CHAPTER 2

2.1 SPECIES NARRATIVE – Canada Lynx

Distribution

Canada lynx (*Lynx canadensis)* currently are found throughout Alaska and Canada (except arctic islands) south through the Rocky Mountains, northern Great Lakes region, and northern New England. Lynx historically occurred in 16 states represented by five ecologically distinct regions: Cascade Range (Washington, Oregon), northern Rocky Mountains (northeastern Washington, northeastern Oregon, Idaho, Montana, western Wyoming, northern Utah), southern Rocky Mountains (southeastern Wyoming, Colorado), northern Great Lakes (Minnesota, Wisconsin, Michigan), and northern New England (Maine, New Hampshire, Vermont, New York, Pennsylvania, Massachusetts).

Resident populations currently exist only in Maine, Montana, Washington, and possibly Minnesota. They are considered extant but no longer sustaining self-support populations in Wisconsin, Michigan, Oregon, Idaho, Wyoming, Utah, and Colorado; they may be extirpated from New Hampshire, Vermont, New York, Pennsylvania, and Massachusetts (Ruediger, et al. 2000).

The lynx was listed as threatened under ESA in 2000.

Life History

Canada lynx are medium-sized cats generally 30-35 inches long and weighing 18-23 pounds. They have large feet adapted to walking on snow, long legs, tufts on ears, and black-tipped tails (Ruediger, et al. 2000).

Snowshoe hares are the primary prey of lynx, comprising 35-97% of the diet. Other prey species include red squirrel, grouse, flying squirrel, and ground squirrel, among others.

During the cycle when hares become scarce, the proportion and importance of other prey species, especially red squirrel, increases in the diet. However, Koehler (1990) suggested that a diet of red squirrels alone might not be adequate to ensure lynx reproduction and survival of kittens. Most research has focused on the winter diet, and diets in the summer are poorly understood throughout the range. Indications are that the summer diet may include a greater diversity of prey species.

There has been little research on lynx diet specific to the southern portion of its range except in Washington (Koehler et al. 1979, Koehler 1990). Southern populations of lynx may prey on a wider diversity of species than northern populations because of lower average hare densities and differences in small mammal communities. In areas characterized by patchy distribution of lynx habitat, lynx may prey opportunistically on other species that occur in adjacent habitats, potentially including white-tailed jackrabbit, black-tailed jackrabbit, sage grouse, and Columbian sharp-tailed grouse (Lewis and Wenger 1998).

Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hares (McKelvey et al. 2000, Ruggiero et al. 2000). In North America, the distribution of lynx is nearly coincident with that of snowshoe hares. Lynx are uncommon or absent from the wet coastal forests of Canada and Alaska.

Both snow conditions and vegetation type are important factors to consider in defining lynx habitat. Across the northern boreal forests of Canada, snow depths are relatively uniform and only moderately deep (total annual snowfall of 39-50 inches) (Kelsall et al. 1977). Snow conditions are very cold and dry. In contrast, in the southern portion of the range of the lynx, snow depths generally increase, with deepest snows in the mountains of southern Colorado. Snow in southern lynx habitats may be subjected to more freezing and thawing than in the taiga (Buskirk et al. 2000), although this varies depending on elevation, aspect, and local weather conditions. Crusting or compaction of snow may reduce the competitive advantage that lynx have in soft snow, with their long legs and low foot loadings.

Most lynx occurrences in the western United States are associated with Rocky Mountain Conifer Forest and most are within the 4,920-6,560 foot elevation zone. There is a gradient in the elevational distribution of lynx habitat from the northern to the southern Rocky Mountains, with lynx habitat occurring at 8,000-11,500 feet in the southern Rockies. Primary vegetation that contributes to lynx habitat is lodgepole pine, subalpine fir, and Engelmann spruce (Aubry et al. 2000). In extreme northern Idaho, northeastern Washington, and northwestern Montana, cedar-hemlock habitat types may also be considered primary vegetation. In central Idaho, Douglas-fir on moist sites at higher elevations may also be considered primary vegetation. Secondary vegetation that, when interspersed within subalpine forests, may also contribute to lynx habitat; include cool, moist Douglas-fir, grand fir, western larch, and aspen forests. Dry forest types (e.g., ponderosa pine, climax lodgepole pine) do not provide lynx habitat.

2.2 Environmental Baseline

The environmental baseline for lynx is described in terms of those parameters that threaten lynx through vegetation management and alteration that may reduce available denning and foraging habitat or through human activities that may either directly or indirectly displace lynx.

2.3 Direct and Indirect Effects Analysis

Conservation Practices

The potential adverse impacts of NRCS conservation practices on lynx have are summarized in Appendix B. Appendix B includes a list of practices that NRCS state office staff determined were the most commonly used in Montana. These practices have been determined to have either a No Effect; a May Affect, Not Likely to Adversely Affect; or a May Affect, Likely to Adversely Affect. A complete list and description of Montana's conservation practices can be found in Section IV of the electronic Field Office Technical Guide (eFOTG): http://efotg.nrcs.usda.gov/treemenuFS.aspx.

Conservation practice were grouped into one of four types of impacts to lynx: 1) No Disturbance Expected; 2) Disturbance; 3) Disturbance/habitat modification; and 4) Disturbance/long-term beneficial. Practices that fall into the '*No Disturbance Expected*' category are as follows: Conservation Crop Rotation (328), Residue and Tillage Management, No Till/Strip Till/Direct Seed (329), Residue and Tillage Management, Mulch Till (345), Cover Crop (340), Windbreak/Shelterbelt Establishment (380), Irrigation System, Sprinkler (442), Irrigation Water Management (449), Pasture and Hay Planting (512), Nutrient Management (590), Salinity and Sodic Soil Management (610) and Waste Utilization (633). These practices are considered to have <u>No Effect</u> on lynx since the practices are generally not implemented in lynx habitat or the type of practice will not disturb lynx habitat that is adjacent or nearby the project site.

The second category describing practice impacts is '*Disturbance*'. This is a general category that includes potential effects to lynx such as noise disturbance during the installation of a practice, noise associated with farm equipment, an increased level of activity at a project site or the temporary disturbance to land, soil, air and water at a project site. These practices may cause a short-term disturbance of, or avoidance by lynx in the area. The practices that are included in this category are as follows: Waste Storage Facility (313), Fence (382), Irrigation Field Ditch (388), Riparian Forest Buffer (391), Stream Habitat Improvement and Management (395), Irrigation Ditch and Canal, Plain Concrete (428A), Irrigation Pipeline, High Pressure Plastic (430DD), Irrigation Pipeline, Low Pressure Plastic (430EE), Irrigation Pipeline, Rigid Gated Pipeline (430HH), Irrigation Land Leveling (464), Land Smoothing (466), Pipeline (516), Pumping Plant (533), Grazing Land Mechanical Treatment (548), Range Planting (550), Spring Development (574), Stream Crossing (578), Streambank and Shoreline Protection (580), Channel Stabilization (584), Structure for Water Control (587), Pest Management (595), Tree/Shrub Establishment (612), Water Well (642), and Wetland Restoration (657). These practices if installed according to NRCS practice standards and guidelines are considered to have a <u>May Affect, Not Likely to Adversely Affect</u> on lynx. In general, these practices do not occur in lynx habitat but may occur on land that is adjacent to or nearby lynx habitat. These specific practices may be applied without any modifications to the installation of the conservation practice.

The third impact category '*Disturbance/habitat modification'* covers six of the practices that require some modifications made to the practice in order to minimize impacts to lynx foraging habitat. These practices may disturb lynx as described in the paragraph above and they may also make permanent or long-term modifications to lynx foraging habitat during installation. Therefore, some modifications to the practice (Conservation Measures) must be implemented in order to reach a <u>May Affect, Not Likely to Adversely Affect</u> determination. The practices that have additional Conservation Measures are: Brush Management (314), Fuel Break (383), Prescribed Grazing (528), Shallow Water Development and Management (646), Wetland Creation (658) and Wetland Enhancement (659). Conservation Measures are fully described in Appendix C.

There is one additional practice that falls into the '*Disturbance/habitat modification*' category, Forest Stand Improvement (666). This practice, when implemented within lynx foraging habitat, cannot be covered by the programmatic consultation screens and could possibly result in a <u>May Affect, Likely to Adversely Affect</u> determination. If the landowner request NRCS assistance to

implement this practice in lynx foraging habitat, then field office staff will need to contact their area biologist in order to begin the process of a standard FWS consultation. If this practice falls into other types of lynx habitat (i.e., denning or travel) then the practice is considered to be a May Affect, Not Likely to Adversely Affect determination and may be implemented without additional consultation work with the FWS.

The fourth and final impact category, '*Disturbance/long-term beneficial*', includes three practices that may have a relatively short-term disturbance effect followed by a long-term benefit to lynx and other wildlife species. Benefits may include improved habitat and better availability of food and water resources. The three practices are: Wetland Wildlife Habitat Management (644), Upland Wildlife Habitat Management (645) and Early Successional Habitat Development/Mgt. (647). These practices if installed according to NRCS practice standards and guidelines are considered to have a May Affect, Not Likely to Adversely Affect on lynx.

Vegetation Alteration

Forest management practices [i.e., Brush Management (314), Fuel Break (383) and Forest Stand Improvement (666)] can influence habitats for lynx and their prey either by removing denning habitat or decreasing available prey habitat (Ruediger et al. 2000). Lynx natal dens generally occur in areas with large quantities of coarse woody debris in either mature or regenerating stands. Their primary prey, snowshoe hares, reaches high densities in young, dense, coniferous forests or mature forests with a dense understory. Another important prey item, the red squirrel, is abundant in mature cone-bearing forests.

Livestock grazing potentially alters lynx habitat by reducing forage available to snowshoe hares through changing the structure and/or composition of native vegetation. Unmanaged grazing throughout the Rocky Mountains has contributed to the decline of aspen as well as the degradation of high elevation willow communities, both of which provide quality habitat for snowshoe hares and other lynx prey items (Ruediger et al. 2000). Additionally, the spread of non-native, invasive species also has the potential to alter lynx habitat although effects to lynx have not been documented (Ruediger et al. 2000).

Vegetation management can be beneficial to lynx and their prey. Timber management used as a disturbance process with, or in place of fire, can create snowshoe hare habitat. Management prescriptions that retain and recruit coarse woody debris can enhance denning habitat. Other habitat management that promotes high densities of conifers, hardwoods, and shrubs will enhance prey habitat.

Human Activity and Development

Generally, lynx are described as being tolerant of humans (Mowat et al. 2000). However, several human activities and developments have the potential to displace lynx or reduce habitat effectiveness. To date, however, little data exist to conclusively determine the effects of human activities on lynx.

Winter recreation use that results in snow compaction may result in increased access by competitors into lynx habitat (Buskirk et al. 2000). Recreational activities adjacent to a den site may cause abandonment of that site and possibly affect kitten survival. Overall, recreational activities may exert direct and indirect effects on lynx and their habitat. Lynx may be able to adapt to regular, concentrated recreational use as long as critical habitat needs are met. Interconnected habitat relatively free of human intervention should minimize effects of human development and disturbance on lynx and their habitat.

Non-winter use of roads and trails may reduce lynx habitat effectiveness although little information exists on potential effects (Ruediger et al. 2000). Conversely, lynx may use less-traveled roadbeds for travel and foraging if roadside vegetation provides snowshoe hare habitat. No data exist that identify the need for management of road densities in lynx habitat at this time. However, direct mortality associated with highways could be detrimental to lynx in the lower 48 states.

Other human activities that may affect lynx include incidental trapping or shooting and activities that impede lynx movement (e.g., reservoir development, utility corridors; Ruediger et al. 2000).

Cumulative Effects Analysis

Cumulative effects will be evaluated and documented on the consultation summary sheet during the initial planning stages of any potential NRCS-funded projects. Cumulative effects are those effects of future non-federal (state, local government, or private) activities on endangered and threatened species or critical habitat that are reasonably certain to occur in the action area during the course of the federal activity subject to consultation. The action area, as defined by the ESA, includes all areas to be affected directly or indirectly by the Federal action and is not limited merely to the immediate area involved in the action [50 CFR 402.02]. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

Actions on private lands such as residential development, logging, grazing, road building, and recreation, will continue to contribute to habitat degradation and loss which may affect lynx habitat. The development of private lands and associated loss and fragmentation of habitat is expected to continue as secondary development creates a demand for new public services and facilities. Tourism and the residential population in Montana have increased in recent years. The number of residential and recreation home sites is also increasing. Human development in high elevation areas has, and will continue to have, a cumulative impact on lynx through loss of habitat. Availability and access to the types of information listed above may be limited or non-existent as privacy issues and final decisions are ultimately up to the individual landowners.

Determination of Effects

Use of the screens as proposed would result in practices that May Affect, Not Likely to Adversely Affect lynx and would properly be included in the programmatic concurrence from the U.S. Fish and Wildlife Service.

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