Occurrence of Lynx in the North Cascades Highway Corridor

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Introduction

In 1994, the lynx was listed as a threatened species by the State of Washington; in April 2000, the U.S. Fish and Wildlife Service listed the lynx as threatened throughout its range in the contiguous U.S. The only known resident population of lynx in the Pacific Northwest is located in an island of boreal forest habitat in the northeastern Cascade Range in Washington. Because boreal forests occur in a peninsular or insular distribution in southern latitudes, lynx habitat in the contiguous U.S. is naturally fragmented; highways and traffic that may further fragment lynx habitat could have adverse effects on critical habitat areas for lynx. Accordingly, the influence of human activities on lynx populations in north-central Washington is of significant concern to both public and private resource managers.

Some activists have argued that logging, road construction, and ski and snowmobile areas degrade or destroy lynx habitat and constrain their movements and spatial patterns. In addition, roads and recreational trails provide human access to lynx habitat, which may disrupt hunting activities and reproduction, and increase the likelihood that lynx will be killed illegally or incidentally. However, reliable information that could be used to critically evaluate the validity of these claims is lacking. Information on the effects of paved roads on lynx is urgently needed so that managers can accurately assess the impacts of such roads on lynx movements and habitat use at the landscape scale. In particular, information is needed on the extent to which such roads may serve as barriers to lynx movements and dispersal and disrupt connectivity among sub-populations. The objectives of this study are (1) to use DNA hair-snagging techniques to conduct surveys for the presence of lynx along the Washington State Highway 20 (North Cascades Highway) corridor in north-central Washington, and (2) attempt to document lynx crossing this

highway during the snow-free period when vehicular traffic is present on the highway.

Methods

To survey the Highway 20 corridor for the presence of lynx, we used a modification of protocols developed by the USDA Forest Service to conduct surveys for lynx throughout its range in the contiguous U.S. (see Appendix 1). The National Lynx Survey is intended to sample broad areas for the presence of lynx; consequently, sampling is conducted with a variably shaped grid of sites spaced about 3 km apart. Each site consists of a 400-m transect containing 5 stations spaced 100 m apart. At each station, a 6 x 6 in. carpet square containing an array of nails that have been driven through the back of the carpet square is nailed to a tree about 50 cm from the ground. An aluminum pie plate is suspended as a visual attractant, and each pad is baited with a lure containing beaver cestrum and catnip oil, which elicits neck-rubbing behavior by lynx on the pad. During rubbing, the nails and the pad collect hairs from the animal. The hairs, and especially the follicles that are pulled out, contain enough DNA to enable geneticists using mitochondria and microsatellite DNA techniques to identify hairs to species and, if sufficient DNA is present, to distinguish individual lynx. The genetics lab at the USDA Forest Service=s Rocky Mountain Research Station at the University of Montana analyzed the hairs we collected during this study using techniques identical to those used for samples from the National Lynx Survey.

From October 2-6, 2000, we established 29 hair-snag sites (consisting of a 400-m transect with 5 pads spaced 100 m apart) spaced 1.5 km apart on alternating sides of Highway 20 from the Klipchuck Campground in Okanogan Co. to East Creek in Whatcom Co. Among these 29 sites, 17 were on the east side of the Cascade Crest (i.e., east of Rainy Pass) and 12 were on the

west side. We checked the pads after 2 weeks; if hair was observed on a pad, we placed the pad in a Ziploc bag and replaced it with a new one. We removed the stations from October 30 to November 3, 2000, after at least 4 weeks of operation, and sent pads containing hair to the University of Montana genetics lab for analysis.

Results

The results of our hair-snag surveys are presented in Table 1. We obtained hair at 12 stations, 10 of which contained adequate amounts and quality of DNA for identification of species. We detected domestic cat at 1 site (no. 14), black bear at 7 sites (nos. 1, 5, 6, 14, 16, 20, and 28), and lynx at 3 sites (nos. 8, 26, and 27). Site 8 is near Pine Creek and is approximately 10 km west of the starting point of our survey on the east side of the Cascade Crest; sites 26 and 27 are near Cabinet Creek and are approximately 3 and 4.5 km east of the end point of the survey on the west side of the Cascade Crest. Sites 26 and 27 are adjacent and are located on opposite sides of Highway 20; however, there was insufficient DNA in these samples to determine if they were from the same individual or not.

Discussion

Because the lynx detections at sites 26 and 27 were only 1.5 km apart, it is tempting to assume that they are from the same individual, and therefore demonstrate that lynx cross Highway 20 during the summer when vehicular traffic is present. Without additional samples having sufficient DNA for individual identification, however, this conclusion remains speculative. Our results and additional field observations indicate that lynx occur throughout the year in subalpine habitats on the west side of the Cascade Crest in easternmost Whatcom Co. In

addition to the DNA detections we reported from sites 26 and 27 in eastern Whatcom Co., our field personnel reported that lynx tracks have been found during the winter in the vicinity of

Table 1. Results of hair-snag surveys for lynx along Highway 20, October-November 2000.

Site	Legal Description	Overstory	Elev. (ft)	Set-up	Check #1	Hair	Check #2	Hair
1	T36N R19E S29 SE	Psme	2860	2-Oct	16-Oct	B. Bear	30-Oct	No
2	T36N R19E S29 SW	Psme/Pico	3000	2-Oct	16-Oct	No	30-Oct	No
3	T36N R19E S30 NW	Thpl/Abla	3140	2-Oct	16-Oct	No	30-Oct	Yes *
4	T36N R18E S24 SW	Thpl/Abla	3150	4-Oct	16-Oct	No	30-Oct	No
5	T36N R18E S26 NW	Thpl/Psme	3500	3-Oct	17-Oct	No	30-Oct	B. Bear
6	T36N R18E S27 NW	Psme/Abla	3630	3-Oct	17-Oct	B. Bear	30-Oct	B. Bear
7	T36N R18E S33 NW	Abla/Pien	3700	3-Oct	17-Oct	No	30-Oct	No
8	T36N R18E S32 SE	Psme/Abla	3930	3-Oct	17-Oct	No	30-Oct	Lynx
9	T35N R18E S5 SE	Pien/Abla	4000	4-Oct	18-Oct	No	31-Oct	No
10	T35N R18E S8 NE	Abla/Pien	4400'	4-Oct	18-Oct	No	30-Oct	No
11	T35N R18E S17 NW	Pien/Abla	4650'	4-Oct	18-Oct	No	31-Oct	No
12	T35N R18E S19 NE	Abam/Pien	5250'	4-Oct	18-Oct	No	31-Oct	No
13	T35N R18E S19 NW	Abam/Tsme	5525	5-Oct	19-Oct	No	31-Oct	No
14	T35N R17E S24 SW	Abam/Pien	5250	5-Oct	19-Oct	B. Bear Dom. Cat	1-Nov	No
15	T35N R17E S26 SE	Abam/Pien	4825	5-Oct	19-Oct	No	1-Nov	Yes *
16	T35N R17E S27 SE	Abam	4450	5-Oct	19-Oct	B. Bear	1-Nov	No
17	T35N R17E S21 SE	Abam/Tsme	4930	5-Oct	19-Oct	No	3-Nov	No
18	T35N R17E S16 SE	Abam/Tsme	4860	5-Oct	19-Oct	No	1-Nov	No
19	T35N R17E S17 NE	Abam/Tsme	4420	5-Oct	19-Oct	No	1-Nov	No
20	T35N R17E S8 NE	Abam/Tsme	4400	5-Oct	19-Oct	B. Bear	1-Nov	No
21	T35N R17E S5 NW	Thpl/Tsme	4050	5-Oct	19-Oct	No	1-Nov	No
22	T36N R17E S31 SW	Tsme/Abam	4020	5-Oct	23-Oct	No	1-Nov	No
23	T36N R16E S25 SE	Abam/Tsme	3650	6-Oct	20-Oct	No	3-Nov	No
24	T36N R16E S24 SW	Tsme/Abam	3700	6-Oct	20-Oct	No	3-Nov	No
25	T36N R16E S23 NE	Tsme/Thpl	3450	6-Oct	20-Oct	No	3-Nov	No
26	T36N R16E S14 NW	Abam/Tsme	3360	6-Oct	20-Oct	No	3-Nov	Lynx

27	T36N R16E S10 NE	Pico/Psme	3320	6-Oct	20-Oct	No	3-Nov	Lynx
28	T36N R16E S3 NW	Psme/Pico	2980	6-Oct	20-Oct	No	3-Nov	B. Bear
29	T37N R16E S33 NE	Psme/Tsme	2800	6-Oct	23-Oct	No	3-Nov	No

* Hair collected, but no quality DNA.

these sites. We also have an unconfirmed report that lynx were detected with DNA hair-snag pads at McMillan Park in eastern Skagit Co., about 11 km north-northwest of site 27.

Our survey has demonstrated that lynx occur in the immediate vicinity of the North Cascades Highway in at least 2 general locations: near Pine Creek at about 4,000 ft. elevation on the east side of the Cascade Crest, and near Cabinet Creek at about 3,300 ft. elevation on the west side of the Cascade Crest. However, additional surveys will be needed to determine whether or not lynx cross Highway 20 when vehicular traffic is present. Intensive field studies using radio-telemetry will be required to determine the extent to which such roads may serve as barriers to lynx movements or dispersal. The results of our survey demonstrate that opportunities exist for studying the effects of a major highway on lynx movements and habitat use at the landscape scale.

Appendix 1. McKelvey, K. S., J. J. Claar, G. W. McDaniel, and G. Hanvey. 1999. National Lynx Detection Protocol. Unpublished report, USDA Forest Service, Rocky Mountain Research Station, Missoula, MT.