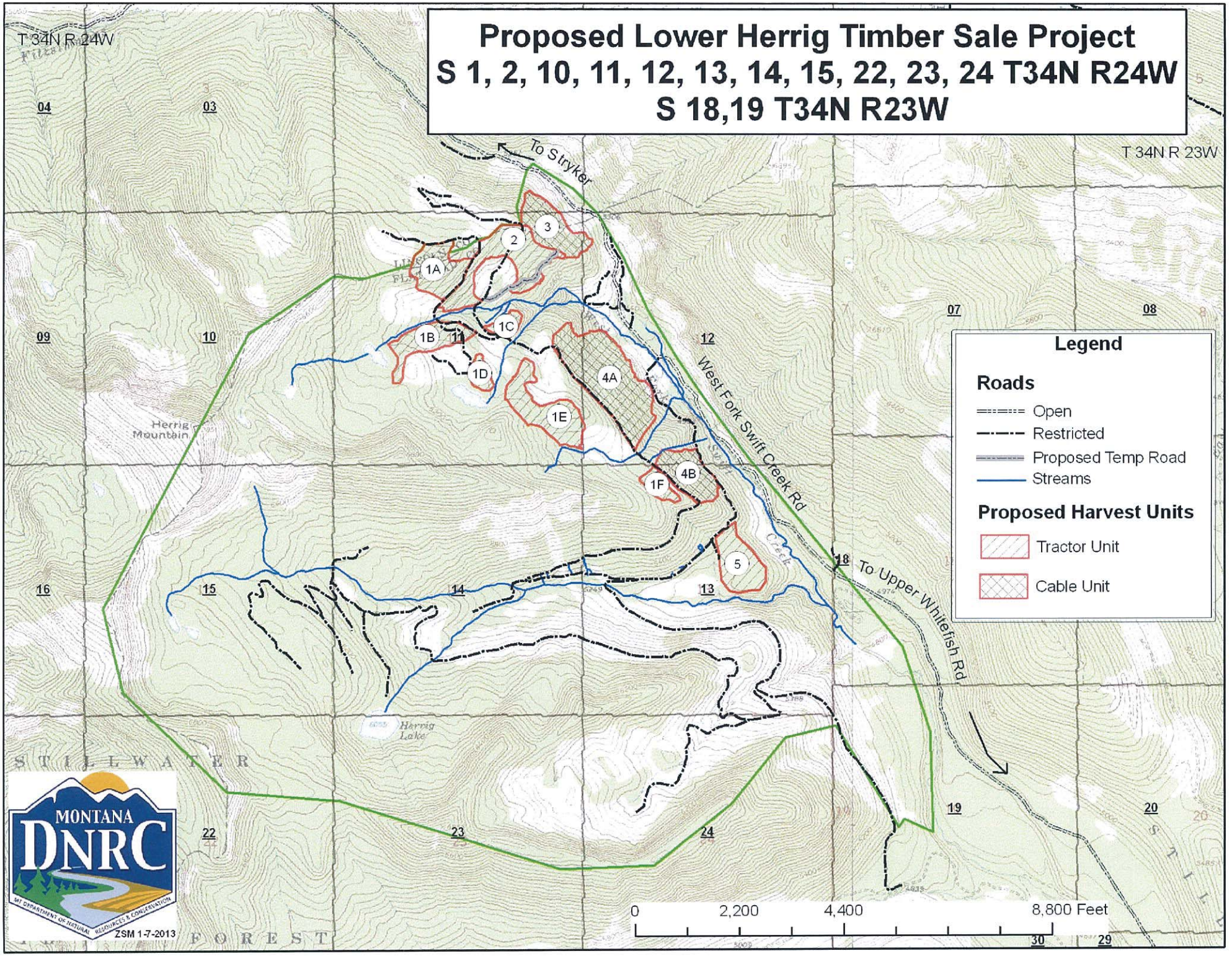
USFWS. 1993. Grizzly Bear Recovery Plan. Missoula Montana. 181pp.

Warren, N.M. (ed.) 1990. Old-growth habitats and associated wildlife species in the northern Rocky Mountains. USDA Forest Service, Northern Region, Missoula, Montana.

Warren, N.M. 1998. Old-growth associated wildlife: status and management strategies. Land management technical note. No. 16. Flathead National Forest. 19pp.

Watershed Consulting, 2009. Flathead-Stillwater TMDL Planning Area Sediment and Habitat Assessment Summary Report. Prepared for Montana DEQ under contract #205037-TO9.

Wittinger, W.T. 2002. Grizzly bear distribution outside of recovery zones. Unpublished memorandum on file at USDA Forest Service, Region 1. Missoula, Montana. 2pp.


Proposed Lower Herrig Timber Sale Project
S 1, 2, 10, 11, 12, 13, 14, 15, 22, 23, 24 T34N R24W
S 18,19 T34N R23W
T 34N R 24W
T 34N R 23W
To Stryker
West Fork Swift Creek Rd
To Upper Whitefish Rd
Herrig Mountain
Herrig Lake
1A
1B
1C
1D
1E
1F
2
3
4A
4B
5
Legend
Roads
Open
Restricted
Proposed Temp Road
Streams
Proposed Harvest Units
Tractor Unit
Cable Unit
0
2,200
4,400
8,800 Feet
MONTANA DNRC
ZSM 1-7-2013

Attachment III:

## Prescription Table

| Unit Number | Est. Acres / MBF | Prescription | Marking guides | Particulars involved in unit(s) | Notes |
|---|---|---|---|---|---|
| 1<br>A,C,D,E | 63<br><br>650 mbf | Improvement Harvest (contains some overstory removal, commercial thin and regeneration treatments) | **Cut by Description**:<br>-Species designated to cut = ES, AF<br>-Leave all whitebark pine<br>-Maintain 4 snags or snag recruits per acre >21" DBH (~100' spacing)<br>-4 acres commercial thinning in unit 1E | -All tractor harvest units<br>-19 percent total of all the units is old growth<br>-Average skid distance: 500'<br>- Class 2 stream SMZ in units 1C and 1D in which there will be no harvest<br>-Jump up road to landings in 1A and 1E<br>-Plan to skid down old road from Unit 1D to a landing at the road junction in Unit 1B<br>-Unit 1E has an existing skid trail in north end of unit<br>-Excavator pile and scarify<br>- Interplant Engelmann spruce | - Units have areas of scattered volume; such areas where it is not economically feasible to harvest may be excluded from harvest as directed by the Forest Officer.<br>-Established brush has out-competed regeneration in the understory of the stand.<br>-90' RMZ in Unit 1 C in which sub-merchantable trees and 50 % of the canopy will be left. |
| 1<br>B,F | 27<br><br>275 mbf | Clearcut w/ reserves | **Cut by Description**:<br>-Species designated to cut = ES, AF<br>-Leave all whitebark pine<br>-Maintain 4 snags or snag recruits per acre >21" DBH (~100' spacing)<br>-Protect areas of advanced regeneration | -Tractor harvest units<br>- No old growth present in either unit<br>-Average skid distance: 600'<br>- Class 2 stream SMZ in unit 1B in which there will be no harvest<br>-Jump up road to landing in 1F<br>-Excavator pile and scarify<br>- Interplant Engelmann spruce | -Both units have areas of scattered volume; such areas where it is not economically feasible to harvest may be excluded from harvest as directed by the Forest Officer. |
| 2 | 38<br><br>920 mbf | Clearcut w/ reserves | **Cut by Description**:<br>-Species designated to cut = ES, AF<br>-Leave all whitebark pine<br>-Maintain 4 snags or snag recruits per acre >21" DBH (~100' spacing)<br>-Protect areas of advanced regeneration | -Primarily a tractor harvest unit<br>-84 percent of the unit is old growth<br>-Average skid distance: 350'<br>-No harvest in Class 2 SMZ<br>-0.26 mile temp road constructed on south east boundary<br>-Portion of unit has slope exceeding 45%, skyline harvest from upper road is possible;<br>-Excavator pile and scarify<br>-Interplant Engelmann spruce | -Common boundary between unit 2 and 3. |

| | | | | | |
|---|---|---|---|---|---|
| 3 | 24<br><br>520 mbf | Clearcut w/ reserves | **Cut by Description**:<br>-Species designated to cut = ES, AF<br>-Unit has a component of DF which will be left (expect clumpy distribution)<br>-Maintain 4 snags or snag recruits per acre >21" DBH (~100' spacing) when DF are not present | -Cable harvest unit<br>-83 percent of the unit is old growth<br>-Average skid distance: 350'<br>-Feather edges of stand for visual effects<br>-2 stage skidding of ~200' to main landing required<br>-Broadcast burn~ 19 Acres: limb first 2 logs to retain slash in unit; outer corridors will act as fire line; 2000' hand line to establish<br>-Interplant Douglas-fir and Engelmann spruce | |
| 4<br>A, B | 81<br><br>2780 mbf | Clearcut w/ reserves | **Cut by Description:**<br>-Species designated to cut = ES, AF<br>-Leave all whitebark pine<br>-Units have a small component of DF and WL which will be left (expect clumpy distribution)<br>-Maintain 4 snags or snag recruits per acre >21" DBH (~100' spacing) when DF are not present | -Cable harvest unit<br>-94 percent of the unit is old growth<br>-Average skid distance: 350'<br>-Areas of 70% slope<br>-Feather stand edges for visual effects<br>-Road widening and turnouts needed for yarding locations<br>-Broadcast burn ~ 50 acres in unit 4A- 1700' excavator line and 1900' hand line and 20 acres in unit 4B -1500' hand line: limb first 2 logs to retain slash in unit; outer corridors will act as fire line; 1600' excavator fire line to establish; 3400' hand dug fire line total<br>- Plant Douglas-fir and Engelmann spruce | -RMZ on portions of unit 4B boundary.<br>-100' SMZ |
| 5 | 23<br><br>200 mbf | Clearcut w/ reserves | **Cut by Description**:<br>-Species designated to cut = ES, AF<br>-Unit has a small component of DF and WL which will be left (expect clumpy distribution)<br>-Maintain 4 snags or snag recruits per acre >21" DBH (~100' spacing) when DF are not present | -Tractor harvest unit<br>-No old growth<br>-Average skid distance: 500'<br>-Brush existing road and update BMPs<br>-Excavator pile and scarify<br>-Plant western larch 16'x16' spacing | |

NOTES:

AF = Alpine fir
BMP = Best Management Practices
DBH = Diameter at Breast Height
DF = Douglas-fir
ERZ = Equipment Restriction Zone
ES = Englemann spruce
RMZ = Riparian Management Zone
SMZ = Streamside Management Zone
WL = Western larch

Attachment IV:

# WILDLIFE ANALYSIS

## INTRODUCTION

This analysis discloses the existing condition of relevant wildlife resources, and displays the anticipated effects that may result from each alternative of this proposal. There is a general discussion on the analysis areas and analysis methods employed to disclose the anticipated direct, indirect, and cumulative effects to these wildlife resources from the proposed actions. Past and current activities on all ownerships in each analysis area, as well as known planned future agency actions, have been taken into account for the cumulative effects analysis.

Considerations and concerns raised by DNRC specialists and public comments received during initial scoping for the proposed project led to the following list of issues:

- The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.
- The proposed activities could reduce abundance of snags and coarse woody debris, which could lower habitat quality for species that depend on these structural attributes.
- The proposed activities could affect wildlife species associated with old-growth forests by reducing habitat availability and increasing fragmentation.
- The proposed activities could alter grizzly bear (*Ursus arctos*) cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increase risk of human-caused bear mortality.
- The proposed activities could result in the modification of habitat preferred by Canada lynx (*Felis lynx*) and decrease the area's suitability for lynx.
- The proposed activities could decrease habitat suitability for fishers (*Martes pennanti*) by decreasing canopy cover in mature forest stands, decreasing abundance of snags and coarse woody debris, and by increasing roads, which could elevate risk of trapping mortality.
- The proposed activities could displace gray wolves (*Canis lupus*) from the vicinity of the project area, particularly at denning and rendezvous sites, and/or alter big game prey availability, which could adversely affect gray wolves.

## ANALYSIS AREAS

The discussions of existing conditions and environmental effects will focus on two different spatial scales. The first scale will be the "project area," which was used to assess direct and indirect effects to wildlife species and their habitats. The "project area," totaling 3,590 acres, consists of portions of Township 34 North, Range 23 West, sections 18 and 19, and portions of Township 34 North, Range 24 West, sections 1, 2, 10-15, 22-24 (TABLE W-1 –WILDLIFE ANALYSIS AREAS, FIGURE W-1 –WILDLIFE ANALYSIS AREAS). This project area

surrounds the proposed timber harvest units and is the area where all proposed road construction would occur. Elevation within the project area ranges between 4,720 and 7,240 feet. The proposed project area contains a variety of slope aspects and wildlife habitats.

The second scale is the "cumulative effects analysis area," which refers to the surrounding landscape for assessing cumulative effects to wildlife species and their habitat. Cumulative effects analysis areas (CEAAs) are named according to the size of the area and are summarized in TABLE W-1 –WILDLIFE ANALYSIS AREAS and FIGURE W-1 – WILDLIFE ANALYSIS AREAS. CEAAs include the project area as well as lands managed by other agencies and private landowners. Detailed descriptions of each analysis area are located in the **Existing Environment** section for each issue or wildlife species evaluated. In general, CEAAs were delineated to approximate the size of a focal species' home range or to approximate a surrounding landscape in which the proposed activities could most likely have measureable cumulative effects to wildlife habitat. See FIGURE W-1- WILDLIFE ANALYSIS AREAS for a map showing the project and cumulative effects analysis areas.

***TABLE W-1. WILDLIFE ANALYSIS AREAS.*** *Descriptions of the project area and CEAAs.*

| ANALYSIS AREA NAME | DESCRIPTION | TOTAL ACRES | ISSUE(S)/SPECIES ANALYZED |
|---|---|---|---|
| Project Area | Portions of Sections 1, 2, 10-15, 22, 23, 24, in T34N, R24W, as well as portions of Sections 18 and 19 in T34N, R23W. | 3,590 | direct & indirect effects for all issues/species |
| Small CEAA | The project area and DNRC lands within the West Fork Swift Creek HUC12 watershed. | 12,807 | mature forests and connectivity, old-growth forest, snags and coarse woody debris |
| Medium CEAA | The project area and DNRC lands within the Upper Whitefish grizzly bear management unit (BMU) subunit. | 27,173 | fishers, wolves |
| Large CEAA | The project area and Stillwater East lynx management area (LMA). | 36,877 | Canada lynx, grizzly bears |

In December 2011, DNRC adopted a Habitat Conservation Plan (HCP) in cooperation with the USFWS to minimize potential impacts of the Forest Management Program to grizzly bears, Canada lynx and three species of fish. As a part of the HCP, DNRC agreed to limit road construction and use for 50 years in a transportation plan developed for blocked forestlands managed by the DNRC Stillwater Unit. This comprehensive access plan is called the Stillwater Block Transportation Plan and includes blocked lands on the Stillwater and Coal Creek state forests. The effects to wildlife associated with the full transportation plan were analyzed in the DNRC HCP EIS (USFWS and DNRC 2010). This effects assessment tiers to the detailed analyses contained in those documents. Changes in legal public motorized access within the proposed project area or CEAAs used in this document would occur through implementation of the

Stillwater Block HCP Transportation Plan, as analyzed in the DNRC HCP EIS and accompanying MEPA documents (USFWS and DNRC 2010).

**ANALYSIS METHODS**

DNRC attempts to promote biodiversity by taking a coarse-filter approach, which favors a mix of stand structures and compositions on state lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, the full complement of species would persist and biodiversity would be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a fine-filter approach for threatened, endangered, and sensitive species (ARM 36.11.406). The fine-filter approach focuses on habitat requirements of several individual species.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of information and techniques were used. Field visits, scientific literature, DNRC's stand level inventory (SLI) data, aerial photographs, USDA Forest Service Geographical Information System (GIS) data, Montana Natural Heritage Program (MNHP) data, and consultations with other professionals provided information for the following discussion and effects analyses. Specialized methodologies are discussed under the species in which they occur. Species were dismissed from further analysis if habitat did not exist in the project area, or the species would not be affected by any alternative.

Cumulative effects analyses account for known past and current activities, as well as planned future agency actions. Ongoing and proposed timber sale projects that could contribute to cumulative effects are summarized in TABLE W-2 - RECENT AND PROPOSED PROJECTS.

***TABLE W-2. RECENT AND PROPOSED PROJECTS.*** *Recent and proposed timber harvest projects that could contribute to cumulative effects and the number of harvested acres that occur in each analysis area.*

| Sale Name | Agency | Status | Project Area | Small CEAA | Medium CEAA | Large CEAA |
|---|---|---|---|---|---|---|
| SE Stryker Ridge | DNRC | ongoing | - | 30 | 397 | 446 |
| Swedish Chicken | DNRC | ongoing | - | - | 267 | 357 |
| Upper Whitefish Lake | DNRC | ongoing | - | - | 164 | 164 |
| Lazy Swift 2 | DNRC | ongoing | - | - | - | 435 |

Changes to vegetation and forest structure resulting from all DNRC projects, with the exception of the ongoing DNRC Lazy Swift 2 Timber Sale, have been accounted for in SLI data used for

this analysis. The effects of ongoing sales on wildlife will be discussed in cumulative effects analyses.

## RELEVANT AGREEMENTS, LAWS, PLANS, RULES, AND REGULATIONS

Various policy and procedural documents provide the foundation for management criteria pertaining to wildlife and their habitat on state lands. The documents most pertinent to this project include *DNRC Forest Management Rules*, *DNRC Forested Trust Lands Final Environmental Impact Statement and Habitat Conservation Plan* (HCP), the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and the *Bald and Golden Eagle Protection Act*.

## COARSE FILTER WILDLIFE ANALYSIS

### *MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY*

***Issue:*** *The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.*

#### Introduction

A variety of wildlife species rely on older, mature forests to meet some or all of their life history requirements. Mature forests, generally characterized by abundant large diameter trees and dense canopy cover, play an important role in providing food, shelter, breeding sites, resting areas, and/or travel corridors for certain animals. Wildlife use of older, mature forests is species-specific; some species use this habitat exclusively, other species only temporarily or seasonally, and some species avoid mature forests altogether. Several species known to be strongly associated with mature and old forests include American marten (*Martes americana*), northern goshawk (*Accipter gentilis*), and winter wrens (*Troglodytes troglodytes*).

Forested landscapes in the western United States were historically shaped by natural disturbance events; primarily wildfire, blowdown, and pest outbreaks. Resulting broad landscape patterns were a mosaic of forest patches varying in age, composition and development. Timber harvest, like stand-replacement fire and blowdown, is a disturbance event that can create open, non-forested patches that over time develop into young, conifer forests. Patch size, age, shape, abundance, and distance to similar patches (connectivity) can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the particular species and its habitat requirements. Temporary non-forested openings, patches, and forest edges created by timber harvest and associated roads may be avoided by certain wildlife species adapted to mature, well-stocked forest. In contrast, other wildlife species flourish in early seral habitats created by disturbance. Connectivity under historical fire regimes within forest types found in the vicinity of the project area was likely relatively high as fire differentially burned various habitats across the landscape (*Fischer and Bradley 1987*).

**Analysis Areas**

Direct and indirect effects were analyzed on the project area (3,590 acres). Cumulative effects were analyzed within 12,807 acres comprised of the project area and the West Fork Swift Creek HUC12 watershed (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale of analysis would be large enough to support a diversity of species that use mature forested habitat and/or require connected forested habitats and centers evaluation of cumulative effects on those areas most likely to be affected by the proposed action.

**Analysis Methods**

Mature forested habitats and landscape connectivity were assessed using field evaluations, DNRC's stand level inventory (SLI) data, aerial-photograph interpretation, USDA Forest Service data (VMap 9.1.1), and GIS analysis. Mature forested habitat was defined as forest stands typically >100 years old with ≥40% canopy cover comprised primarily of trees >9 inches diameter at breast height (dbh). Forested stands containing trees of at least this size and density were considered adequate for providing minimal conditions necessary to facilitate movements of many wildlife species that benefit from well-connected mature forest conditions across the landscape. Road density was calculated in linear miles per square mile by dividing the number of road miles by the specified analysis area in square miles. Factors considered in the analysis include: 1) availability of mature forested habitats (≥40% canopy cover, >9 inches dbh), 2) average patch size, 3) the degree of timber harvesting, 4) open and restricted road density, and 5) the availability of potential travel corridors.

**Existing Environment**

The project area currently contains approximately 1,872 acres (52.1% of the project area) of mature Engelmann spruce and subalpine fir stands that have a reasonably well-developed canopy (≥40% crown closure). Crown closure values within these stands are mostly between 40 to 70 percent. Another 1,677 acres (46.7%) of the project area consists of mature Engelmann spruce and subalpine fir stands or subalpine/krummholz areas with a more open overstory (<40% crown closure). Dense brush and shrubs up to 8 feet tall are prevalent in the understory of most of these mature stands. With approximately 1,988 acres (55.4%) of the project area above 6,000 feet in elevation, environmental conditions have influenced habitat types and in some cases created forest stands with lower average tree densities and reduced overstory crown closure than what would be found in lower elevation, undisturbed mature forest. The 1,872 acres of well-stocked, mature forest stands are well-connected within the proposed project area, with one 1,864-acre patch and two additional smaller patches that are connected to other mature forest outside of the project area (average patch size = 624 acres, see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY). Approximately 437 acres of old-growth forest, as defined by *Green et al. (1992),* are present within the proposed project area (see OLD-GROWTH FOREST for more details). Harvesting activities in the late 1970's have resulted in approximately 317 acres (8.8% of project area) of densely stocked, regenerating forest within the project area. Regenerating conifers within this stand are on average 15 to 20 feet tall. Approximately 42 acres (1.2% of the project area) of non-forest areas

comprised of alpine tundra, scree fields, and small lakes or wetlands are also present within the project area.

Approximately 16.7 miles (3.0 miles/sq. mile) of DNRC roads exist in the project area (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION). Of these miles, approximately 2.5 miles (0.5 miles/sq. mile) are seasonally open to public motorized use. All other 14.2 miles of roads (2.5 miles/sq. mile) within the project area are currently restricted to non-motorized use by the general public. All of the road miles within the project area are inaccessible by wheeled motor vehicles during average winter conditions. Due to abundant mature forest cover and low open road densities, habitat connectivity for species using older (100+ years), undisturbed forest is good within the project area (see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY).

The abundance and spatial arrangement of mature, closed canopy forest within the CEAA is influenced by past timber harvesting and climatic conditions that limit forest growth at higher elevations. Presently, 53.2 percent (6,811 acres) of the CEAA is comprised of relatively well-connected mature forest stands possessing ≥40% crown closure. Another 3,473 acres (27.1%) of the CEAA consists of primarily mature forest stands with a more open overstory (<40% crown closure). Dense brush and shrubs up to 8 feet tall are prevalent in the understory of most of these mature stands. Environmental conditions at high elevations within the CEAA have created habitat types and forest stands with lower average tree densities and reduced overstory crown closure than what would be found in lower elevation, undisturbed mature forest. Average patch size of mature forest in the CEAA is 401 acres (17 patches, range 0.5 to 6,374 acres). Landscape connectivity of mature forest stands within the CEAA is good, with a single 6,374-acre patch providing connectivity throughout most of the CEAA. Three patches less than 5 acres in size are part of larger mature forest patches located outside of the CEAA borders. About 2,321 acres of the CEAA (18.1%) has been harvested within the last 40 years. These lands consist of young, dense regenerating forest with few large scattered trees and do not provide suitable habitat for species that utilize well-stocked, mature forests. Lakes, scree fields, and wetland/riparian meadows comprise 203 acres (1.6%) of the CEAA.

Approximately 51.8 miles (2.6 miles/sq. mile) of DNRC roads exist within the CEAA. Of these roads, there are 9.9 miles of open roads that equate to a density of 0.5 mile/square mile. These roads are primarily a result of past harvesting activities within the CEAA, however they are now used mostly by recreationalists. Ongoing harvesting associated with the SE Stryker Ridge Timber Sale in the CEAA is currently altering forested habitats and landscape connectivity on approximately 30 acres at the far southern end of the area (TABLE W-2 - RECENT AND PROPOSED PROJECTS). These activities will likely be completed by November of 2013. Across the CEAA, mature forest habitat and landscape connectivity are largely available for species that require and/or prefer these conditions.

**Environmental Effects**

- **Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitat and Connectivity**

Under this alternative no timber harvesting activities would occur. This would result in: 1) no changes to existing stands; 2) no appreciable changes to forest age, the distribution of forested cover, or landscape connectivity; and 3) no changes to wildlife use. Thus, no direct or indirect effects to mature forested habitat suitability and connectivity would be expected.

- **Direct and Indirect Effects of the Action Alternative on Mature Forested Habitat and Connectivity**

Under the Action Alternative, approximately 256 acres (7.1% of the project area) would be harvested. Of these acres, 217 acres (6.0% of the project area) of well-stocked, mature forest would undergo harvesting (see TABLE W-3 – MATURE FORESTED HABITAT). All of these acres of mature forest would receive harvest treatments that would reduce overstory crown closure from >40% to <5% and increase mature tree spacing to >90 feet. Species that rely on these mature forested habitats would experience a reduction in habitat for 50 to 80 years. Under the proposed silvicultural prescriptions, residual trees would be healthy seral species (e.g. Engelmann Spruce, Douglas-fir, whitebark pine). Average mature forest patch size would be reduced from 624 acres (3 patches) to 236 acres (7 patches). Four of the seven mature forest patches would remain connected to larger patches located outside the project area boundaries. The largest mature forest patch providing connectivity throughout the project area would be reduced from 1,864 acres to 1,626 acres (see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY). Approximately 1,655 acres (46.1%) of mature forest in the project area would remain unharvested and could provide suitable habitat for species utilizing mature forest. In particular, unharvested areas adjacent to riparian areas could serve as travel corridors for some species favoring mature forest. After harvesting, the project area would continue to provide a variety of forested habitat conditions for wildlife, but the proportions of these habitats would change. Species preferring larger continuous patches of well-stocked mature forest would likely experience a reduction in habitat quality, as 217 acres would be removed and the amount of edge habitat would increase under the proposed harvesting. After harvest completion, the amount of young, regenerating forest stands would increase. However, approximately 317 acres of densely stocked, regenerating forest would continue to develop and will likely provide appreciable amounts of mature forest cover within the next 30 to 50 years. In general, under this alternative, habitat conditions would improve for species adapted to more open forest conditions with seral species, while reducing habitat quality for species that prefer well-stocked, mature forest habitats.

***TABLE W-3 – MATURE FORESTED HABITAT.*** *Existing acres, proposed harvest acres, and percentages of mature forested habitat possessing ≥40% canopy closure within the project area and cumulative effects analysis area.*

| Analysis Area | Total Acres | Mature Forested Habitat Present (% area) | Proposed Harvest Under Action Alternative (% area) | Mature Forested Habitat Post-Harvest (% area) |
|---|---|---|---|---|
| Project Area | 3,590 | 1,872 (52.1%) | 217 (6.0%) | 1,655 (46.1%) |
| Cumulative Effects Analysis | 12,807 | 6,811 (53.2%) | 217 (1.7%) | 6,594 (51.5%) |

Under the Action Alternative, approximately 1.4 miles of existing restricted road would be used for harvesting activities. Approximately 0.4 miles of temporary road would be built under the proposed action. No new permanent roads would be built. During harvest activities, up to 6.9 miles of road (open, restricted, and temporary) within the project area could receive use and have elevated traffic levels (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION). All 14.2 miles of currently restricted road within the project area would remain restricted to public motorized use during harvest activities. Approximately 1.3 miles of existing restricted road within the project area would be permanently opened to public motorized access through implementation of the Stillwater Block HCP Transportation Plan, as analyzed in the DNRC HCP EIS and accompanying MEPA documents (USFWS and DNRC 2010). These 1.3 miles of road would be open to public motorized access from July 1 through September 15. Open road density would increase from 0.5 miles/sq. mile to 0.7 miles/sq. mile during this seasonally open period. All temporary roads constructed would be reclaimed and closed to all motorized vehicles following use. Thus, at the conclusion of the proposed project, the total amount of roads within the project area would remain the same as pre-project levels, however the amount of open roads would increase annually for a 2.5 month period (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION).

Minor adverse direct and indirect effects to connectivity and suitability of mature forested habitat in the project area would be expected since: 1) harvesting would appreciably reduce tree density and existing cover on approximately 217 acres (11.6%) of existing available mature stands, 2) connectivity of mature forest would be altered, with an increase in the number of patches from 3 to 7 and a decrease in average patch size from 624 to 236 acres, however the largest existing patch would be reduced from 1,864 acres to 1,626 acres (a 12.8% change); 3) a measure of connectivity would be maintained on 1,655 acres (46.1% of project area) of mature forest along riparian areas and topographic features, and 4) long-term open road density would increase by 0.2 miles/sq. mile seasonally for a 2.5 month period, but total road density would not change.

***TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION.*** *Miles and density (miles/square mile) of existing road and new road that would be used in the project area under the proposed Action Alternative.*

| Road Types | Existing Condition Road Miles (mi./sq. mi.) | Used During Proposed Activities Road Miles (mi./sq. mi.) | After Proposed Activities Road Miles (mi./sq. mi.) |
|---|---|---|---|
| **Open** | 2.5 (0.5) | 0.7 (0.1) | 3.8[b] (0.7) |
| **Restricted Road** | 14.2 (2.5) | 5.8 (1.0) | 12.9 (2.3) |
| **Temporary Road** | 0 (0.0) | 0.4 (0.1) | 0 (0.0) |
| **Total Roads** | 16.7 (3.0) | 6.9[a] (1.2) | 16.7 (3.0) |

[a] *Of the 6.9 miles of road that would be used and functionally open during harvest activities, 2.5 miles would be open for public motorized access.*
[b] *This would be the maximum open road density occurring from July 1 through September 15.*

- **Cumulative Effects of the No-Action Alternative on Mature Forested Habitat and Connectivity**

Under this alternative no timber harvesting activities would occur. Thus: 1) no changes to existing stands would occur, 2) no further changes to the suitability of mature forested cover or connectivity would be anticipated, and 3) no changes to wildlife use would be expected. Past and ongoing forest management projects not associated with the proposed Lower Herrig Timber Sale have affected mature forest wildlife habitat in the CEAA, and other proposed projects could affect mature forest habitat in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Activities associated with the SE Stryker Ridge Timber Sale would continue altering mature forest habitat and create disturbance within a small portion of the CEAA. No additional cumulative effects to connectivity and suitability of mature forested habitat are expected to result from the No-Action Alternative that could affect wildlife in the cumulative effects analysis area.

- **Cumulative Effects of the Action Alternative on Mature Forested Habitat and Connectivity**

Proposed harvesting would remove 217 acres (1.7% of the CEAA) of mature forest stands within the CEAA (see TABLE W-3 – MATURE FORESTED HABITAT). This would result in a reduction of 3.2% of the total 4,586 acres of mature forest habitat currently available. Reductions in mature forested habitats associated with this alternative would be additive to losses associated with past harvesting activities and any ongoing activities within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). Across the CEAA, 51.5% of mature forested habitat would remain and landscape connectivity would be altered to a minor degree given the existing condition of the surrounding forested landscape. Existing landscape connectivity would be slightly reduced, as the number of mature forest patches would increase from 17 to 18. Average patch size would decrease from 401 acres to 366 acres. The largest

mature patch (6,374 acres) within the CEAA would be reduced by 217 acres, but would remain connected to the largest patch within the project area and to mature forest outside of the CEAA. Habitat for species associated with dense, mature stands would be reduced in the CEAA; however, the remaining unharvested stands would be expected to provide adequate habitat for wildlife preferring mature, well-stocked forest. Approximately 1,192 acres of forest harvested in the 1970s and early 1980s would continue to develop and could provide mature forest habitat within the next 30 to 50 years. Wildlife species using young forest stands in the CEAA would benefit from increases of this habitat in the project area for 10 to 30 years post-harvest.

A total of 6.9 miles of restricted and temporary roads would be used within the CEAA to conduct project activities. Proposed harvesting and associated activities could temporarily increase (up to 4 years) open road density within the CEAA from 0.5 miles/sq. mile to 1.5 miles/sq. mile. Approximately 1.3 miles of existing restricted road within the CEAA would be permanently opened to public motorized access through implementation of the Stillwater Block HCP Transportation Plan, as analyzed in the DNRC HCP EIS and accompanying MEPA documents (USFWS and DNRC 2010). These 1.3 miles of road would be open to public motorized access from July 1 through September 15. Thus long-term open road density would increase from 0.5 miles/sq. mile to 0.6 miles/sq. mile within the CEAA during the seasonally open period. Thus, minor adverse cumulative effects to mature forested habitat suitability and connectivity for wildlife would be expected in the cumulative effects analysis area since: 1) harvesting would remove 217 acres (3.2%) of existing mature forest in the CEAA and average patch size would be reduced from 401 acres to 366 acres; 2) current availability of mature, closed canopy habitat would be reduced but connectivity would be altered to a minor degree; 3) mature forest connectivity of the largest patch in the CEAA would be maintained, especially through riparian areas; and 4) no new permanent roads would be built and long-term open road density would increase by 0.1 miles/sq. mile annually for a 2.5 month period within the CEAA.

### *SNAGS AND COARSE WOODY DEBRIS*

***Issue:*** *The proposed activities could reduce abundance of snags and coarse woody debris, which could lower habitat quality for species that depend on these structural attributes.*

**Introduction**

Snags and coarse woody debris are important components of forested ecosystems. The following are five primary functions of snags and downed logs in forest ecosystems: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide important habitat substrate for wildlife, and 5) act as storehouses for nutrient and organic matter recycling agents (*Parks and Shaw 1996*).

Snags and defective trees (e.g. partially dead, spike top, broken top) are used by a variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (*Hejl and Woods 1991*). The quantity, quality, and distribution of snags affect the

presence and abundance of many wildlife species relying upon them. Snags provide foraging sites for insectivorous species and provide structures used by primary cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) provide habitat for secondary cavity users, including other birds and small to mid-sized mammals. Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Large, tall snags tend to provide nesting sites, while short snags and stumps tend to provide feeding sites (*Bull et al. 1997*). Many species that use small-diameter snags will also use large snags; however, the opposite is not true. Typically, old stands will have greater numbers of large snags. The density of snags is another important indicator of habitat quality for some cavity-nesting species. Species such as the black-backed woodpecker tend to nest and forage in areas where snag densities are high, using one snag for nesting and others nearby for foraging and roosting.

Coarse woody debris provides food sources, areas with stable temperatures and moisture, shelter from the environment, lookout areas, and food-storage sites for several wildlife species. Several mammals rely on downed logs and snags for survival and reproduction. The size, length, decay, and distribution of woody debris affect the capacity of various species to meet their life requisites. Single, scattered downed trees can provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles may provide foraging sites for weasels and secure areas for snowshoe hares.

**Analysis Areas**

Direct and indirect effects were analyzed within the project area (3,590 acres). Cumulative effects were analyzed within a CEAA consisting of the project area and the West Fork Swift Creek HUC12 watershed (CEAA = 12,807 acres, see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). Wildlife species associated with snags and coarse woody debris found in the CEAA would be those most likely to be influenced by cumulative effects associated with nearby activities and proposed habitat alteration on the project area.

**Analysis Methods**

The abundance of snags and coarse woody debris were quantitatively estimated in the proposed project area using 19 randomly-placed plots 0.15 acres in size. Factors considered in the analysis included the level of proposed harvesting, past timber harvest, number of snags, and weight in tons of coarse woody debris.

**Existing Environment**

Analysis of sampling plots and field observations indicated snags within the project area occurred at a density of 9.7 snags per acre (range 0-33 snags per acre). The average diameter of all snags ≥8″ dbh was 15.1″ dbh (range 9-40″); and snag species were primarily Engelmann spruce or subalpine fir. Several snags ≥21″ dbh were documented within project area sampling plots. Snags were generally distributed unevenly; with some areas containing higher densities than others. Signs of firewood gathering were not present and public motorized access to the project area is limited to 2.5 miles of open road near the eastern border of the area. Evidence of snag use by wildlife for feeding and/or cavity building was observed in around half of the snags

that were present. Coarse woody debris levels were also variable across the project area, averaging 18.6 tons per acre (range 0.0-54.3 tons per acre). Similar to snags, downed logs were generally of moderate diameter (10.1" at transect line, range 3-22"), and some larger logs were observed. Thus, habitat quality for wildlife utilizing snags and/or coarse woody debris is likely moderate to good within the project area.

Overall, snags exist at current levels to exceed DNRC's minimum-retention thresholds (*ARM 36.11.411).* Large diameter (>21" dbh) snags and snag recruits are present within the project area. Coarse woody debris in the majority of the project area is present in appropriate amounts for the current existing habitat types (*Graham et. al. 1994*).

Similar to unaltered forested landscapes, snags and coarse woody debris are not distributed evenly across the project area or CEAA (*Harris 1999*). Snags and coarse woody debris are frequently collected for firewood near open roads, which are relatively rare and mainly concentrated in the eastern portion of the CEAA. Abundance and distribution of snags and coarse woody debris within the CEAA is likely similar to patterns observed on sampling plots, except within recently harvested stands. Within the CEAA, past harvesting on 2,321 acres of DNRC lands (18.1% of CEAA), has altered snags, snag recruits, and coarse woody debris levels. On these acres of harvested land within the CEAA, snag and downed wood abundance is likely lower than levels in unharvested areas. Open road density within the CEAA is low at 0.5 miles/sq. mile, which limits firewood gathering.

**Environmental Effects**

- **Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris**

No direct changes in the abundance or distribution of snags and downed logs would be expected. Existing snags would continue to provide wildlife habitat, and new snags and coarse woody debris would be recruited as trees die. No direct or indirect effects to habitat quality for wildlife species requiring snags and coarse woody debris would be expected since: 1) no harvesting would occur that would alter present or future snag or coarse woody debris concentrations, and 2) no changes to human access for firewood gathering would occur.

- **Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris**

Existing snags, live recruitment trees and coarse woody debris would be altered due to timber harvesting on 256 acres (7.1%) in the proposed project area. Coarse woody debris amounts would likely remain similar to existing levels or increase within 166 acres of harvested stands under the proposed action. Another 90 acres within line-harvested units would likely undergo broadcast burning after harvesting activities and would contain lesser amounts of coarse woody debris than the existing condition. If weather conditions do not permit broadcast burning after harvest activities, herbicide treatments could be used for site preparation and coarse woody debris levels would be similar within all stands. Proposed harvesting would likely decrease snag abundance and the number of live trees that could be recruited into snags or coarse woody debris. Harvest prescriptions call for retention of 2 snags, and 2 snag recruits per acre greater than 21 inches dbh where they exist, otherwise the next largest size class would be retained.

Additional large-diameter recruitment trees would be left if sufficient large snags are not present. Coarse woody debris would be left in amounts ranging from 15 to 20 tons/acre. Although current snags present in the project area are generally moderate in diameter (average 15.1" dbh), ample large live trees >21" dbh suitable for snag recruitment exist within proposed harvest units. Future snag quality in the harvested areas would be enhanced with proposed silvicultural prescriptions. Proposed treatments would be expected to promote increased tree growth, larger tree diameters, and the reestablishment of shade-intolerant species like western larch and Douglas-fir, which provide high-quality structures important for wildlife nesting and foraging. The potential future risk for snag and coarse woody debris loss due to firewood gathering would be expected to increase to a minor degree with the opening of 1.3 miles of previously restricted road. However, given the proposed harvest in the area, steep slopes, general lack of desirable firewood species, and distance from population centers; appreciable loss of snags or coarse woody debris due to firewood gathering would not be expected. Thus, minor adverse direct and indirect effects to snags and coarse woody debris would be anticipated that would affect habitat quality of wildlife species requiring these habitat attributes since: 1) harvesting would reduce the density of existing snags and snag recruitment trees on 256 acres (7.1% of project area); 2) coarse woody debris amounts would be retained at similar or greater levels to those existing on 166 acres, but could be reduced from existing levels on 90 acres; 3) levels of snags and coarse woody debris in unharvested areas comprising 82.9% of the project area would remain unaltered, 4) two large snags and two future recruitment trees per acre would be retained in all proposed treatment areas, and 5) a minor increase in open road access for firewood gathering would occur.

- **Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris**

Snags and coarse woody debris would not be altered in the project area under this alternative. Past and ongoing forest management projects not associated with the proposed Lower Herrig Timber Sale have affected snag and coarse woody debris in the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). Ongoing harvesting associated with the SE Stryker Ridge Timber Sale in the CEAA is currently altering snags and coarse woody debris on approximately 30 acres in the southern end of the CEAA. No additional cumulative effects to habitat quality for wildlife species that utilize snags and downed woody debris are expected to result from the No-Action Alternative since: 1) no further harvesting would occur that could affect existing snag and coarse woody debris abundance, and 2) no changes to human access for firewood gathering would occur.

- **Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris**

Wildlife species that rely on snags and coarse woody debris would experience a reduction in habitat quality within 256 acres (2.0% of the CEAA) of harvest units. Coarse woody debris amounts would likely remain similar to existing levels or increase within 166 acres (1.3% of the CEAA) of harvested stands under the proposed action. Another 90 acres (0.7% of the CEAA) within line-harvested units would likely undergo broadcast burning after harvesting activities and would contain lesser amounts of coarse woody debris than the existing condition. If weather conditions do not permit broadcast burning after harvest activities, herbicide

treatments could be used for site preparation and coarse woody debris levels would be similar within all stands. Snags and coarse woody debris within the CEAA have received different levels of consideration regarding their management and retention over time. Generally, past harvesting on 2,321 acres (18.1% of the CEAA) has reduced these attributes. The reduction of snags associated with this alternative would be additive to the losses associated with past harvesting and any ongoing harvesting within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). However, the project requirements to retain two large snags and two large snag recruits per acre (greater than 21 inches dbh or next largest size class), and 15 to 20 tons of coarse woody debris per acre would mitigate additional cumulative effects associated with this project. Approximately 10,284 acres (80.3%) within the CEAA have not been recently harvested and likely contain moderate levels of snags and coarse woody debris. Under the Action Alternative, long-term open road amounts would increase by 1.3 miles; thus, risk of potential loss of snags and coarse woody debris resulting from firewood gathering would increase to a minor degree. Thus, minor adverse cumulative effects to habitat quality for wildlife requiring snags and coarse woody debris would be anticipated over the next 30 to 100 years since: 1) 256 acres (2.0%) of the CEAA would be harvested reducing snags and snag-recruit trees, 2) coarse woody debris levels would increase or not appreciably change on 166 acres (1.3% of CEAA) and would likely decrease on 90 acres (0.7% of the CEAA) receiving post-harvest broadcast burning, 3) the majority of the CEAA (80.3%) that would not be harvested would continue to provide snags and downed wood habitat attributes, 4) motorized public access and associated firewood gathering would increase to a minor degree along 1.3 miles of seasonally open road, and 5) there would be increased representation of shade-intolerant tree species within harvest units that could become high-quality snags in the long term.

### *OLD-GROWTH FORESTS*

***Issue:*** *The proposed activities could affect wildlife species associated with old-growth forests by reducing habitat availability and increasing fragmentation.*

**Introduction**

Old-growth forests are an important component of biological diversity. Old-growth forest stands typically contain various combinations of large old trees, abundant snags and downed logs, and multiple canopy layers, which are typically not found in young forests. These attributes provide structures used by a diversity of wildlife species. The diversity of species and the complexity of interactions between them can be different than in earlier successional stages (Warren 1990). On nearby lands on the Flathead National Forest, approximately 31 wildlife species associated with old-growth forests have been documented (Warren 1998). Of the 48 old-growth associated species occurring in the Northern Rockies, about 60% may require stands larger than 80 acres (*Harger 1978*). Smaller patches may be unsuitable for wildlife species with large home ranges. Additionally, small, less-mobile species may be at greater risk of local extinction in small patches/habitat islands. Timber harvest can affect the size, availability, and spatial juxtaposition of old-growth stands.

**Analysis Area**

The analysis area for direct and indirect effects is the 3,590-acre project area (TABLE W-1 – ANALYSIS AREAS). Cumulative effects were analyzed within a CEAA consisting of the project area and the West Fork Swift Creek HUC12 watershed (CEAA = 12,807 acres, see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This CEAA represents an area large enough to support a diversity of species that use old-growth forest habitats and provides a reasonable scale of analysis for wildlife species that inhabit old-growth forests that could be influenced by project-related activities.

**Analysis Methods**

Old-growth forest patches were identified based upon tree density and size characteristics described by *Green et al. (1992).* Patch sizes and shapes were assessed using *ArcGIS 9.3*. Changes in the total acres of old growth, as well as the number of patches greater than 80 acres, were assessed. Effects to wildlife were evaluated in terms of the total amount of old-growth habitat and the abundance of large patches greater than 80 acres that would be retained under each alternative.

**Existing Environment**

The project area contains approximately 437 acres (12.2% of project area) of stands meeting the definition of old-growth (*Green et al. 1992;* see VEGETATION ANALYSIS). Old-growth stands in the project area average 55 acres (range 1.5 - 259 acres), and 1 of 8 existing total patches are larger than 80 acres (TABLE W-5 – NUMBER OF OLD-GROWTH PATCHES AND PATCH SIZES). Three additional patches within the project area are connected to larger patches within the CEAA. Old-growth habitat within the project area is moderately abundant but scattered (see FIGURE W-2 – MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY). Old-growth stands within the project area primarily consist of large, scattered Engelmann spruce and subalpine fir with 40-60% overstory crown closure, small patchy openings <0.1 acre in size, and an understory of dense brush. Mature forested stands not meeting old-growth classification are interspersed between old-growth stands and likely provide some additional connectivity for species that move between existing patches (see FIGURE W-2 – MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY). Unfavorable growing conditions associated with elevations above 6,000 feet (55% of project area) within the project area have likely influenced the abundance and spatial distribution of old-growth stands. Additionally, periodic reductions of some attributes, such as large trees, snags, and downed logs, occurred during recent past timber sales and salvage logging (317 acres, 8.8%). Thus, habitat quality has been reduced by management activities or is naturally limited in some areas for some wildlife species associated with old-growth forest conditions.

There is approximately 2,136 acres (16.7% of the CEAA) of old-growth forest present within the CEAA. The average existing patch size of old-growth stands within the CEAA is 85 acres and 8 out of 25 existing patches are larger than 80 acres (see TABLE W-5 – NUMBER OF OLD-GROWTH PATCHES AND PATCH SIZES). All of the old-growth patches in the CEAA share some, if not all, of their boundaries with mature, dense forests and old-growth patches located inside or outside of the CEAA. In these cases, the effective patch size for old-growth associated

species is likely larger than for patches surrounded by younger-aged forest stands. Stands in the mature and old-age categories in the CEAA currently represent greater than 50% of the forested acres. Decreases in the acreage of old growth, reductions in average patch size, simplification of patch shapes, and loss of connectivity between stands of old growth have occurred due to past timber management on 2,321 acres (18.1%) within the CEAA, including ongoing harvesting associated with the SE Stryker Timber Sale. Presently within the CEAA, an abundance of mixed-conifer covertypes and shortages of western white pine and western larch/Douglas-fir covertypes also exist. Thus, wildlife species that are typically associated with old growth in covertypes comprised of seral tree species that are underrepresented have likely suffered from lower habitat quality. In contrast, those species associated with old growth in the overrepresented covertypes have likely benefited from a greater abundance of high-quality habitat.

***TABLE W-5 - NUMBER OF OLD-GROWTH PATCHES AND PATCH SIZES.*** *Number of patches and patch sizes of old-growth forests in the project area and the cumulative effects analysis area.*

| OLD-GROWTH PATCHES | ALTERNATIVE | |
|---|---|---|
| | NO-ACTION | ACTION |
| **Project Area** | | |
| Number of old-growth patches | 8 | 14 |
| Average patch size (acres) | 55 | 21 |
| Number of large patches greater than 80 acres | 1 | 0 |
| Maximum patch size | 259 | 68 |
| Minimum patch size | 1 | 1 |
| Average size for large patches | 259 | N/A |
| **Cumulative Effects Analysis Area** | | |
| Number of old-growth patches | 25 | 30 |
| Average size (acres) | 85 | 67 |
| Number of large patches greater than 80 acres | 8 | 7 |
| Maximum patch size | 434 | 434 |
| Minimum patch size | 0.5 | 0.5 |
| Average size for large patches | 205 | 198 |

**Environmental Effects**

- **Direct and Indirect Effects of the No-Action Alternative to Old-Growth Forest**

No changes to the amounts, quality, or spatial arrangement of old growth would occur under this Alternative. Thus, old-growth associated wildlife species would not be affected.

- **Direct and Indirect Effects of the Action Alternative to Old-Growth Forest**

Under the Action Alternative, of the 437 acres of old-growth forest in the project area, 140 acres would be removed (3.9% of the project area; 32.0% of the existing old growth in the project area), resulting in 297 acres (68.0% of the existing old growth) of old-growth forest remaining in the proposed project area. Logging would alter the existing attributes on all 140 acres of the old growth treated and potentially affect some old-growth associated species using those stands, particularly those preferring larger stands. The proposed activities would result in reduced availability of old-growth habitat and increases in old-growth fragmentation habitat parameters, such as reduced overall average patch size and reduced number of large patches. Remaining old-growth patches would range from 1 to 68 acres in size; the single existing patch greater than 80 acres would be affected (TABLE W-5 – NUMBER OF OLD-GROWTH PATCHES AND PATCH SIZES). The average patch size of old-growth stands on the project area would be reduced from 55 acres to 21 acres (61.8% reduction), however the majority of remaining old-growth patches would be connected to larger stands of mature, well-stocked forest with ≥40% crown closure, which would increase effective patch size for some species. Thus, a moderate level of adverse direct and indirect effects to wildlife associated with old-growth forests would be expected under the Action Alternative because: 1) the total amount of old growth would be reduced on the project area by 32.0%; 2) the number of small patches (less than 80 acres) would increase (TABLE W-5 – NUMBER OF OLD-GROWTH PATCHES AND PATCH SIZES); 3) the single large patch (>80 acres) entirely within the project area would be impacted; 4) existing environmental factors and past harvest history have limited the baseline availability of large, contiguous old-growth stands within the project area; 5) unharvested mature, non-old-growth forest would provide some connectivity between remaining old-growth patches; and 6) stands in the mature and old forest age categories in the project area would continue to represent 50% of the forested acres (see *VEGETATION ANALYSIS* for further details).

- **Cumulative Effects of the No-Action Alternative to Old-Growth Forest**

Under the No-Action Alternative, the project would not affect any old-growth forest. Ongoing and proposed forest management projects not associated the proposed Lower Herrig Timber Sale within the CEAA could alter mature forest wildlife habitat in the present and future. Therefore, existing stands of old growth would remain in their current state and no additional cumulative effects to old-growth associated wildlife species would be anticipated.

- **Cumulative Effects of the Action Alternative to Old-Growth Forest**

Under the Action Alternative, of the 2,136 total acres of old-growth forest across the CEAA, 140 acres would be removed (6.6% of the total existing old-growth), resulting in 1,996 acres of old-growth forest remaining (15.6% of the 12,807-acre CEAA). Logging would alter the existing attributes on all of the 140 acres of old growth treated and potentially affect some old-growth associated species using those stands, particularly those preferring forest stands ≥80 acres. Effects to old-growth and associated wildlife species that would be likely under this alternative would be in addition to those that have occurred in the CEAA over the last several decades on DNRC lands (e.g. ongoing SE Stryker Timber Sale). Remaining old-growth patches would

range from 0.5 to 434 acres in size; 7 patches greater than 80 acres would remain across the forest (TABLE W-5 – NUMBER OF OLD-GROWTH PATCHES AND PATCH SIZES). However, the average patch size of large old-growth stands within the CEAA would be reduced from 205 acres to 198 acres (3.4% reduction). All but a few patches within the CEAA would be connected to larger interspersed mature forest patches within the CEAA and likely provide a larger effective patch size for some species. Thus, a minor level of adverse cumulative effects to wildlife associated with old-growth forests would be expected under the Action Alternative as a result of reduced availability of habitat and increases in old-growth fragmentation habitat parameters because: 1) the total amount of old growth would be reduced within the CEAA by 6.6%; 2) the number of large patches would be reduced by one (TABLE W-5 – NUMBER OF OLD-GROWTH PATCHES AND PATCH SIZES); 3) the average large patch size would decrease by 3.4%; 4) unharvested mature, non-old-growth forest would provide some connectivity between remaining old-growth patches; and 5) stands in the mature and old-forest age categories within the CEAA would continue to represent over 50% of the forested acres.

**FINE-FILTER WILDLIFE ANALYSIS**

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and animals managed as big game by Montana DFWP. TABLE W-6 – FINE FILTER summarizes how each species considered was included in detailed subsequent analysis or removed from further consideration, since suitable habitat either did not occur within the project area or proposed activities would not affect their required habitat components.

***TABLE W-6 – FINE FILTER.*** *Species considered in the fine-filter analysis for the Lower Herrig Timber Sale.*

| | SPECIES/HABITAT | DETERMINATION – BASIS |
|---|---|---|
| Threatened and Endangered Species | **Grizzly bear** (*Ursus arctos*)<br>Habitat: Recovery areas, security from human activity | ***Detailed analysis provided below*** – The proposed project area occurs in the Upper Whitefish and Stryker Subunits of the Northern Continental Divide Ecosystem (NCDE) Recovery Area (USFWS 1993). |
| | **Canada lynx** (*Felis lynx*)<br>Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zones | ***Detailed analysis provided below*** – Potential lynx habitat types occur within the project area. |
| Sensitive Species | **Bald eagle** (*Haliaeetus leucocephalus*)<br>Habitat: Late-successional forest less than 1 mile from open water | No known nest territories are present in the vicinity of the project area and no large water bodies exist within one mile of the project area that might provide suitable locations for nesting. Thus, no direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative. |

| | | |
|---|---|---|
| | **Black-backed woodpecker** (*Picoides arcticus*)<br>Habitat: Mature to old burned or beetle-infested forest | No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative. |
| | **Coeur d'Alene salamander** (*Plethodon idahoensis*)<br>Habitat: Waterfall spray zones, talus near cascading streams | No moist talus or streamside talus habitat would be affected by proposed activities within the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative. |
| | **Columbian sharp-tailed grouse** (*Tympanuchus Phasianellus columbianus*)<br>Habitat: Grassland, shrubland, riparian, agriculture | No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative. |
| | **Common loon** (*Gavia immer*)<br>Habitat: Cold mountain lakes, nest in emergent vegetation | No suitable lakes occur within 500 feet of the project area. Thus, no direct, indirect or cumulative effects to common loons would be expected to occur as a result of either alternative. |
| | **Fisher** (*Martes pennanti*)<br>Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian areas | ***Detailed analysis provided below*** – Potential fisher habitat occurs within the project area. |
| | **Flammulated owl** (*Otus flammeolus*)<br>Habitat: Late-successional ponderosa pine and Douglas-fir forest | No potentially suitable dry ponderosa pine or Douglas-fir stands exist in the project area. Thus, no direct, indirect or cumulative effects to flammulated owls would be expected to occur as a result of either alternative. |
| | **Gray Wolf** (*Canis lupus*)<br>Habitat: Areas with ample big game populations, security from human activities | ***Detailed analysis provided below*** – Wolves have been documented in the vicinity of the proposed project area in the past, and future use of the area by wolves is possible (Kent Laudon, MFWP, pers. comm. January 18, 2013). |
| | **Harlequin duck** (*Histrionicus histrionicus*)<br>Habitat: White-water streams, boulder and cobble substrates | Any potentially suitable streams are over ¼ mile from proposed harvest units and the project area contains no records of harlequin duck sightings in the past (MNHP 2013). The proposed activities would not occur until July 1 or later, after most nesting activity has occurred. Thus, negligible direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative. |

| | | |
|---|---|---|
| | **Northern bog lemming** (*Synaptomys borealis*)<br>Habitat: Sphagnum meadows, bogs, fens with thick moss mats | No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative. |
| | **Peregrine falcon** (*Falco peregrinus*)<br>Habitat: Cliff features near open foraging areas and/or wetlands | No known cliffs suitable for peregrine falcon nesting exist within the project area. Recent or historical records of peregrine falcons in the vicinity of the project area are lacking (MNHP 2013). Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative. |
| | **Pileated woodpecker** (*Dryocopus pileatus*)<br>Habitat: Late-successional ponderosa pine and larch-fir forest | No potentially suitable pileated woodpecker habitat exists within the project area. Thus, no direct, indirect or cumulative effects to pileated woodpeckers are anticipated as a result of either alternative. |
| | **Townsend's big-eared bat** (*Plecotus townsendii*)<br>Habitat: Caves, caverns, old mines | No suitable caves or mine tunnels are known to occur in the project area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats are anticipated as a result of either alternative. |
| Big Game Species | **Elk** (*Cervus canadensis*) | The project area does not contain deer or elk winter range habitat identified by DFWP (DFWP, 2008). Hiding cover is abundant within the project area (see Grizzly Bear section below). The quality of hiding cover would be reduced on 256 acres proposed for harvest; however, patches of advanced regenerating conifers would be retained where feasible and suitable hiding cover would be expected to develop over time. Long-term open road density would increase by 0.2 miles/sq. mile during the summer, but would revert to existing levels (0.5 miles/sq. mile) during the fall rifle hunting season. Visual screening along open roads would be maintained where present and practicable. Proposed broadcast burning on 90 acres would likely improve foraging habitat conditions for big game during the summer and fall seasons. Thus, negligible direct, indirect or cumulative effects to big game would be expected to occur as a result of either alternative. |
| | **Mule Deer** (*Odocoileus hemionus*) | |
| | **White-tailed Deer** (*Odocoileus virginianus*) | |

***THREATENED AND ENDANGERED SPECIES***

**GRIZZLY BEAR**

***Issue:*** *The proposed activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increase risk of human-caused bear mortality.*

**Introduction**

Grizzly bears are generalist omnivores that use a diversity of habitats found in western Montana, and they are currently listed as "threatened" under the Endangered Species Act. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. Of these, meadows, riparian areas, and avalanche chutes occur in the project area. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover, and/or by creating roads, which can increase access for humans in otherwise secure areas (Mace et. al. 1997). These actions could lead to the displacement of grizzly bears from preferred areas, and/or result in an increased risk of human-caused mortality. By developing roads and reducing forest cover, forest management activities can bring humans and bears into closer contact, and make bears more detectable, which can increase their risk of being shot illegally. Displacing bears from preferred areas may increase their energetic costs, potentially lowering their ability to survive, and/or reproduce successfully.

**Analysis Areas**

Direct and indirect effects were analyzed for activities conducted within the 3,590-acre project area. Cumulative effects were analyzed in a 36,877-acre area (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS) that encompasses the project area and approximates the home range size of a female grizzly bear in northwest Montana (Mace and Roberts 2011). This CEAA contains DNRC-lands on portions of the Upper Whitefish, Stryker, and Lazy Creek Grizzly Bear BMU Subunits.

**Analysis Methods**

Field evaluations, aerial photograph interpretation, scientific literature and GIS queries were the basis for this analysis. Grizzly bear hiding cover was considered to be forest vegetation that will hide 90% of a grizzly bear at a distance of 200 feet. Within the CEAA, open road densities were calculated using the simple linear calculation method (road length in miles divided by area in square miles). Factors considered within this CEAA include availability of timbered stands for hiding cover, level of human disturbance, and miles of open, restricted, and temporary roads.

**Existing Environment**

All 3,950 acres of the proposed project area occurs in the NCDE Recovery Area (*USFWS 1993*). Grizzly bears have been observed in the vicinity of the project area in the past and continued

appreciable use by bears is anticipated. The proposed project area contains approximately 33 acres (0.8% of project area) of Stillwater Block Class A lands that are managed as "quiet areas" requiring special management under the DNRC HCP (*USFWS and DNRC 2010*). Approximately 3,387 acres (94.3% of project area) of grizzly bear hiding cover is present within the proposed project area. The abundance of vegetative cover likely contributes to security for bears, and facilitates their ability to move freely within the project area. Stands harvested within the last 35 years (317 acres, 8.8% of project area) within the project area contain dense patches of regenerating conifers that currently break up sight distances and provide hiding cover for grizzly bears. Preferred riparian and wetland areas, as well as avalanche chutes are present within the project area. Whitebark pine is present within the project area at low densities (see *VEGETATION ANALYSIS*). Managing human access is a major factor in management of grizzly bear habitat. Presently, open road density in the proposed project area is 0.5 miles/sq. mile and total road density is 3.0 miles/sq. mile. In addition to being blocked by gates or berms, many of the restricted roads within the project area are overgrown with brush and conifers, rendering them impassible to any motorized vehicle use. All roads within the project area are restricted from public motorized use from April 1 – June 30 and September 16 – November 30, which reduces potential disturbance to grizzly bears during the important spring and fall foraging periods.

The entire 36,877-acre CEAA is within the NCDE Recovery Area (*USFWS 1993*). The CEAA is a relatively intact, mostly undeveloped forested area with a variety of preferred grizzly bear habitats (avalanche chutes, berry fields, riparian areas). Grizzly bear use of the area is well-documented and continued use of the CEAA by bears is likely. Ownership of the CEAA is 100% DNRC. Approximately 6,615 acres of Stillwater Block Class A lands occur within the CEAA. Forest stands that provide hiding cover persist on over 88.8% of the CEAA (approximately 32,738 acres). Forest habitats across the CEAA are a combination of age classes, ranging from recently harvested stands to mature stands. Approximately 16.6% of the CEAA (6,130 acres) has been harvested within the last 40 years and consists of younger stands with regenerating trees. Ongoing timber sale projects within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS) are sources of disturbance and are currently altering grizzly bear habitat. Reductions in vegetative cover and increased disturbances, such as those associated with timber harvest, can lower effective use of habitat by bears and render bears more vulnerable to human-caused mortality (*Servheen et. al. 1999*). Human disturbance levels are closely tied to road abundance and access. Open road density within the CEAA is approximately 0.9 miles/sq. mile and total road density is approximately 2.7 miles/sq. mile (simple linear calculations). Roads present in the CEAA are primarily a result of past timber management activities, but also include roads used to access USDA Forest Service and privately owned lands. The greatest risk factors for bears within or near the CEAA are likely associated with homes, developments, and railway activities outside the southern border of the CEAA. Areas where high levels of human recreational use occur are also higher-risk localities for grizzly bears. Unnatural attractants potentially associated with these areas could increase the probability of human-bear conflicts, which can result in bear mortalities.

**Environmental Effects**

- **Direct and Indirect Effects of the No-Action Alternative on Grizzly Bears**

None of the proposed forest management activities would occur. No changes to grizzly bear habitat would be expected. Visual screening, existing secure areas, risk of displacement, and open and restricted road density would remain the same. Thus, since: 1) no timber harvesting would alter existing visual screening cover, 2) risk of displacement from important habitat would not increase, 3) no existing secure areas would be affected, and 4) no changes to open or restricted road density would occur, no direct or indirect effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the No-Action Alternative.

- **Direct and Indirect Effects of the Action Alternative on Grizzly Bears**

Under the Action Alternative, grizzly bear hiding cover would be reduced for 15-20 years on approximately 256 acres (7.1%) of the project area. Harvesting associated with the Action Alternative would increase sight distances within all proposed harvest units. Current levels of patchy cover in the form of sub-merchantable trees would be retained where present and feasible in 151 acres of harvest units. An additional 90 acres within harvested units would undergo post-harvest broadcast burning or herbicide treatment, which would likely temporarily remove any hiding cover existing in the understory within these acres. Existing stands of adjacent dense regenerating conifers, neighboring mature forest patches, and topographic breaks would exist in such a manner that no point in any harvest unit would be greater than 600 feet to screening cover. Existing riparian cover along 14.5 miles of Class 1 and 2 streams would be largely protected and offer movement corridors as well as hiding cover for bears in this preferred habitat. Harvesting would not occur within or adjacent to avalanche chutes (preferred bear habitat), however an existing restricted road that would be used for activities crosses the downhill end of approximately three chutes. Whitebark pine is present within the project area, however this species comprises less than 10% of the tree species in a single harvest unit and harvest prescriptions would retain all healthy whitebark pine. Hiding cover adjacent to open roads within the project area would not be affected, which lessens the risk of mortality by accidental or intentional shooting. Levels of hiding cover would be expected to recover within 15 to 20 years following proposed treatments as shrub and tree regeneration proceeds. Should grizzly bears be present in the area at the time of harvest operations, they could be affected by increased road traffic, noise, and human activity, and by reduced amounts of hiding cover. Proposed activities in grizzly bear habitats would reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditures to endure the disturbance, or causing bears to move away from the area. These potential disturbances would only occur during harvesting operations (1 to 4 years). Continued use of the project area by grizzly bears would be anticipated. No harvest activities would occur within Stillwater Block Class A lands. Restrictions on motorized use in spring and commercial harvest restrictions would apply to 256 acres of proposed harvest, which would minimize disturbance to bears during the spring period (April 1 – June 30). Additionally, contract requirements would assist in mitigating bear-human conflict risk by specifying that contractors are not

permitted to carry firearms on the work site and that unnatural attractants must stored or disposed of in a bear-resistant manner.

Motorized activites associated with the Action Alternative, such as the use of restricted roads and the construction of new temporary roads, could affect grizzly bears by temporarily (1 to 4 years) displacing them from previously secure areas. See TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION for road summaries within the project area. No new open roads would be built. Approximately 0.4 miles of temporary road would be built, and 5.8 miles of existing restricted road could be used under the Action Alternative. The use of up to 6.2 miles of restricted and temporary roads would increase motorized vehicle activity during the non-denning season for up to 4 years. The use of existing restricted roads, and temporary roads would contribute to open road density in the short term (1-4 years); increasing potential for disturbance to grizzly bears. All 5.8 miles of restricted roads that would be used temporarily for 1 to 4 years to complete proposed project activities would be closed in a manner to prohibit public motorized access during harvesting activities. Including temporary roads, functionally open road amounts could increase temporarily from 2.5 miles (density 0.5 mi./sq. mi.) up to 8.7 miles (density 1.5 mi./sq. mi.) during project operations. Approximately 1.3 miles of existing restricted road within the project area would be permanently opened to public motorized access through implementation of the Stillwater Block HCP Transportation Plan, as analyzed in the DNRC HCP EIS and accompanying MEPA documents (*USFWS and DNRC 2010*). These 1.3 miles of road would be open to public motorized access from July 1 through September 15. During this seasonally open period, open road density would increase from 0.5 miles/sq. mile to 0.7 miles/sq. mile. Thus, at the conclusion of the proposed project, the total amount of roads within the project area would remain the same as pre-project levels, however the amount of open roads would increase seasonally for 2.5 months during the summer (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION).

Thus, minor adverse direct or indirect effects to grizzly bears associated with displacement and mortality risk would be expected since: 1) low to moderate levels of temporary (1-4 years) disturbance and displacement would be anticipated; 2) hiding cover on 256 acres (7.1%) would be reduced in the short term, but would be expected to recover in 15-20 years; 3) hiding cover would remain on approximately 3,131 acres (87.2%) of the project area; 4) reductions in hiding cover would be mitigated through vegetation retention patches within and between harvest units, vegetation retention along riparian corridors, and reduced sight distances associated with varied topography; 5) Stilllwater Block Class A lands would be unaffected; 6) commercial harvest and public motorized activities would be restricted during the spring period; and 7) short-term increases in functional open road densities from 0.5 mi/sq. mi. to 1.5 miles/sq. mi. would be anticipated and long-term open road density would increase from 0.5 mi/sq. mi. to 0.7 mi/sq mile from July 1 through September 15 each year.

- **Cumulative Effects of the No-Action Alternative on Grizzly Bears**

Under the No-Action Alternative, no proposed project activities would occur. No additional cumulative changes to the level of disturbance to grizzly bears or secure areas would be anticipated. No additional cumulative changes in open-road densities or hiding cover from the existing conditions would be anticipated. Past and ongoing forest management projects not

associated with the proposed Lower Herrig Timber Sale have affected grizzly bear habitat in the project area, and other ongoing projects (see TABLE W-2 – RECENT AND PROPOSED PROJECTS) could continue to alter grizzly bear habitat and/or disturb bears in the future. Thus, since no additional changes in available habitats or level of human disturbance would be anticipated as a result of the No-Action Alternative, no cumulative effects to grizzly bear diplacement or effects involving mortality risk would be anticipated.

- **Cumulative Effects of the Action Alternative on Grizzly Bears**

Approximately 256 acres (0.7% of the CEAA) of grizzly bear hiding cover would be harvested within the CEAA. Reductions in hiding cover on 256 acres and anticipated elevated disturbance levels would be additive to past timber harvesting that has affected approximately 6,130 acres (16.6%), as well as current harvest projects (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Harvesting and road building within the last 40 years in the CEAA has altered grizzly bear cover and habitat connectivity, however 49.2% (18,134 acres) of the area would remain in mature forest possessing ≥40% canopy cover in the overstory. Additionally, approximately 2,682 acres (7.3% of the CEAA) harvested over 15 years ago are likely providing hiding cover and reduced sight distances. Continued use of the CEAA by grizzly bears would be anticipated. Mature stands and young, fully stocked stands that likely provide hiding cover would make up approximately 32,482 acres (88.1%) of the CEAA. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands across the CEAA.

Collectively, short-term (1 to 4 years) increases in human disturbance would be anticipated in the CEAA, but contract requirements would lessen risk of human-bear conflicts during active harvest operations (e.g. proper storage/disposal of unnatural attractants, prohibit possession of firearms etc.). The increased use of road systems during the proposed project would temporarily increase human disturbance and displacement risk for grizzly bears within a portion of the CEAA. A short-term increase in open road density would occur, increasing from 0.9 mi/sq. mi. to 1.1 miles/sq. mile in the CEAA. Approximately 1.3 miles of existing restricted road within the CEAA would be permanently opened to public motorized access through implementation of the Stillwater Block HCP Transportation Plan, as analyzed in the DNRC HCP EIS and accompanying MEPA documents (*USFWS and DNRC 2010*). These 1.3 miles of road would be open to public motorized access from July 1 through September 15. These timing restrictions on road use would minimize risk of disturbing grizzly bears during the spring period and fall hyperphagia period. Density of all permanent roads within the CEAA would not change. Disturbance associated with temporarily accessed roads would be additive to that occurring on roads used for other ongoing forest management projects (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Within the CEAA, high-risk factors for bears associated with human developments would continue to be largely absent. Thus, minor adverse cumulative effects to grizzly bears associated with displacement or effects involving mortality risk would be expected in the short term (1 to 4 years) and long term (15 to 20 years) since: 1) short-duration (1 to 4 year) increases in human disturbance levels would be expected within the CEAA, 2) hiding cover would be removed in the short-term (~15 to 20 years) on a relatively small portion (0.7%) of the CEAA, 3) approximately 88.1% of the CEAA would

continue to provide hiding cover, and 4) short-term increases in functional open road densities from 0.9 mi/sq. mi. to 1.1 miles/sq. mi. would be anticipated and long-term open road density would increase by 0.02 mi/sq. mi from July 1 through September 15 each year.

## CANADA LYNX

***Issue:*** *The proposed activities could result in the modification of habitat preferred by Canada lynx and decrease the area's suitability for lynx.*

### Introduction

Canada lynx are listed as "threatened" under the Endangered Species Act. Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (*Ruediger et al. 2000*). Lynx abundance and habitat use are strongly associated with snowshoe hare populations; thus activities which decrease habitat quality for snowshoe hares can reduce the availability of prey for lynx. Lynx habitat in western Montana consists primarily of stands that provide habitat for snowshoe hares including dense, young and mature coniferous stands (Squires et al. 2010). Forest type, tree densities, natural disturbance history, and time since harvesting play important roles in shaping the suitablilty of young foraging habitat for lynx. Mature subalpine fir stands with abundant horizontal cover and coarse woody debris also provide structure important for foraging, denning, travel, and security. These conditions are found in a variety of habitat types (*Pfister et al. 1977*), particularly within the subalpine fir series. Historically, northwest Montana contained a variety of stand types with differing fire regimes. This variety of stand types combined with patchy elevation and snow-depth gradients preferred by lynx, likely formed a non-continuous mosiac of lynx and non-lynx habitats (*Fischer and Bradley 1987, Ruggiero et. al. 1999, Squires et al. 2010*). Forest management considerations for lynx include providing a mosaic of young and mature lynx habitats that are well connected across the landscape.

### Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 3,590-acre project area. The cumulative effects analysis area consisted of the Stillwater East Lynx Management Area and the project area (36,877 acres, see FIGURE W-1 – WILDLIFE ANALYSIS AREAS), which approximates the home range size of a Canada lynx. Lynx Management Areas (LMAs) are designated portions of DNRC land "where resident lynx populations are known to occur or where there is a high probability of periodic lynx occupancy over time," (*USFWS and DNRC 2010, Vol. II, p. 2-46*).

### Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of SLI data and suitable lynx habitats. Suitable lynx habitat was subdivided into the following lynx habitat types: 1) winter foraging, 2) summer foraging, 3) other suitable, and 4) temporary non-habitat. Classification occurred according to DNRC HCP lynx habitat mapping protocols (*DNRC 2010*) based upon a variety of vegetation characteristics important to lynx and snowshoe hares (i.e., forest habitat type, canopy cover, stand age class, stems/acre, and coarse woody

debris). Other suitable lynx habitat is defined as habitat that has the potential to provide connectivity and lower quality foraging habitat. The temporary non-habitat category consists of non-forest and open forested stands that are not expected to be used appreciably by lynx until adequate horizontal and vertical cover develops. Factors considered in the analysis include: 1) the abundance of lynx habitat types, 2) landscape connectivity of potential and suitable lynx habitat, and 3) the level of harvesting.

**Existing Environment**

Approximately 3,283 acres (91.4%) of potential lynx habitat occurs in the 3,590 acre project area. Of this potential lynx habitat, 3,225 acres (98.2%) are currently providing suitable habitat (TABLE W-7– LYNX HABITAT). Suitable lynx habitat within the project area is defined as the sum of the summer foraging, winter foraging, and "other suitable" lynx habitat catagories. In the project area, winter foraging habitat is the most abundant type of suitable habitat (TABLE W-7 – LYNX HABITAT). Amounts of coarse woody debris were quantitatively assessed within the project area and found to be appropriate for the habitat types present (see SNAGS AND COARSE WOODY DEBRIS section of this analysis for further detail). Additionally, ridges and riparian areas are present within the proposed project area that provide a number of potential travel corridors for lynx, should they be present in the area. Past harvesting of 317 acres (8.8% of the project area) within the proposed project area has altered lynx habitat, however all but 58 acres have regenerated enough to provide suitable habitat for lynx. The remaining 58 acres of temporary non-suitable habitat will likely be suitable for use by lynx within the next 5 to 10 years. Throughout the project area, habitat and connectivity conditions are favorable for potential use by lynx.

Canada lynx have been documented within the CEAA in the past (*DNRC unpublished data, and MNHP 2013*). DNRC manages 100% of the CEAA. Habitat types preferred by lynx are abundant within the CEAA (TABLE W-7 – LYNX HABITAT). The distribution of the various lynx habitat elements within the CEAA is the result, primarily, of past natural disturbances, environmental factors affecting vegetation growth at higher elevations, past timber harvesting and the general lack recent wildfire. The lack of recent fire disturbance in the CEAA (influenced by modern-day fire suppression) has likely led to a smaller proportion of young foraging habitat and a greater proportion of mature foraging habitat or forested travel/other habitats on DNRC lands than was typically present pre-European settlement (*Losensky 1997*). Suitable habitat is well connected within the CEAA, particularly along ridges and in riperian areas. Timber harvesting on 6,130 acres (16.6%) within the CEAA in the last 40 years has altered lynx habitat, however those harvest units older than 20 years are now providing suitable summer foraging or other suitable habitat.

***TABLE W-7 – LYNX HABITAT.*** *Estimates of existing lynx habitat and habitat that would persist post-harvest on DNRC lands in the project area, Stillwater East LMA, and cumulative effects analysis area. Percent refers to the percent of the lynx habitat category of the total potential habitat[a] present on DNRC-managed lands.*

| LYNX HABITAT CATEGORY | **Acres of lynx habitat (percent of DNRC lynx habitat)** | | | |
|---|---|---|---|---|
| | **Project Area** | | **Cumulative Effects Analysis Area** | |
| | Existing | Post-Harvest | Existing | Post-Harvest |
| OTHER SUITABLE | 339.8 (10.4%) | 339.4 (10.3%) | 2,648.6 (7.7%) | 2,648.2 (7.7%) |
| SUMMER FORAGE | 631.7 (19.2%) | 621.5 (18.9%) | 2,667.0 (7.7%) | 2,656.8 (7.7%) |
| TEMP NON-SUITABLE | 57.9 (1.8%) | 313.9 (9.6%) | 4,841.9 (14.0%) | 5,097.9 (14.8%) |
| WINTER FORAGE | 2,253.7 (68.6%) | 2,008.1 (61.2%) | 24,307.3 (70.5%) | 24,061.8 (69.8%) |
| **Grand Total: Suitable Lynx Habitat** | 3,225.2 (98.2%) | 2,969.0 (90.4%) | 29,622.9 (86.0%) | 29,366.8 (85.2%) |

[a] *Total potential lynx habitat is a habitat catagory that describes all areas that are providing suitable lynx habitat now, or those likely to provide suitable habitat at some time in the future. Total potential lynx habitat is the sum of the other suitable, summer forage, temp non-suitable, and winter forage habitat categories.*

**Environmental Effects**

- **Direct and Indirect Effects of the No-Action Alternative on Canada Lynx**

Under this alternative, no changes in lynx habitat elements would be expected in the project area and landscape connectivity would not be altered. Thus, no direct or indirect effects influencing lynx habitat suitability would be expected to occur in the project area.

- **Direct and Indirect Effects of the Action Alternative on Canada Lynx**

Approximately 256 acres (7.1% of project area) of suitable lynx habitat would be subject to harvesting with this alternative. Proposed harvest prescriptions on 256 acres of suitable lynx habitat would decrease mature tree abundance to 4 to 10 mature trees per acre and reduce overstory crown closure to <10%. All acres of suitable lynx habitats inside harvest units would be converted to temporary non-suitable habitat (TABLE W-7 – LYNX HABITAT) for the next 15 to 20 years. Where operationally feasible and available, existing patches of shade-tolerant sub-merchantable conifers would be retained. The total area of these patches would not be expected to comprise more than 10% of the acres proposed for harvest. Growth of retained mature trees and patches of sapling to pole-sized conifers, combined with post-harvest conifer regeneration following harvest, would lessen the time harvested stands would be temporarily unsuitable for lynx. Activities associated with active logging operations could temporarily displace any lynx using the area for 1-4 years. Following proposed logging, 2,969 acres (90.4% of project area) of

suitable lynx habitat would remain within the project area (TABLE W-7 – LYNX HABITAT). Suitable lynx habitat would be largely retained along streams and ridges in the project area, although some of these potential travel corridors are less than 300 feet wide and could be less effective for lynx movement. Vegetation retention along important travel features could facilitate lynx movement in the project area, although appreciable use by lynx within harvest unit boundaries would not be expected for 15 to 20 years. In the proposed harvest units, 15 to 20 tons/acre of coarse woody debris would be retained that would provide horizontal cover and security structure for lynx and lynx prey, once harvest units regenerated into suitable habitat in 15-20 years. Shade-tolerant tree abundance and coarse woody debris levels would likely be reduced on approximatly 90 acres of line-harvesting units that would undergo broadcast burning site preparation compared to 166 harvested acres that would not be burned. Small portions of each line harvest unit (approximatly 15 total acres) would not be broadcast burned and thus retain more shade tolerant conifer species and coarse woody debris. Overall, minor adverse direct and indirect effects to habitat suitability for Canada lynx would be expected since: 1) the amount of existing suitable lynx habitat in the project area would be reduced by 7.8% (TABLE W-7– LYNX HABITAT), 2) suitable lynx habitats would likely develop on 58 acres during the next 5 to 10 years within the project area, 3) moderate levels of landscape connectivity would persist along important travel features despite a minor overall reduction in landscape connectivity, and 4) coarse woody debris and small shade-tolerant conifers would be retained to promote forest structural complexity in harvest units, expediting their growth back into suitable lynx habitat.

- **Cumulative Effects of the No-Action Alternative on Canada Lynx**

No appreciable change in lynx habitats would occur under this No-Action Alternative, and no further changes in landscape connectivity would be anticipated. Past forest management projects not associated with the proposed Lower Herrig Timber Sale have affected lynx habitat in the project area, and ongoing and proposed projects could alter lynx habitat in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Thus, no additional cumulative effects to suitable lynx habitat are expected to result from the No-Action Alternative that could affect lynx habitat suitability in the CEAA.

- **Cumulative Effects of the Action Alternative on Canada Lynx**

Under the Action Alternative, approximately 256 acres (0.7%) of the 36,877-acre CEAA would be altered by harvesting. Of these acres, harvesting would affect 256 acres of currently suitable lynx habitat. Following proposed harvesting, the CEAA would contain 29,367 acres (85.2%) of suitable lynx habitat (TABLE W-7 – LYNX HABITAT). Expected reductions in suitable lynx habitat and increases in temporary nonsuitable habitat in the proposed harvest units would not be expected to appreciably alter lynx use of the CEAA, particularly given that habitat suitability is relatively high in the surrounding landscape. Following treatments, connectivity of suitable lynx habitat would also be maintained along riparian areas and features frequently used by lynx during daily movements (i.e. drainages, ridges etc.) throughout the majority of the CEAA. Suitable lynx habitat within the CEAA is being altered by ongoing DNRC timber sales (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Increased levels of motorized activities

associated with the Action Alternative would be additive to current and proposed timber sales, which could temporarily displace lynx should they be present near the proposed project area and associated roads. Thus, minor adverse cumulative effects to lynx and the suitability of their habitat would be expected as a result of proposed activities since: 1) overall baseline habitat suitability would remain high with 85.2% of the CEAA in suitable habitat; 2) existing suitable lynx habitat within the CEAA would be reduced by 0.8% and those areas would remain unsuitable for at least 15 years, 3) stands converted to temporary non-suitable habitat in old logging units would continue maturing and developing into suitable habitat within the CEAA in the absence of natural disturbance, 4) habitat connectivity within the CEAA would be minimally affected by proposed activities, and 5) lynx could be temporarily displaced by logging activities in the CEAA.

### *SENSITIVE SPECIES*

When conducting forest-management activities, the *SFLMP* directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or, could become listed under the *Federal Endangered Species Act* if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful 'fine filter' for ensuring that the primary goal of maintaining healthy and diverse forests is met. A search of the *Montana Natural Heritage Database* was used to locate historical records of sensitive species (as shown in TABLE W-6 – FINE FILTER) in the vicinity of the project area.

### FISHER

***Issue:*** *The proposed activities could decrease habitat suitability for fishers by decreasing canopy cover and snag/coarse woody abundance, and by increasing risk of trapping mortality through greater road access.*

#### Introduction

Fishers are generalist predators that prey upon a variety of small mammals and birds, as well as snowshoe hares and porcupines. They also eat carrion and seasonally available fruits and berries (Foresman 2012). Fishers use a variety of forest successional stages, but are disproportionately found in low to mid elevation mature stands with dense canopies (*Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994*). They generally avoid openings or young forested stands (*Buskirk and Powell 1994*). However, some use of openings does occur for short hunting forays or if sufficient overhead cover (shrubs, saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites, and tend to use areas within 150 feet of water (*Jones 1991*). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest management considerations for fisher involve maintaining large snags,

retaining abundant coarse woody debris, providing habitat suitable for resting and denning near riparian areas, and maintaining travel corridors.

**Analysis Areas**

Direct and indirect effects were analyzed for activities conducted within the 3,590-acre project area. Cumulative effects for fisher habitat were analyzed on the Upper Whitefish Grizzly Bear BMU Subunit combined with the project area for a total CEAA of 27,173 acres (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). The proposed project area ranges from 4,720 to 7,240 feet in elevation.

**Analysis Methods**

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of travel corridors, preferred fisher cover types (*ARM 36.11.403(60)*), and habitat structure. To assess potential fisher habitat and travel cover on DNRC managed lands, sawtimber size class stands (≥9 inches dbh average) within preferred fisher cover types below 6,000 feet in elevation with 40 percent or greater canopy closure were considered potential habitat suitable for use by fishers (*ARM 36.11.403(60)*). Fisher habitat was further divided into upland and riparian-associated areas depending upon the proximity to Class 1 and Class 2 streams (*ARM 36.11.403(15)* and *(16)*). DNRC manages preferred fisher cover types within 100 feet of Class 1 and 50 feet of Class 2 streams, so that at least 75 percent of the acreage (DNRC lands only) remains in the sawtimber size class in moderate to well-stocked density (*ARM 36.11.440(1)(b)(i)*). Effects were analyzed using field evaluations, GIS analysis of SLI stand data to estimate potential habitat, and aerial photograph interpretation to evaluate habitat conditions on non-DNRC lands. Snags and coarse woody debris were assessed using plot data (described in the snag and coarse woody debris analysis subsection above), site visits, and by reviewing past DNRC harvesting information. Factors considered in this analysis include the type of harvesting, number of snags, relative amounts of coarse woody debris, the level of firewood harvesting and the risk of trapping mortality.

**Existing Environment**

The proposed project area contains 788 acres (21.9% of project area) of suitable fisher habitat (TABLE W-8 – FISHER HABITAT). Riparian fisher habitat within the project area is comprised of approximately 172 acres of preferred fisher cover types, of which 140 acres (81.4% of preferred cover types) of riparian habitat are currently suitable for use by fishers. Snags and coarse woody debris (CWD) were quantified at sampling plots within proposed harvest units and were generally found to be within levels recommended by *Graham et al. (1994)* for the habitat types present (see SNAGS AND COARSE WOODY DEBRIS). Suitable fisher habitat that provides good habitat connectivity occurs along most of the perennial streams in the project area below 6,000 feet. Across the project area, suitable fisher habitat is scattered and mainly confined to the eastern portion of the project area due to elevations above 6,000 feet and the presence of non-preferred cover types. Existing suitable stands are providing the mature forest conditions (≥40 crown closure) necessary for use as fisher travel habitat in upland areas. Open roads facilitate firewood gathering, which can affect the abundance of snags and CWD

used by fishers. Additionally, roads near streams can also offer trappers convenient access to forested riparian areas, which increase trapping risk to fishers should they be using the area. There are 2.5 miles of open roads along the eastern edge of the project area and firewood gathering is minimal. The lack of convenient vehicle access to the project area and large amounts of winter snow likely limit trapper presence and associated mortality risk for fisher. Overall, fisher habitat suitability and connectivity within the project area is moderate to low and risk factors are low.

Historical records of fisher occurring in the CEAA within the last 50 years are generally lacking, however fishers have been documented in Flathead County (*MNHP 2012, Foresman 2012*) and fishers are likely to use the CEAA. Within the CEAA, there are 9,483 acres (34.9% of the CEAA) of suitable fisher habitat (TABLE W-8 – FISHER HABITAT). Riparian fisher habitat within the CEAA consists of approximately 1,363 acres of preferred fisher cover types on DNRC lands, of which 1,155 acres (84.7% of preferred fisher cover types) are currently suitable for use by fishers. The majority of Class 1 and 2 streams within the CEAA (below 6,000 feet elevation) have accompanying riparian vegetation that would facilitate fisher travel, and contribute to habitat suitability and connectivity, however suitable upland habitat is somewhat scattered within the CEAA. Within the CEAA, past harvesting has influenced mature crown closure, snags and coarse woody debris levels on about 3,998 acres (14.7% of the CEAA). The CEAA contains a network of existing open roads (density = 0.8 mi/sq. mile) that facilitate trapper access, although most are not plowed, which limits motorized vehicle use during typical winter conditions. Collectively, habitat suitability for fishers within the CEAA is moderate and risk factors are moderate.

**Environmental Effects**

- **Direct and Indirect Effects of the No-Action Alternative on Fishers**

No change to the stands providing fisher denning and foraging habitats would be expected as no timber harvesting activities would occur under this alternative. Thus, since: 1) no changes to existing habitats would be anticipated; 2) landscape connectivity would not be altered; 3) no appreciable changes to canopy cover, snags, snag recruits, and coarse woody debris levels would be anticipated; and 4) no changes to human access or potential for trapping mortality would be anticipated, no direct or indirect effects associated with fisher habitat suitability would be expected in the project area.

- **Direct and Indirect Effects of the Action Alternative on Fishers**

Approximately 147 acres of the 788 acres (18.7%) of suitable fisher habitat in the project area would be harvested under the Action Alternative (TABLE W-8 – FISHER HABITAT). Approximately 147 acres of upland fisher habitat within the project area harvest units would receive harvest treatments that would likely yield stands too sparsely forested for appreciable use by fishers for 40-80 years. Up to 0.1 acres of fisher riparian habitat (<0.1%) within 50 to 100 feet of a Class 1 stream could receive a harvest treatment that would leave the harvested area unsuitable for fisher use. No harvesting would occur within 50 feet of Class 1 or Class 2

streams. Approximately 81.4% (140 acres) of preferred fisher cover types in riparian areas would remain suitable for use by fishers. After harvest activities, remaining suitable fisher habitat and habitat connectivity would be primarily associated with riparian areas running through the project area. In all areas, harvest prescriptions call for retention of 2 snags and 2 snag recruits per acre (≥21 in. dbh) where they exist, otherwise the next largest size class. In addition, 15 to 20 tons of coarse woody debris per acre would be planned for retention within the 151 acres of harvest units proposed for tractor harvesting. An additional 105 acres would be line-harvested and 90 acres could undergo subsequent broadcast burning; these acres would likely contain lower levels of snags and coarse woody debris. While the proposed harvest may reduce density of snags and their recruits in the near future, the sustainability and development of snags in the area would be maintained by retention of appreciable numbers of large snags and snag recruitment trees. These large snags and trees could be a source for fisher denning and resting sites in the future when intensively harvested stands regenerate and develop mature stand characteristics (40 to 80 years). Approximately 220 acres of riparian and upland preferred fisher covertypes that currently do not provide ample structural attributes found in suitable fisher habitat would continue maturing and could provide suitable habitat in the next 15 to 40 years. Open road density during trapping season (December 1 – Feb 14) would not change under the Action Alternative. Because roads would remain restricted during the trapping season, fisher mortality risk due to trapping would be expected to remain the same. The potential future risk for snag and coarse woody debris loss due to firewood gathering would be expected to increase to a minor degree with the seasonal opening of 1.3 miles of previously restricted road. However, given the proposed harvest in the area, steep slopes, general lack of desirable firewood species and distance from population centers; appreciable loss of snags or coarse woody debris due to firewood gathering would not be expected. Thus, minor adverse direct and indirect effects would be anticipated that would affect fisher habitat suitability in the project area since: 1) existing baseline suitability and connectivity of fisher habitat within the project area is moderate to low, 2) harvesting would remove 4.1% of suitable upland fisher habitat in the project area, 3) reductions in habitat connectivity would occur but existing levels of riparian fisher habitat would be maintained, and 4) overall risk factors associated with motorized human access levels would not appreciably change.

- **Cumulative Effects of the No-Action Alternative on Fishers**

No additional effects to riparian or upland fisher habitats on DNRC-managed lands would be expected, as no timber harvesting activities would occur under the No-Action Alternative. Thus, no further cumulative effects to fisher habitat suitability would be anticipated in the cumulative effects analysis area since: 1) no changes to existing habitats on DNRC ownership would occur; 2) landscape connectivity afforded by the stands on DNRC ownership would not change; 3) no changes to canopy cover, snags, snag recruits, or coarse woody debris levels would be expected; and 4) no changes to human access or potential for trapping mortality would be anticipated. Ongoing forest management projects not associated with the proposed Lower Herrig Timber Sale have affected fisher habitat in the CEAA and other proposed projects could alter fisher habitat suitability in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS).

- **Cumulative Effects of the Action Alternative on Fishers**

Approximately 147 acres (1.6%) of 9,483 acres of potentially suitable fisher habitat in the CEAA would be harvested. Of these proposed acres, 147 acres would be upland fisher habitat and 0.1 acres would be fisher riparian habitat. Riparian fisher habitat would receive a harvest treatment that would make it unsuitable for use by fishers for 40 to 80 years. Of the approximately 1,363 acres of preferred fisher cover types associated with Class 1 and 2 streams on DNRC lands, 1,155 acres (84.7% of preferred fisher cover types) would remain suitable for use by fishers (*ARM 36.11.440(1)(b)(i)*). Reductions in upland fisher habitat would be additive to the changes associated with past and current timber harvesting in the CEAA (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Approximately 9,336 acres of the 27,173-acre cumulative effects analysis area (34.4%) would remain as suitable fisher habitat (TABLE W-8 – FISHER HABITAT). Reductions in landscape connectivity of suitable upland fisher habitat within the CEAA would occur; however suitable forest stands along riparian areas would persist and appreciable affects on fisher use of the CEAA would not be expected. The potential future risk for snag and coarse woody debris loss due to firewood gathering would be expected to increase to a minor degree with the opening of 1.3 miles of previously restricted road. However, given the proposed harvest in the area, steep slopes, general lack of desirable firewood species and distance from population centers; appreciable loss of snags or coarse woody debris due to firewood gathering would not be expected. Potential trapping mortality would be minimally influenced, as there would be no change in public access during the fisher trapping season (December 1 – February 14. Thus, minor adverse cumulative effects would be anticipated that would affect fisher habitat suitability within the CEAA since: 1) harvesting would alter tree density and stand structure in 1.6% of suitable fisher habitat within the CEAA, 2) negligible changes to fisher habitat associated with riparian areas in the CEAA would be anticipated and 84.7% of the total preferred cover type acreage would remain moderately to well-stocked, 3) suitable fisher habitat would remain connected within riparian areas, and 4) minimal risk of snag/coarse woody debris loss and trapping mortality would be expected.

***TABLE W-8– FISHER HABITAT.*** *Estimates of existing and post-harvest acreages of suitable fisher habitat within the project area and CEAA for the Lower Herrig Timber Sale. Values in parentheses refer to the percentage of the fisher habitat in a category of the total area within the corresponding analysis area.*

| **Fisher Habitat Category** | **Project Area** (3,590 acres) | | **Cumulative Effects Analysis Area** (27,173 acres) | |
|---|---|---|---|---|
| | Existing | Post-Harvest | Existing | Post-Harvest |
| Suitable Upland Fisher Habitat | 648.5 (18.1%) | 501.8 (14%) | 8,328.2 (30.6%) | 8,181.5 (30.1%) |
| Riparian Fisher Habitat | 139.7 (3.9%) | 139.6 (3.9%) | 1,154.9 (4.3%) | 1,154.8 (4.2%) |
| Total Suitable Fisher Habitat | 788.2 (22%) | 641.4 (17.9%) | 9,483.1 (34.9%) | 9,336.3 (34.4%) |

**GRAY WOLF**

***Issue:*** *The proposed activities could displace gray wolves from the vicinity of the project area, particularly at denning and rendezvous sites, and/or alter big game prey availability, which could adversely affect gray wolves.*

**Introduction**

In April 2011, gray wolves were removed from the federal list of threatened and endangered species in Montana, Idaho and parts of Washington, Oregon, and Utah. DNRC currently considers them as a sensitive species for the purpose of analyzing impacts associated with forest management activities.

Wolves are wide-ranging opportunistic carnivores that prey primarily on white-tailed deer, and, to a lesser extent, elk and moose, in northwest Montana (*Kunkel et al. 2004*). In general, wolf densities are positively correlated to prey densities (*Oakleaf et al. 2006, Fuller et al. 1992*). Some studies have shown that wolves may prey upon elk more frequently during certain portions of the year (particularly winter) or in areas where elk numbers are higher (*Arjo et al. 2002, Kunkel et al. 2004, Garrott et al. 2006*). Thus, reductions in big game numbers and/or winter range productivity could indirectly be unfavorable to wolves.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases.

**Analysis Areas**

Direct and indirect effects were analyzed for activities conducted within the 3,590-acre project area. Cumulative effects were analyzed on a 27,173-acre CEAA around the project area (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale approximates an area large enough to support a wolf pack in northwest Montana (based upon DFWP wolf pack home range data, 2010-2011).

**Analysis Methods**

Direct, indirect, and cumulative effects were analyzed using field evaluations, aerial photograph interpretation, and a GIS analysis of habitat components. Factors considered in the analysis include the amount of big game winter range modified and level of human disturbance in relation to any known wolf dens or rendezvous sites.

**Existing Conditions**

Wolf presence has been recently documented in the vicinity of the project area, however no denning or rendezvous sites are known or have been recorded in the project area (*Kent Laudon, DFWP, personal comm. January 18, 2013*). Landscape features commonly associated with denning

and rendezvous sites, including meadows and other openings near water and in gentle terrain, are largely absent within the project area, as most of the area is relatively high elevation with steep, brushy slopes. Additionally, the project area does not contain deer or elk winter range. Thus, while current or future presence of wolves in the vicinity of the project area is possible during the non-winter periods, year-round occupancy of the project area is unlikely.

In northwest Montana, wolves and habitats they use generally mirror those of their ungulate prey - primarily white-tailed deer, elk, and moose. The proposed project area contains summer habitat for the aforementioned prey species, but the only ungulate winter range habitat present is for moose. Signs of use by elk and moose in summer were observed during field visits. The proposed project area contains 2.5 miles of open roads and 14.2 miles of restricted roads that could serve as a source of disturbance and mortality for both wolves and big game (see TABLE W-4– ROAD MANAGEMENT AND CONSTRUCTION).

Within the larger CEAA, winter range for white-tailed deer and mule deer is not present, elk winter range is limited (2.3%), whereas moose (94.0%) winter range is more abundant. Because winter range for most prey species is largely absent from the CEAA, year-round habitat suitability of the CEAA for wolves is marginal. Landscape features commonly associated with denning and rendezvous sites, including meadows, openings near water, and gentle terrain, occur within the CEAA but are limited to relatively small areas along Swift and Antice Creeks. Past harvesting on all ownerships in the CEAA has altered mature forest on 3,998 acres (14.7% of CEAA), which could influence use of the area by big game. Current and proposed harvesting (see TABLE W-2 – RECENT AND PROPOSED PROJECTS) could potentially alter big game habitat and indirectly influence wolves by potentially changing the distribution of big game. The CEAA contains an extensive network of restricted and open roads (total road density 2.8 miles/sq mile), which has increased human access and the potential for wolf-human interactions. Increasing access to these areas can elevate risk of wolf/human encounters and elevate the vulnerability of their ungulate prey, especially during the hunting season. Big game habitat suitable for non-winter use within CEAA remains largely intact and undeveloped; thus, continued wolf use of the area during the summer and fall months is expected.

**Environmental Effects**

- **Direct and Indirect Effects of the No-Action Alternative on Gray Wolves**

No timber harvesting or associated activities would occur under the No-Action Alternative. Thus, since: 1) no additional changes in human disturbance levels would occur; and 2) no changes to the vegetation on big game winter ranges would occur, no direct and indirect effects would be expected to affect gray wolf displacement risk, or big game prey availability that could subsequently affect wolves.

- **Direct and Indirect Effects of the Action Alternative on Gray Wolves**

The proposed activities would affect 256 acres (7.1% of the project area) of moose winter range. However, overall, moose are fairly tolerant of winter conditions due to their large body size and the proposed activities are not expected to adversely affect moose. Additional big game winter

range does not occur in the project area, but the proposed activities could lead to a shift in big game use of the area and could cause a shift in wolf use of the project area, should they be present. There are no known wolf rendezvous or den sites in the project area. However, if documented in the vicinity of the project area, mechanized activities would be restricted within 1 mile of wolf dens (ARM 33.11.430(1)(a)) and 0.5 miles of wolf rendezvous sites (ARM 33.11.430(1)(b)). Wolf use of the area is possible, and if present in the vicinity of the project area, wolves could be displaced by forest management activities for up to 4 years. Approximately 1.3 miles of existing restricted road within the project area would be permanently opened to public motorized access through implementation of the Stillwater Block HCP Transportation Plan, as analyzed in the DNRC HCP EIS and accompanying MEPA documents (USFWS and DNRC 2010). These 1.3 miles of road would be open to public motorized access from July 1 through September 15. These timing restrictions on motorized road use would reduce the risk of wolf mortality during the majority of the fall hunting season (September 1 – February 28). Thus, minor adverse direct and indirect effects to wolves associated with displacement or changes in prey availability would be anticipated as a result of the Action Alternative since: 1) known wolf den or rendezvous sites do not occur in the vicinity of the project area, but restrictions would apply if one or both are encountered during operations (ARM 33.11.430(1)(a)(b)); 2) year-round suitability of the project area for wolves is likely low, 3) some canopy cover would be removed, but the proposed activities are not expected to appreciably affect prey availability for wolves, and 4) a 1.3 mile increase in the amount of open roads could increase hunting mortality risk for wolves to a minor degree during the first two weeks of archery hunting season, but then revert to existing levels.

- **Cumulative Effects of the No-Action Alternative on Gray Wolves**

No additional disturbance of gray wolves, their prey, or their habitat would occur under this alternative as no timber harvesting activities would occur. Past and ongoing forest management projects not associated with the proposed Lower Herrig Timber Sale have affected wolf prey availability in the CEAA (see TABLE W-2 – RECENT AND PROPOSED PROJECTS), and other proposed projects could displace wolves and/or alter wolf prey availability in the future. Therefore, no additional cumulative effects to wolves associated with displacement or prey availability would be expected to result from the No-Action Alternative within the CEAA.

- **Cumulative Effects of the Action Alternative on Gray Wolves**

The proposed harvest would affect 256 acres (0.7%) of the 33,073 acres of moose winter range within the CEAA. However, moose are tolerant of winter conditions and the proposed activities are not expected to adversely affect moose or prey availability for wolves. Additional big game winter range does not occur in the project area, but the proposed activities could lead to a shift in big game use of the area and could cause a shift in wolf use of the project area, should they be present. There are no known rendezvous or den sites on DNRC lands in the CEAA. However, if documented in the vicinity of the project areas, mechanized activities would be restricted within 1 mile of wolf dens (*ARM 33.11.430(1)(a)*) and 0.5 miles of wolf rendezvous sites (*ARM 33.11.430(1)(b)*). The alteration of canopy cover and disturbance to wolves would be additive to any proposed and ongoing activities occurring in the CEAA (see

TABLE W-2 – RECENT AND PROPOSED PROJECTS). If present in the vicinity of the project area, wolves could be displaced by forest management activities associated with the proposed Lower Herrig Timber Sale for up to 4 years. Approximately 1.3 miles of existing restricted road within the project area would be permanently opened to public motorized access through implementation of the Stillwater Block HCP Transportation Plan, as analyzed in the DNRC HCP EIS and accompanying MEPA documents (*USFWS and DNRC 2010*). These 1.3 miles of road would be open to public motorized access from July 1 through September 15. These timing restrictions on motorized road use would reduce the risk of wolf mortality during the majority of the fall hunting season (September 1 – February 28). A 0.02 mi/sq. mile increase in open road density within the CEAA from July 1 through September 16 would not be expected to appreciably affect big game or wolf mortality risk within the CEAA. Thus, since: 1) known wolf den or rendezvous sites do not occur in the vicinity of the project area, but restrictions would apply if one or both are encountered during operations(*ARM 33.11.430(1)(a)(b)*); 2) an appreciable increase in hunting mortality risk for wolves and prey species would not be anticipated, and 3) some canopy cover would be removed, but the proposed activities are not expected to adversely affect prey availability for wolves; minor adverse cumulative effects to wolves associated with displacement or changes in prey availability would be anticipated as a result of the Action Alternative.

***FIGURE W-1 – WILDLIFE ANALYSIS AREAS.*** *Areas used to assess effects of the action and no-action alternatives on wildlife and wildlife habitat for the proposed DNRC Lower Herrig Timber Sale.*

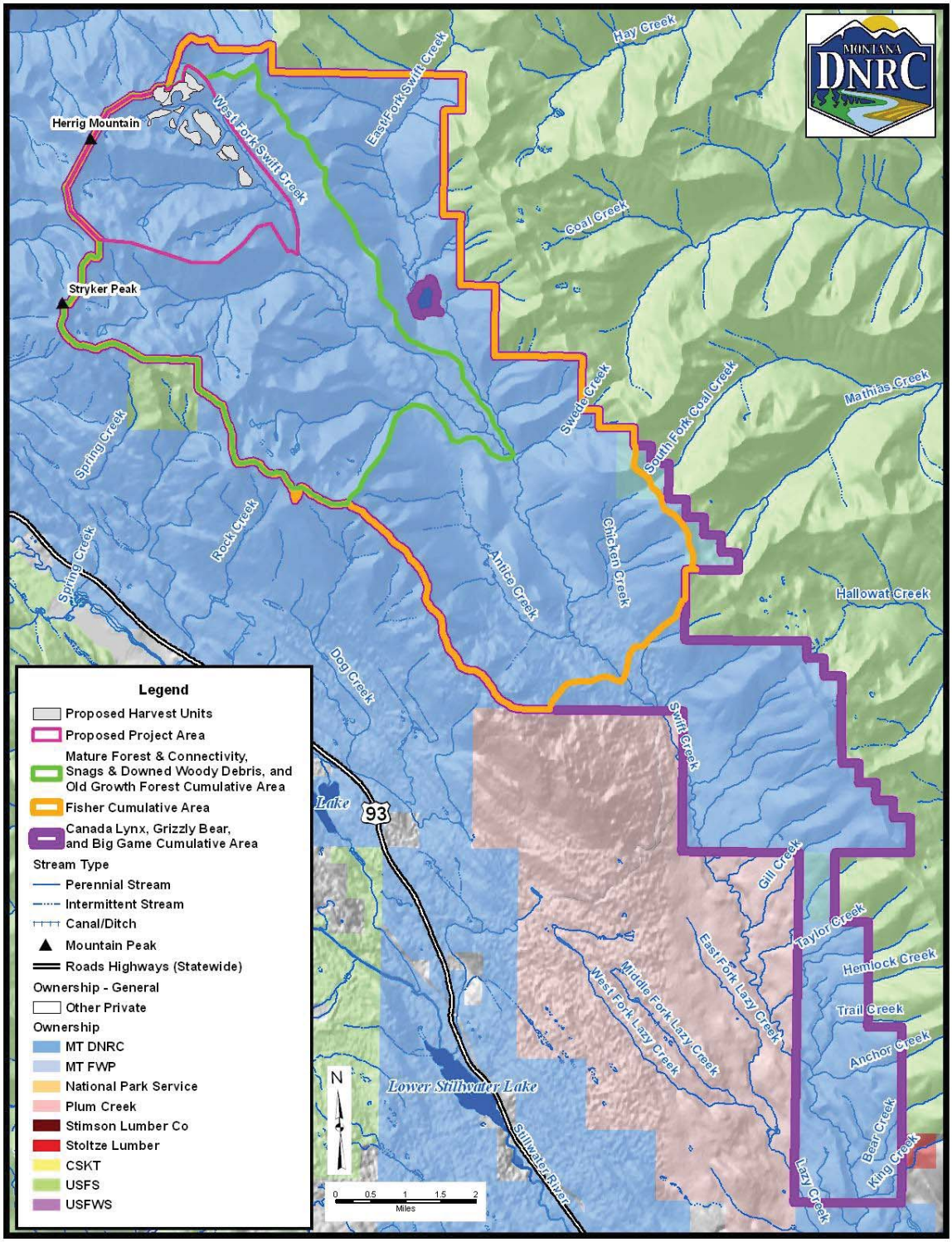
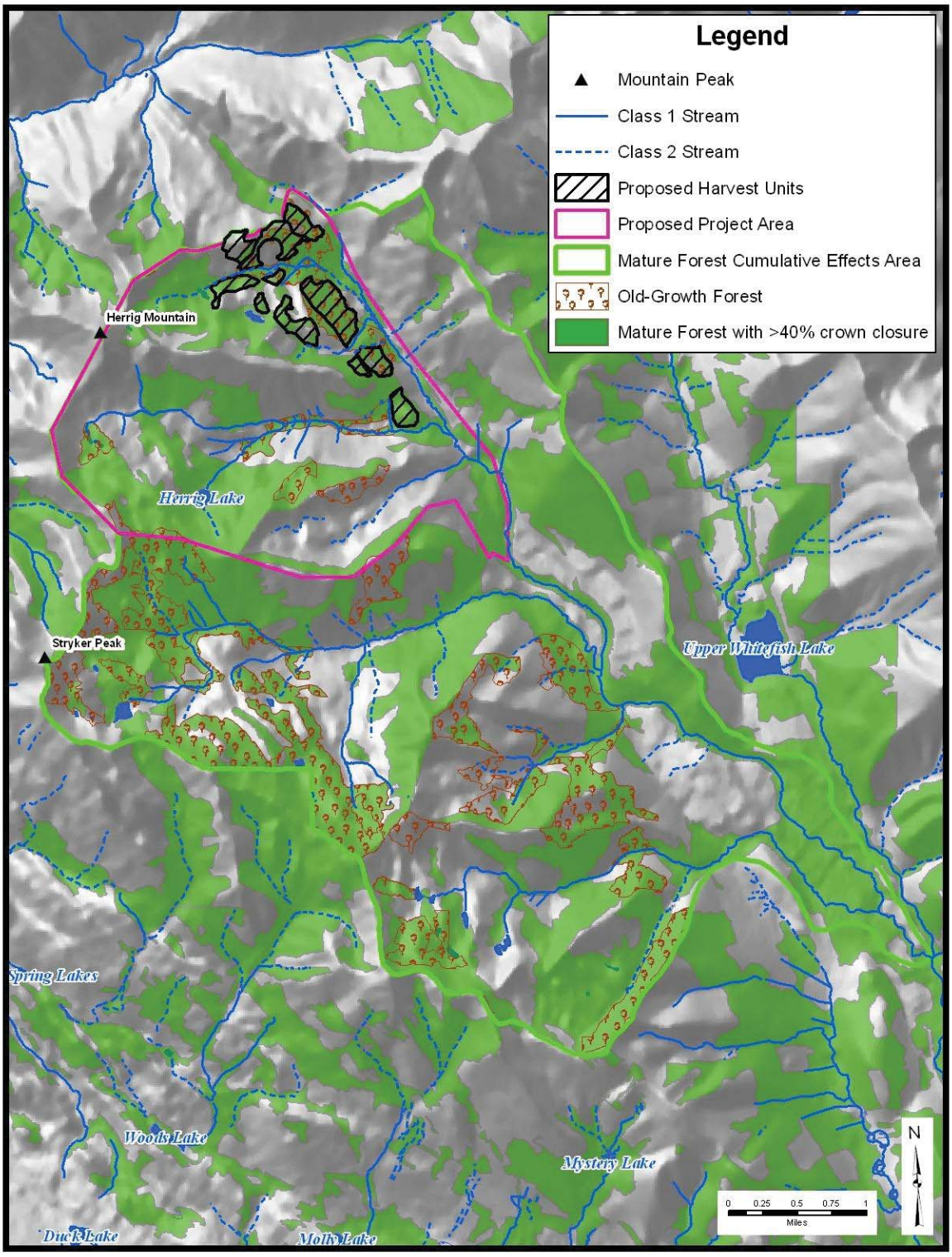


***FIGURE W-2 – MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY.*** *Relationship of the project area and proposed units to mature forested stands and potential connectivity for the DNRC Lower Herrig Timber Sale.*



Attachment V:
**WATER RESOURCES ANALYSIS**

## INTRODUCTION

This analysis is designed to disclose the existing condition of the hydrologic and fisheries resources and describe the anticipated effects that may result from each alternative of this proposal. During the initial scoping, no issues were identified by the public regarding water-quality, water-quantity, or fisheries resources. The following issue statements were developed from interdisciplinary team discussions regarding the effects of the proposed timber harvesting:

- *Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality.*
- *Cumulative effects from timber harvest may affect channel stability and fisheries habitat by increasing annual water yields and by decreasing the amount of recruitable woody debris into streams and /or increasing stream temperatures.*

The *ENVIRONMENTAL EFFECTS* sections disclose the anticipated direct, indirect, and cumulative effects to water resources in the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships in each analysis area have been taken into account for the cumulative effects analysis.

## ANALYSIS METHODS

### *Risk Assessment Description*

In terms of the risk that an impact may occur, a low risk of an impact means that the impact is unlikely to occur. A moderate risk of an impact means that the impact may or may not (50/50) occur. A high risk of an impact means that the impact is likely to occur.

A *very low impact* means that the impact is unlikely to be detectable or measurable, and the impact is not likely to be detrimental to the resource. A *low impact* means that the impact is likely to be detectable or measurable, but the impact is not likely to be detrimental to the resource. A *moderate impact* means that the impact is likely to be detectable or measurable, and the impact is likely to be moderately detrimental to the resource. A *high impact* means that the impact is likely to be detectable or measurable, and the impact is likely to be highly detrimental to the resource.

### *Sediment Delivery*

The methods applied to the project area to evaluate potential direct, indirect, and cumulative effects include a field review of potential sediment sources from haul routes. Stream crossings and roads were evaluated to determine existing sources of introduced sediment from existing and proposed roads.

Potential sediment delivery from harvest units will be evaluated from a risk assessment. This risk assessment will use the soil information provided in the *SOILS ANALYSIS* and the results from soil monitoring on past DNRC timber sales.

Sediment sources from in-channel sources will be addressed qualitatively by identifying areas that contribute sediment and assessing the risk of adverse impacts from each alternative using the *Risk Assessment Descriptions* above.

***Water Yield***

Annual water yield will be disclosed as a cumulative effect in the *EXISTING CONDITIONS* portion of this report because the existing condition is a result of all past harvesting and associated activities. Annual water yield refers to the gross volume of water in a watershed that is contributed to a stream or other surface water feature over an entire year. This does not address peak flows or seasonal fluctuations in stream flow. In the *ENVIRONMENTAL EFFECTS* portion of this report, modeled water-yield increases as a result of this project will be disclosed as a direct effect. The cumulative water yield increase for each alternative will also be disclosed.

The annual water-yield increase for watersheds in the project area was estimated using the ECA (Equivalent Clearcut Acres) method, as outlined in *Forest Hydrology, Part II (Haupt et al, 1974)*.

ECA is a function of total area roaded, harvested, or burned; percent of crown removed during harvesting or wildfire; and amount of vegetative recovery that has occurred in the harvested or burned areas. As live trees are removed, the water that would have otherwise evaporated and transpired, either saturates the soil, or is translated to runoff. This method also estimates the recovery of these increases as new trees revegetate the site and move toward preharvest water use.

In order to evaluate the potential effects of water-yield increases, a threshold of concern for each watershed was established per *ARM 36.11.423*. Thresholds were established based on evaluation of the acceptable risk level, resources value, and watershed sensitivity. Increased annual water yields above the threshold of concern may result in an increased risk of in-channel erosion and degradation of fisheries habitat and may have detrimental impacts on other downstream beneficial uses.

***Woody Debris Recruitment***

The analysis method for woody debris recruitment will evaluate the potential reduction in available woody debris and shading due to timber-harvesting activities in the riparian management zone (RMZ) of the project area.

***Stream Temperature Increases***

Stream temperature will be addressed by disclosing the stream temperature data collected on West Fork Swift Creek over the last several years and assessing the risk of stream temperature increases due to reduced shading from proposed vegetation removal under the Action Alternative.

## ANALYSIS AREA

### *Sediment Delivery*

The analysis area for sediment delivery is the proposed harvest units and roads used for hauling. This includes upland sources of sediment that could result from this project. In addition, in-channel sources of sediment such as mass-wasting locations or excessive scour/deposition will be disclosed if found in project area streams.

### *Water Yield*

The analysis area for annual water yield will include the West Fork Swift Creek 6th code watershed.

### *Woody Debris Recruitment*

The analysis area for woody debris recruitment is generally the RMZ along Class 1 streams in the project area.

### *Stream Temperature Increases*

The analysis area for stream temperature increases is identical to the analysis area for woody debris recruitment.

## WATER USES AND REGULATORY FRAMEWORK

### *Water Quality Standards*

This portion of the Flathead River basin, including the Whitefish River and its tributaries, is classified as A-1 by the Montana Department of Environmental Quality (MDEQ) , as stated in *ARM 17.30.608*. The water quality standards for protecting beneficial uses in A-1 classified watersheds are located in *ARM 17.30.622*. Water in A-1 classified waterways is suitable for drinking, culinary and food processing purposes (after conventional treatment), bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. State water quality regulations prohibit any increase in sediment above naturally occurring concentration in water classified A-1. Naturally occurring means, condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied [*ARM 17.30.602 (17*)]. Reasonable land, soil and water conservation practices include, "methods, measures or practices that protect present and reasonably anticipated beneficial uses…" [*ARM 17.30.602 (21)*]. The State of Montana has adopted Best Management Practices (BMPs) through its non-point source management plan (*MDEQ, 2007*) as the principle means of meeting the Water Quality Standards. These practices include, but are not limited to, structural and nonstructural controls as well as operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of activities that could create their own impacts.

***Water Quality Limited Waterbodies***

The streams in the project area are not considered impaired waterbodies and listed on the 2012 303(d) list. The 303(d) list is compiled by MDEQ as required by section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency Water Quality Planning and Management Regulations (40 CFR, part 130). Under these laws, MDEQ is required to identify water bodies that do not fully meet water quality standards, and/or where beneficial uses are threatened or impaired.

***Streamside Management Zone Law (SMZ)***

All rules and regulations pertaining to the SMZ Law are to be followed. An SMZ width of 100 feet is required on Class 1 and 2 streams and lakes when the slope is greater than 35 percent. An SMZ width of 50 feet is required when the slope is less than 35 percent.

***Forest Management Rules***

In 2003, DNRC drafted Administrative Rules for Forest Management. The portion of those rules applicable to watershed and water resources include ARM 36.11.422 through 426 and 470 through 471.

***Habitat Conservation Plan (HCP)***

DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP, which can be found at *http://dnrc.mt.gov/HCP*.

***Water Rights And Beneficial Uses***

No water rights for surface water exist within three miles downstream of the project area.

Designated beneficial water uses within the project area include cold-water fisheries, aquatic life support, and recreational use in the streams, wetlands, and lakes in the surrounding areas.

***Fisheries—Threatened, Endangered And Sensitive Species***

Westslope cutthroat trout are listed as a Class-A Montana Animal Species of Concern. A Class-A designation is defined as a species or subspecies that has limited numbers and/or habitats both in Montana and elsewhere in North America, and elimination from Montana would be a significant loss to the gene pool of the species or subspecies (*Montana Fish, Wildlife and Parks, Montana Natural Heritage Program,* and *Montana Chapter American Fisheries Society Rankings*). DNRC has also identified westslope cutthroat trout as a sensitive species (*ARM 36.11.436*).

Bull trout are also listed as a Montana Animal Species of Concern, with the same ranking as westslope cutthroat trout; however bull trout are also listed as 'threatened' by the US Fish and Wildlife Service under the Endangered Species Act. DNRC is a signatory to the 2000 (interagency) Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin, Montana.

**EXISTING CONDITION**

***General Description***

The project area is located in the West Fork Swift Creek watershed which is a 6th-code watershed also referred to as a HUC (Hydrologic Unit Code). This HUC encompasses approximately 12,819 acres of land that combines with the East Fork Swift Creek to form the main channel of Swift Creek. Average precipitation in this HUC is approximately 46 inches per year, mostly in the form of snow. Several small first and second order streams are tributary to this channel. Other streams in the watershed have discontinuous surface flow. Larger, named tributaries of the West Fork Swift Creek include Herrig and Johnson creeks.

Elevation ranges in the West Fork Swift watershed range from 4,180 feet at the confluence with East Fork Swift to 7,285 feet on Herrig Mountain. Slopes in the watershed range from nearly flat in the valley bottom and on benches to nearly vertical in areas adjacent to streams.

West Fork of Swift Creek (including Herrig Creek) was inventoried in 1999 for channel stability, sediment sources and stream crossing conditions. A R1/R4 fisheries habitat inventory was conducted on West Fork Swift Creek in 2001 and on Herrig Creek in 2004-2005. Both streams were evaluated during fieldwork in 2012 for channel stability. Channel stability was rated as fair or good in all reaches except for a lower reach of West Fork Swift Creek, which flows through expansive, relic alluvial debris deposits, where the stability was rated as poor. The poor rating is due to downcutting (***see Figure 1***), headcutting and recent bank erosion as a result of the channel adjusting to rotting large woody debris which has stored sediment for several decades. Extended high water flows during spring of 2012 exacerbated the failure rate of the natural woody debris check dam and caused bank erosion into the adjacent West Fork Swift Creek Road. This portion of West Fork Swift Creek flows less than six

**Figure 1: Downcutting in West Fork Swift Creek--2012**

months of the year and provides very limited, marginal fish habitat. A temporary stabilization project was completed in October 2012 to reduce bank cutting on the roadfill until a long-term plan can be developed.

Eastern brook trout, bull trout, westslope cutthroat trout and slimy sculpin are found in West Fork Swift Creek. Within the project area, many of the streams area not fish-bearing primarily due to steep gradient and intermittent surface flow. Westslope cutthroat trout in West Fork Swift Creek may be nearly pure strain (*MFISH, 2012*). Additional information on fisheries habitat and populations can be found in the *West Fork Swift Creek Timber Sale Project Final Environmental Impact Statement* (DNRC 2005) located in the project file.

***Sediment Delivery***

- ***Roads***

A field review of the haul route identified potential sediment sources from roads. While past timber sale projects and the Stillwater State Forest road maintenance contracts resulted in adequate surface drainage on most roads proposed for hauling, limited or no road maintenance has been implemented on the Herrig Basin road system since the 1980's. Consequently, some corrugated metal pipes (CMPs) have become plugged and failed or resulted in past erosion of the road surface and fills. Ditches on the in-sloped roads carry water for several hundred feet (in some cases) before crossing the road prism at a water bar resulting in scouring which has developed into small stream channels. All of the resulting stream channels observed during field reconnaissance are stable, but the lack of road maintenance caused erosion and sediment delivery. Over the years, as the new stream channels stabilized, the road surface also became quite stable and heavily vegetated with grasses, forbs and shrubs.

- ***Proposed Units***

The erosion risk for landtypes in the project area with proposed timber harvest proposed is generally moderate, however approximately three acres of high erosion risk landtype is proposed for harvest (proposed Unit 5). No mass wasting sites or unstable soils were observed in any of the proposed harvest areas.

- ***In-Channel Sources***

In-channel sources of sediment in Herrig Creek are limited to small locations of erosion at outcurves and constrictions. Despite having a very steep gradient in some reaches, the channel substrate is stable. Woody debris from historic avalanches stores sediment and functions to maintain channel stability. The upper reaches of West Fork Swift Creek area also relatively stable

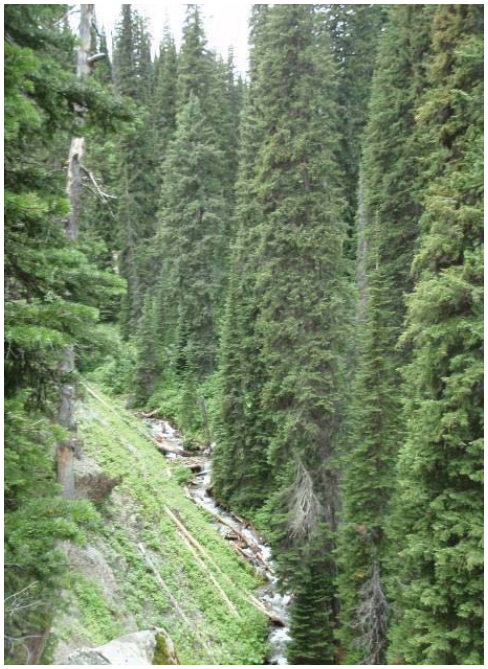


**Figure 2: Large, steep revegetating banks above West Fork Swift Creek-2012**

and have very few banks that contribute sediment to the stream. However, in the east half of Section 11, T34N, R24W, several large banks have eroded into the stream over the last several decades. The steep slopes are revegetating (***see Figure 2***) although they will continue to contribute varying amounts of sediment to the stream, especially during spring runoff periods **.** These steep (40 percent and greater) reaches of stream have maintained function by transporting the material to reaches of lesser gradient where the sediment is deposited (***see Figure 3***) until it is transported downstream in subsequent high flows.

**Figure 3: Depositional area on West Fork Swift Creek--2012**

***Water Yield***

A harvest history was developed for the Stillwater State Forest watersheds from aerial photos, timber sale contracts, and section record cards to estimate the annual water-yield increases the West Fork Swift Creek watershed. Past harvesting operations in the project area include harvests from the 1950's to the 1980's. Major harvests occurred in the project area in 1960 and 1974; no harvesting has occurred since 1984. A list of harvesting in the project area can be found in the project file. Other forest product removals include pulp, individual firewood and individual Christmas tree harvests.

Using the ECA method described earlier, the existing annual water yield increase for the West Fork Swift Creek watershed is estimated at 5.9 percent annual water yield increase over fully forested conditions.

After reviewing the beneficial uses, existing channel conditions, and existing watershed condition per *ARM 36.11.423*, the threshold of concern for the West Fork Swift Creek watershed threshold was set at 10 percent. These threshold values expect a low degree of risk of adverse impacts to beneficial uses due to water-yield increases, as described in *ARM 36.11.423(f)(iv)*.

***Recruitable Woody Debris***

Large woody debris recruitment to streams is important to maintain channel form and function and as a component of fish habitat. According to *ARM 36.11.425*, DNRC will establish a RMZ *'…when forest management activities are proposed …on sites that are adjacent to fish bearing streams and lakes.'* One reason for the RMZs is to retain adequate levels of large woody debris recruitment to the stream channel. Site potential tree height (SPTH) is

the method used to identify RMZ width according to *ARM 36.11.425 (5).* Past analysis has looked at the site potential tree heights ($SPTH_{100}$) at 100 years in this portion of the Stillwater State Forest (*DNRC 2005*). Tree heights ranged from 63 feet to 115 feet for the dominant, open grown tree species in the riparian area. The average $SPTH_{100}$ for West Fork Swift Creek was approximately 87 feet.

***Stream Temperature Increases***

Data collected over six non-consecutive years from 2001 to 2009 showed a mean weekly maximum temperature of 11.1 and 11.7 degrees Celsius for Upper West Fork Swift and Lower West Fork Swift sites respectively (*Bower 2010*). The maximum daily temperature at either site was 14.1 degrees Celsius. These temperatures are conducive to beneficial uses including cold water fisheries.

**ENVIRONMENTAL EFFECTS**

***Description Of Alternatives***

- ***No-Action Alternative***

No timber harvesting or associated activities would occur under this alternative.

- ***Action Alternative***

Eleven units totaling approximately 256 acres would be commercially harvested under this alternative. All of the proposed harvest would be regeneration harvest (clear cut). Approximately 151 acres would be harvested using conventional ground-based equipment and 105 acres would employ cable yarding methods. Approximately 0.1 acres of RMZ harvest would occur within 100 feet of a Class 1, non-fish bearing stream. Site preparation would include machine piling and scarification on the ground-based units and broadcast burning on the cable units. An herbicide treatment to control brush may also be used on the cable units.

Approximate miles of road activities include:

- 4.6 miles of heavy maintenance/minor reconstruction
- 0.4 miles of road construction/reconstruction for temporary use
- 13.3 miles of existing road would be maintained or have drainage improvements installed as necessary to protect water quality.

***Issues Dismissed From Further Analysis***

After considering the extent of the proposed actions listed above, the resource variables of fisheries habitat woody debris recruitment and stream temperature increases were dismissed from further analysis. All woody debris recruitment and stream shading (the effect mechanism which tends to have the greatest effect on stream temperature) to fish-bearing, Class 1 streams in the project area is generally expected to occur within 100 feet of these streams. Although low impacts to woody debris recruitment may occur to a short segment of a non-fish-bearing, Class 1 stream as a result of harvest of up to 0.1 acres of

merchantable timber between the edge of the SMZ and edge of the RMZ, this effect is not expected to have any impact to the woody debris or channel forms of habitats in downstream fish-bearing reaches. Impacts to stream temperature in non-fish-bearing, Class 1 streams may affect downstream fish-bearing reaches; however, the retention of all riparian vegetation within 50 feet of a stream is expected to ensure levels of stream shading that are very similar to the existing condition (*USFWS and DNRC 2010*). No foreseeable measureable or detectable direct or indirect impacts to these fisheries resources would be expected to occur in any of the analysis areas; furthermore, no additional cumulative effects to these fisheries resources would be expected in any of the analysis areas as a result of implementing the Action Alternative.

***Direct And Indirect Effects***

- ***Direct and Indirect Effects of the No-Action Alternative to Water Resources***

  **Sediment Delivery**

  Under this alternative, no timber harvesting or related activities would occur. Sediment from all sources would continue as described in *EXISTING CONDITION*.

  **Water Yield**

  No increased risk of increases or reductions in annual water yield or ECA would result from this alternative.

- ***Direct and Indirect Effects of the Action Alternative to Water Resources***

  **Sediment Delivery**

  - ***Roads***

  Existing roads would have drainage improvements and BMP upgrades implemented under this alternative to minimize sediment delivery to streams. Improvements include:

  - Replacing a bridge across West Fork Swift Creek
  - Installing several CMPs on Class 1 and Class 2 streams. All of the streams are non-fish bearing.
  - Installing surface drainage and ditch relief CMPs to ensure delivery of runoff to streams is minimized.

  All of the installations would be completed in a dewatered condition which would minimize the risk of sediment delivery during installation. Although forestry BMPs would be followed to minimize sediment delivery, a high risk of a short-term increase in sediment would be expected following this work. The increase in sediment would be short-lived and would have low level impacts to beneficial uses present.

  - ***Proposed Units***

  Past monitoring of DNRC timber harvests has shown erosion on approximately 6 percent of the sites monitored, although no water-quality impacts from the erosion

were found (*DNRC 2005a*). These sites were harvested during the summer period, and the erosion was attributed to inadequate skid-trail drainage. Displacement was limited to main skid trails that occupy less than 2% of the harvest units." (*DNRC 2005a*). By minimizing displacement, less erosion would likely occur compared to other harvest methods with more extensive disturbance (*Clayton 1987 in DNRC 2005a*).

During a review of BMP effectiveness, including stream buffer effectiveness, *Raskin et. al. 2006* found that 95 percent of erosion features (disturbed soil) greater than 10 meters (approximately 33 feet) from the stream did not deliver sediment. Their findings indicated that the main reasons stream buffers are effective include 1) keeping active erosion sites away from the stream, and 2) stream buffers may intercept and filter runoff from upland sites as long as the runoff is not concentrated in gullies or similar features (*Raskin et.al. 2006*). Because no harvesting is proposed within 70 feet of any stream and generally would be greater than 100 feet from streams, this alternative would be expected to have a low risk of very low impacts to sediment delivery from proposed harvest units.

- ***In-Channel Sources***

Direct and indirect effects of the Action Alternative to in-channel sources of sediment would be limited to actions that would exacerbate the existing sediment sources including increases in annual water yield that would destabilize channels. Because the existing annual water yield is considerably below the recommended threshold that may trigger increased risk of channel erosion and the proposed harvest would increase annual water yield by an estimated 0.7 percent, a low risk of very low impacts from increased in-channel erosion would be expected.

Because DNRC would incorporate BMPs into the project design as required by *ARM 36.11.422 (2)* and all laws pertaining to SMZs would be followed, a moderate risk of low impacts from short-term sediment delivery associated with timber-harvesting activities would result from the implementation of this alternative. A low risk of low long-term impacts to water quality or beneficial uses due to increased sediment delivery would be expected.

**Water Yield**

Approximately 256 acres would be harvested using conventional ground-based and cable yarding methods, and approximately 255 ECA would be generated from these activities in the West Fork Swift Creek 6$^{th}$ code watershed. This level of harvest would result in an annual water yield increase of 0.7 percent. This level of increase would not be expected to result in impacts that would be different from the current conditions.

***Cumulative Effects***

- ***Cumulative Effects of the No-Action Alternative to Water Resources***

  **Sediment Delivery**

  No additional cumulative impacts from sediment delivery would be expected. Sediment delivery sites from roads on the proposed haul routes would remain unchanged, as would the sediment sources described in *EXISTING CONDITION*.

  **Water Yield**

  No increase in water yield would be associated with this alternative. As vegetation continues toward a fully forested condition, annual water yields would also be expected to gradually decline.

  - ***Cumulative Effects Summary - No-Action Alternative***

  Because no timber harvesting or associated activities would occur under this alternative, cumulative effects would be limited to the existing condition. Sediment delivery risk from existing sources would remain in the project area. Conditions would continue to provide adequate levels of large woody debris recruitment and shade retention. Under this alternative, fisheries habitat and water quality variables described in this assessment would be maintained at their current level.

- ***Cumulative Effects of the Action Alternative to Water Resources***

  **Sediment Delivery**

  Under this alternative, the proposed timber-harvesting and road-construction activities would occur. Although a high risk short-term low level impacts would be expected following improvements to roads, a low long-term cumulative impact from increases in sediment delivery as a result of timber harvesting and roadwork would have a moderate risk of occurring because of the BMP application and adequate stream buffers to filter potential displaced soil.

  **Water Yield**

  If this alternative were selected, the estimated cumulative water-yield increase in the West Fork Swift watershed would be 6.6 percent. Because this level would remain below the threshold set in accordance with *ARM 36.11.425(g)*, a low degree of risk to water quality would result from the implementation of this alternative.

  - ***Cumulative Effects Summary – Action Alternative***

  Because all timber-harvesting activities would follow BMPs as required by *ARM 36.11.422* and the direct and indirect effects would have a low to moderate risk of impacts, a moderate risk of low cumulative impacts would be expected to occur under this alternative. This expectation includes (1) minor removal of recruitable woody debris from 0.1 acres of RMZ; (2) soil disturbance associated with road work and CMP installations; and, (3) increases in annual water yield.

Attachment VI:
**STIPULATIONS AND SPECIFICATIONS**

Stipulations and specifications for the Action Alternative include project design provisions that follow Forest Management Rules, relevant laws and regulations. They also include mitigations that were designed to avoid or reduce potential effects to resources considered in this analysis. In part, stipulations and specifications are a direct result of issue identification and resource concerns. This section is organized by resource.

Stipulations and specifications that apply to operations required by, and occurring during the contract period, would be contained within the Timber Sale Contract. As such, they are binding and enforceable. Project administrators would enforce stipulations and specifications relating to activities such as hazard reduction, site preparation, and planting, that may occur during or after the contract period.

The following stipulations and specifications would be incorporated into the selected action alternative to mitigate potential effects of resources.

## Aesthetics

- Damaged residual vegetation visible from open roads would be slashed.
- The size and number of landings would be limited.
- In areas where cable logging is required, the width of the cable corridor would be limited, and a minimum distance between corridors would be required to reduce the amount and visibility of corridors in the harvest areas.
- Disturbed soil sites along road right-of-ways would be grass seeded.
- Leave trees are to be left with both even and clumpy distributions.
- The temporary roads and all jump-ups would be reclaimed after harvesting.
- Where harvest units are highly visible from open roads, stand boundaries will be feathered by cutting or leaving groups of trees close to the unit boundary.

## Air Quality

- To minimize cumulative effects during burning operations, burning would be done in compliance with the Montana Airshed Group, reporting regulations and any burning restrictions imposed in Airshed 2. This would provide for burning during conditions of acceptable ventilation and dispersion.
- Dozer, excavator, landing, and roadwork debris would be piled clean to allow ignition during fall and spring when ventilation is good and surrounding fuels are wet. The Forest Officer

may require that piles be covered so the fuels are drier, ignite easier, burn hotter, and extinguish sooner.

- In order to reduce smoke production, some large woody debris would be left in the woods to minimize the number of burn piles.
- Dust abatement may be applied on some road segments, depending on the seasonal conditions and level of public traffic.

## Archaeology

- A contract clause provides for suspending operations if cultural resources were discovered; operations in that area may only resume as directed by the Forest Officer following consultation with a DNRC Archeologist.
- If cultural resources were discovered, the Confederated Salish-Kootenai Tribe would be notified.

## Fisheries

- Apply all applicable Forestry Best Management Practices (BMPs), including the Streamside Management Zone (SMZ) Law and Rules, HCP commitments, and Forest Management Rules for fisheries, soils, and watershed management (*ARMs 36.11.425* and *36.11.426*).
- Apply the SMZ Law and Rules to all streams and lakes.
- Monitor all road-stream crossings for sedimentation and deterioration of road prism.
- Only allow equipment traffic at road-stream crossings when road prisms have adequate load-bearing capacity, thus reducing the potential for rutting.
- Stillwater River Road, Fitzsimmons Road and the West Fork Swift Creek Road to the Herrig Road would be brushed, and would have improvements made to the surface and ditches to meet BMPs.

## Noxious Weed Management

- All tracked and wheeled equipment would be cleaned of noxious weeds prior to beginning project operations.
- Disturbed roadside sites would be promptly revegetated with a native grass seed mix. Roads used and closed as part of this proposal would be reshaped and reseeded.

## Recreation

- Information would be disseminated to the public through signage related to road restrictions due to logging and road construction.
- The Stillwater Block Transportation Plan would apply for all road use.
- Dust abatement may be applied on some road segments near state leases on the Stillwater River Road, depending on the seasonal conditions.

## Soils

### *Soil Compaction and Displacement*

- Limit equipment operations to periods when soils are relatively dry, (less than 20 percent), frozen, or snow-covered to in order to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- On ground-based units, the logger and sale administrator would agree to a skidding plan prior to equipment operations. Skid-trail planning would identify which main trails to use and how many additional trails are needed. Trails that do not comply with BMPs (i.e. trails in draw bottoms) would not be used unless impacts can be adequately mitigated. Regardless of use, these trails may be closed with additional drainage installed, where needed, or grass seeded to stabilize the site and control erosion.
- Tractor skidding should be limited to slopes of less than 40 percent unless the operation can be completed without causing excessive displacement or erosion. Based on site review, short, steep slopes may require a combination of mitigation measures, such as adverse skidding to a ridge or winchline, and skidding from more moderate slopes of less than 40 percent.
- Keep skid trails to 20 percent or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrently with operations.
- Slash disposal: Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest units. No dozer piling on slopes over 35 percent; no excavator piling on slopes over 40 percent, unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jackpot burning on the steeper slopes. Consider disturbance incurred during skidding operations to, at least partially provide scarification for regeneration.
- Retain 15 to 20 tons of large woody debris (depending on habitat type) and a feasible majority of all fine litter following harvesting operations. On units where whole tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid slash and evenly distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

### *Erosion*

- Ground-skidding machinery would be required to be equipped with winchline to limit equipment operations on steeper slopes.
- Roads used by the purchaser would be reshaped and the ditches redefined following use to reduce surface erosion.
- Drain dips and gravel would be installed on roads as needed to improve road drainage and reduce maintenance needs and erosion.
- Some road sections would be repaired to upgrade the roads to design standards that reduce erosion potential and maintenance needs.
- Certified weed-free grass seed and fertilizer would be applied in a prompt and timely manner to all newly constructed road surfaces, cutslopes, and fillslopes. These applications would also be applied to any existing disturbed cutslopes, fillslopes, and landings immediately adjacent to open roads. Seeding to stabilize soils and to reduce or prevent the establishment of noxious weeds would include:
  - Seeding all road cuts and fills concurrent with construction.
  - Applying "quick-cover" seed mix within 1 day of work completion at culvert installation sites involving stream crossings.
  - Seeding all road surfaces and reseeding culvert installation sites when the final blading is completed for each specified road segment.
- Based on ground and weather conditions, water bars, logging-slash barriers and, in some cases, temporary culverts would be installed on skid trails where erosion is anticipated, and as directed by the Forest Officer. These erosion-control features would be periodically inspected and maintained throughout the contract period or extensions thereof.

## Vegetation

- All harvest areas shall have a minimum of 2 snags and 2 snag-recruits over 21 inches dbh, or the next largest size class available. Additional large-diameter recruitment trees may be left if sufficient large snags are not present. These snags and recruitment trees may be clumped or evenly distributed throughout the harvest units.
- Certain portions of the harvest areas would be left uncut; these areas may include large healthy trees, snag patches, small healthy trees, rocky outcrops, SMZs, small wetlands, etc.

## Watershed

- Planned erosion-control measures include:

  - grade breaks on roads,
  - surface water-diverting mechanisms on roads,
  - slash-filter windrows, and
  - grass seeding.
- Details for these control measures would be included in *ATTACHMENT B* of the *TIMBER SALE AGREEMENT*.
- Streamside Management Zones and Riparian Management Zones (RMZs) would be defined along those streams and/or wetlands where they occur within, or adjacent to, harvest areas. This project would meet or exceed SMZ and RMZ rules.
- Brush would be removed from existing road prisms to allow for effective road maintenance, which can help reduce sediment delivery.
- The contractor would be responsible for the immediate cleanup of any spills (fuel, oil, dirt, etc.) that may affect water quality.
- Segments of temporary road would be reclaimed to near-natural levels following the sale.
- The BMP audit process will continue. This project would likely be reviewed in an internal audit, and may be selected at random as a statewide audit site.

## Wildlife

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (*ARM 36.11.428* through *36.11.435*).
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per GB-PR2 (*USFWS AND DNRC 2010, Vol. II p. 2-5*).
- Contractors will adhere to food storage and sanitation requirements as per GB-PR3 (*USFWS AND DNRC 2010, Vol. II p. 2-6*).
- Manage road closures and restrictions in accordance with the Stillwater Block HCP transportation plan as per GB-ST1 (*USFWS AND DNRC 2010, Vol. II p.2-21)*
- Public access would be limited at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) may be used during inactive periods (nights, weekends, etc.).
- Restrict commercial harvest and motorized activities on seasonally restricted roads (refer to Stillwater Block HCP transportation plan) to reduce disturbance to grizzly bears. West Fork and Fitzsimmons roads would be restricted from April 1-June 30 during the Spring Period and the first 1.3 miles of the Herrig Road would be restricted from September 16-June 30. (*GB-NR3, USFWS AND DNRC 2010, Vol. II pp. 2-11, 2-12*).

- Use a combination of topography, group retention, and roadside vegetation to reduce sight distances within harvest units where feasible.
- Retain 2 large snags and 2 large snag recruitment trees per acre (>21 inches dbh) particularly favoring western larch and Douglas-fir and retain 15-20 tons/acre coarse woody debris as consistent with Graham et.al. (*1994*). Emphasize the retention of downed logs ≥15 inches dbh where they occur as per LY-HB2 (*USFWS and DNRC 2010).*
- Within Canada lynx winter foraging habitat, retain up to 10% of the stand area in patches of advanced regeneration of shade-tolerant trees (grand fir, subalpine fir, and spruce) as per LY-HB4 (*USFWS and DNRC 2010).*
- Design clearcuts to provide topographic breaks in view or to retain visual screening for bears by ensuring that vegetation or topographic breaks be no greater than 600 feet in at least one direction from any point in the unit as per *GB-NR4 (USFWS and DNRC 2010*).

Attachment VII:

# Glossary

**Administrative road use:** Road use that is restricted to DNRC personnel and contractors or for purposes such as monitoring, forest improvement, fire control, hazard reduction, etc.

**Airshed:** An area defined by a certain set of air conditions; typically, a mountain valley in which air movement is constrained by natural conditions such as topography.

**Basal area:** A measure of the number of square feet of space occupied by the stem of a tree.

**Best Management Practices**: A practice or combination of land use management practices that are used to achieve sediment control and protect soil productivity and prevent or reduce non-point pollution to a level compatible with water quality goals. The practices must be technically and economically feasible and socially acceptable.

**Biodiversity**: The variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

**Board foot:** A unit for measuring wood volumes. One board foot is a piece of wood 1 foot long, 1 foot wide, and 1 inch thick (144 cubic inches). This measurement is commonly used to express the amount of wood in a tree, saw log, or individual piece of lumber.

**Canopy:** The upper level of a forest consisting of branches and leaves of the taller trees.

**Canopy closure:** The percentage of a given area covered by the crowns, or canopies, of trees.

**Cavity:** A hollow excavated in trees by birds or other animals. Cavities are used for roosting and reproduction by many birds and mammals.

**Class A Lands:** Large tracts of Stillwater Block lands situated near federal lands designated as security core that are managed as quiet, secure areas for grizzly bears. Allowable commercial management occurs on a schedule of 4 years of management and 8 years of rest. Low-intensity forest management activities and short-term (<31 operating days) commercial forest management activities are permitted within rested areas during the grizzly bear non-denning period (April 1 – November 15). All forest management activities are permitted within rested Class A lands during the grizzly bear denning period (November 16 – March 31), when bears are typically inactive.

**Coarse down woody material:** Dead trees within a forest stand that have fallen and begun decomposing on the forest floor; generally larger than 3 inches in diameter.

**Coarse-filter:** An approach to maintaining biodiversity as described in the State Forest Land Management Plan (DNRC 1996) that involves maintaining a diversity of structures and species composition within stands and a diversity of ecosystems across the landscape.

**Co-dominant tree:** A tree that extends its crown into the canopy, receiving direct sunlight from above and limited sunlight on its sides. One or more sides are crowded by the crowns of other trees.

**Compaction:** Increased soil density caused by force exerted at the soil surface, modifying aeration and nutrient availability.

**Connectivity:** The quality, extent, or state of being joined; unity; the opposite of fragmentation.

**Connectivity (fish):** The capability of different life stages of HCP fish species to move among the accessible habitats within normally occupied stream segments.

**Connectivity (lynx):** Stand conditions where sapling, pole or sawtimber stands possess at least 40% crown canopy closure, in a patch greater than 300 feet wide.

**Cover:** See *Hiding cover* and/or *Thermal cover*.

**Covertype:** A classification of timber stands based on the percentage of tree species composition.

**Crown cover or crown closure:** The percentage of the ground surface covered by vertical projection of tree crowns.

**Cull:** A tree of such poor quality that it has no merchantable value in terms of the product being cut.

**Cutting units:** Areas of timber proposed for harvesting.

**Cumulative effect:** The impact on the environment that results from the incremental impact of the action when added to other actions. Cumulative impacts can also result from individually minor actions, but collectively they may compound the effect of the actions.

**Desired future conditions:** The land or resource conditions that will exist if goals and objectives are fully achieved. It is considered synonymous with appropriate conditions.

**Direct effect:** Effects on the environment that occur at the same time and place as the initial cause or action.

**Ditch relief:** A method of draining water from roads using ditches and corrugated metal pipe. The pipe is placed just under the surface of the road.

**Dominant tree:** Those trees within a forest stand that extend their crowns above surrounding trees and capture sunlight from above and around the crown.

**Drain dip:** A graded depression built into a road to divert water and prevent soil erosion.

**Ecosystem:** An interacting system of living organisms and the land and water that make up their environment; the home place of all living things, including humans.

**Edge:** The border between two or more habitats such as a wetland and mature forest.

**Equivalent clearcut acres (ECA):** This method equates the area harvested and the percent of crown removed with an equivalent amount of clearcut area.

- *Allowable ECA* - The estimated number of acres that can be clearcut before stream channel stability is affected.
- *Existing ECA* - The number of acres that have been previously harvested, taking into account the degree of hydrologic recovery that has occurred due to revegetation.
- *Remaining ECA* - The calculated amount of harvesting that may occur without substantially increasing the risk of causing detrimental effects to the stability of the stream channel.

**Excavator piling:** The piling of logging residue using an excavator.

**Fire regimes:** Describes the frequency, type, and severity of wildfires. Examples include: frequent nonlethal underburns; mixed-severity fires; and stand-replacement or lethal burns.

**Forage:** All browse and nonwoody plants available and acceptable to grazing animals or that may be harvested for feeding purposes.

**Forest improvement:** The establishment and growing of trees after a site has been harvested. Associated activities include:

- site preparation,
- planting,
- survival checks,
- regeneration surveys, and
- stand thinnings.

**Fragmentation (forest):** A reduction of connectivity and an increase in sharp stand edges resulting when large contiguous areas of forest with similar age and structural character are interrupted through disturbance (stand-replacement fire, timber harvesting, etc.).

**Habitat:** The place where a plant or animal naturally or normally lives and grows.

**Habitat type:** Forest vegetation types that follow the habitat type climax vegetation classification system developed by Pfister et al. (1977).

**Hazard reduction:** The reduction of fire hazard by processing logging residue with methods such as separation, removal, scattering, lopping, crushing, piling and burning, broadcast burning, burying, and chipping.

**Hiding cover:** Vegetation capable of hiding some specified portion of a standing adult mammal from human view, at a distance of 200 feet.

**Historical forest condition:** The condition of the forest prior to settlement by Europeans.

**Homogeneous:** Of uniform structure or composition throughout.

**Indirect Effects:** Secondary effects that occur in locations other than the initial action or significantly later in time.

**Interdisciplinary team (ID Team):** A team of resource specialists brought together to analyze the effects of a project on the environment.

**Intermediate trees:** A characteristic of certain tree species that allows them to survive in relatively low light conditions, although they may not thrive.

**Landscape:** An area of land with interacting ecosystems.

**Live Crown Ratio:** The percentage of the length of tree having live limbs divided by the tree's height.

**Meter:** A measurement equaling 39.37 inches.

**Mitigation measure:** An action or policy designed to reduce or prevent detrimental effects.

**Multistoried stands:** Timber stands with 3 or more distinct stories.

**Nest-site area (bald eagle):** The area in which human activity or development may stimulate abandonment of the breeding area, affect successful completion of the nesting cycle, or reduce productivity. This area is either mapped for a specific nest based on field data, or, if that is impossible, is defined as the area within a quarter-mile radius of all nest sites in the breeding area that have been active within 5 years.

**No-action alternative:** The option of maintaining the status quo and continuing present management activities; the proposed project would not be implemented.

**Nonforested area:** A naturally occurring area where trees do not establish over the long term, such as bogs, natural meadows, avalanche chutes, and alpine areas.

**Old growth:** For this analysis, old growth is defined as stands that meet the minimum criteria (number of trees per acre that have a minimum dbh and a minimum age) for a given site (old-growth group from habitat type). These minimums can be found in the *Green et al Old Growth Forest Types of the Northern Region* (see *REFERENCES).*

**Open-Road Densities:** Percent of the grizzly bear subunit exceeding a density of 1 mile per square mile of open roads.

**Overstory:** The level of the forest canopy including the crowns of dominant, codominant, and intermediate trees.

**Patch:** A discrete area of forest connected to other discrete forest areas by relatively narrow corridors; an ecosystem element (such as vegetation) that is relatively homogeneous internally, but differs from what surrounds it.

**Phloem:** The living tissue of the tree.

**Project file:** A public record of the analysis process, including all documents that form the basis for the project analysis. The project file for the Mystery Fish Timber Sale is located at the Stillwater State Forest office near Olney, Montana.

**Redds:** The spawning ground or nest of various fish species.

**Regeneration:** The replacement of one forest stand by another as a result of natural seeding, sprouting, planting, or other methods.

**Restricted road**: A road that is managed to limit the manner in which motorized vehicles may be used. Restricted roads have a physical barrier that restricts the general use of motorized vehicles. Restriction s may be man-made or naturally occurring.

**Residual stand:** Trees that remain standing following any harvesting operation.

**Road:** Any created or evolved access route that is greater than 500 feet long and is reasonably and prudently drivable with a conventional two-

wheel-drive passenger car or two-wheel-drive pickup.

**Road-construction activities:** In general, the term 'road construction activities' refers to all the activities conducted while building new roads, reconstructing existing roads, and obliterating roads. The activities may include any or all of the following:

- road construction;
- right-of-way clearing;
- excavation of cut/fill material;
- installation of road surface and ditch drainage features;
- installation of culverts at stream crossings;
- burning right-of-way slash;
- hauling and installation of borrow material; and
- blading and shaping road surfaces.

**Road improvements:** Construction projects on an existing road to improve ease of travel, safety, drainage, and water quality.

**Saplings:** Trees 1 to 4 inches in diameter at breast height.

**Sawtimber trees:** Trees with a minimum dbh of 9 inches.

**Scarification:** The mechanized gouging and ripping of surface vegetation and litter to expose mineral soil and enhance the establishment of natural regeneration.

**Scoping:** The process of determining the extent of the environmental assessment task. Scoping includes public involvement to learn which issues and concerns should be addressed and the depth of assessment that will be required. It also includes a review of other factors, such as laws, policies, actions by other landowners, and jurisdictions of other agencies that may affect the extent of assessment needed.

**Security:** For wild animals, the freedom from the likelihood of displacement or mortality due to human disturbance or confrontation.

**Seedlings:** Live trees less that 1 inch dbh.

**Sediment:** In bodies of water, solid material, mineral or organic, that is suspended and transported or deposited.

**Sediment yield:** The amount of sediment that is carried to streams.

**Seral:** Refers to a biotic community that is in a developmental, transitional stage in ecological succession.

**Shade intolerant:** Describes the tree species that generally can only reproduce and grow in the open or where the overstory is broken and allows sufficient sunlight to penetrate. Often these are seral species that get replaced by more shade-tolerant species during succession. In Stillwater State Forest, shade-intolerant species generally include ponderosa pine, western larch, Douglas-fir, western white pine, and lodgepole pine.

**Shade tolerant:** Describes tree species that can reproduce and grow under the canopy in poor sunlight conditions. These species replace less shade-tolerant species during succession. In Stillwater State Forest, shade-tolerant species generally include subalpine fir, grand fir, Engelmann spruce, and western red cedar.

**Sight distance:** The distance at which 90% of an animal is hidden from view. On forested trust lands, this is approximately 100 feet, but may be more or less depending on specific vegetative and topographic conditions.

**Siltation:** The process of very fine particles of soil (silt) settling. This may occur in streams or from runoff. An example would be the silt build-up left after a puddle evaporates.

**Silviculture:** The art and science of managing the establishment, composition, and growth of forests to accomplish specific objectives.

**Site preparation:** A hand or mechanized manipulation of a harvested site to enhance the success of regeneration. Treatments are intended to modify the soil, litter, and vegetation to create microclimate conditions conducive to the establishment and growth of desired species.

**Slash:** Branches, tree tops, and cull trees left on the ground following a harvest.

**Snag:** A standing dead tree or the portion of a broken-off tree. Snags may provide feeding and/or nesting sites for wildlife.

**Snow intercept:** The action of trees and other plants in catching falling snow and preventing it from reaching the ground.

**Spur roads:** Low-standard roads constructed to meet minimum requirements for harvest-related traffic.

**Stand:** An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition so as to be distinguishable from the adjoining forest.

**Stand density:** Number of trees per acre.

**Stocking:** The degree of occupancy of land by trees as measured by basal area or number of trees, and as compared to a stocking standard (which is an estimate of either the basal area) or the number of trees per acre required to fully use the growth potential of the land.

**Stream gradient:** The slope of a stream along its course, usually expressed in percentage indicating the amount of drop per 100 feet.

**Stumpage:** The value of standing trees in the forest; sometimes used to mean the commercial value of standing trees.

**Succession:** The natural series of replacement of one plant (and animal) community by another over time in the absence of disturbance.

**Suppressed:** The condition of a tree characterized by a low growth rate and low vigor due to competition.

**Temporary road:** Roads built to the minimal standards necessary to prevent impacts to water quality and provide a safe and efficient route to remove logs from the timber sale area. Following logging operations or site preparations, the road would no longer function as an open road, restricted road or trail. DNRC would assure that they no longer could be accessed for commercial, administrative or public motorized use.

- Segments near the beginning of the new temporary road systems would be reshaped to their natural contours and reclaimed for approximately 200 feet by grass seeding and strewing slash and debris.

- The reclamation of the remaining road would include a combination of ripping or mechanically loosening the surface soils on the road, removing culverts or bridges that were installed, spreading forest debris along portions of the road, and allowing the surface to revegetate naturally.

**Texture:** A term used in visual assessments indicating distinctive or identifying features of the landscape depending on distance.

**Thermal cover:** For white-tailed deer, thermal cover has 70 percent or more coniferous canopy closure at least 20 feet above the ground, generally requiring trees to be 40 feet or taller.

For elk and mule deer, thermal cover has 50 percent or more coniferous canopy closure at least 20 feet above the ground, generally requiring trees to be 40 feet or taller.

**Timber-harvesting activities:** In general, the term timber-harvesting activities refers to all the activities conducted to facilitate timber removal before, during, and after the timber is removed. These activities may include any or all of the following:

- felling and bucking standing trees into logs;
- skidding logs to a landing;
- processing, sorting, and loading logs onto trucks at the landing;
- hauling logs by truck to a mill;
- slashing and sanitizing residual vegetation damaged during logging;
- machine piling logging slash;
- burning logging slash;
- scarifying and preparing the site for planting; and
- planting trees.

**Total Road Densities:** Percent of grizzly bear subunit with more than 2 miles per square mile of total road.

**Understory:** The trees and other woody species growing under a, more or less, continuous cover of branches and foliage formed collectively by the overstory of adjacent trees and other woody growth.

**Uneven-aged stand:** Various ages and sizes of trees growing together on a uniform site.

**Ungulates:** Hoofed animals, such as mule deer, white-tailed deer, elk, and moose, that are mostly herbivorous; many are horned or antlered.

**Vigor:** The degree of health and growth of a tree or stand of trees.

**Visual screening:** Vegetation and/or topography providing visual obstruction capable of hiding a grizzly bear from view. The distance or patch size and configuration required to provide effective visual screening depends on the topography and/or type and density of cover available.

**Watershed:** The region or area drained by a river or other body of water.

**Water yield:** The average annual runoff for a particular watershed expressed in acre-feet.

**Water-yield increase:** Due to forest canopy removal, an increase in the average annual runoff over natural conditions.

**Windthrow:** A tree pushed over by wind. Windthrows (blowdowns) are common among shallow-rooted species and in areas where cutting or natural disturbances have reduced the density of a stand so individual trees remain unprotected from the force of the wind.

Attachment VIII:

# Preparers and Contributors

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# Acronyms

ARM.....*Administrative Rules of Montana*

BMP.....*Best Management Practices*

BMU.....*Bear Management Unit*

CEAA.....*Cumulative Effects Analysis Area*

CFR .....*Code of Federal Regulations*

CMP.....*corrugated metal pipe*

CWD.....*Coarse Woody Debris*

DBH .....*diameter at breast height*

DEQ.....*Department of Environmental Quality*

DFWP .....*Montana Department of Fish, Wildlife, and Parks*

DFC .....*Desired Future Conditions*

DNRC .....*Department of Natural Resources and Conservation*

EA.....*Environmental Assessment*

ECA .....*Equivalent Clearcut Acres*

EIS.....*Environmental Impact Statement*

FIA.....*Forest Inventory and Analysis group*

FI .....*Forest Improvement*

FNF.....*Flathead National Forest*

FRTA .....*Federal Roads and Trails Act*

FOGI.....*Full Old-Growth Index*

GBS…….*Grizzly Bear Subunit*

GIS .....*Geographic Information System*

HCP .....*Habitat Conservation Plan*

ID Team .....*Interdisciplinary Team*

MCA.....*Montana Codes Annotated*

MEPA.....*Montana Environmental Policy Act*

Mbf.....*Thousand Board Feet*

MMbf.....*Million Board Feet*

MNHP .....*Montana Natural Heritage Program*

NCDE.....*Northern Continental Divide Ecosystem*

NWLO .....*Northwestern Land Office*

RL.....*Random Lengths*

RMZ ..... *Riparian Management Zone*

SFLMP ..... *State Forest Land Management Plan*

SLI ..... *Stand Level Inventory*

SMZ ..... *Streamside Management Zone*

SPTH…….*Site Potential Tree Height*

STW ..... *Stillwater Unit*

TLMD ..... *Trust Land Management Division*

TMDL ..... *Total Maximum Daily Load*

USFS ..... *United States Forest Service*

USFWS ..... *United States Fish and Wildlife Service*

WFP..... *Washington Forest Practices Board*

WMZ ..... *Wetland Management Zone*

WYI ..... *Water Yield Increases*

124 Permit . *Stream Protection Act Permit*

318 Authorization.....*A Short-Term Exemption from Montana's Surface Water Quality and Standards*

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