

# Wolverine-Forest Carnivore Research in the Northern Cascades of Oregon

*Final Progress Report for Field Season 1 (Oct 2012–May 2013)*

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*American marten at elevated bait station covered by high snow depth in the Oregon Cascades.*

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***Project video available at:***

[http://www.dfw.state.or.us/images/video\\_gallery/forest\\_carnivore\\_research\\_project.asp](http://www.dfw.state.or.us/images/video_gallery/forest_carnivore_research_project.asp)

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On 4 February 2013, the U.S. Fish and Wildlife Service (USFWS) published a proposal to list the distinct population segment of the wolverine in the contiguous U.S. as threatened under the federal Endangered Species Act (Federal Register Vol. 78, No. 23; USFWS 2013a). In Oregon, the wolverine was thought to have been extirpated by 1936 (Hiller 2011). Based on records from the Oregon Department of Fish and Wildlife (ODFW), at least 1 report of a wolverine was documented for each decade from the 1960s to the 1990s, including locations in Linn, Harney, Wheeler, and Grant counties, respectively (Hiller 2011). More recently, a monitoring project resulted in confirmation of 3 individual wolverines in northeastern Oregon (Magoun et al. 2013), an area with no prior documentation of wolverines. During 2008, a wolverine (probably of Rocky Mountain origin) was confirmed in northern California, the first such evidence for almost 90 years (Moriarty et al. 2009).

A recent examination of verified and documented reports of wolverines in the contiguous U.S. suggested that, in the Pacific states, the Cascade Mountain Range of Washington and northern Oregon, and the central and southern Sierra Nevada Mountain Range in California may contain habitat conditions appropriate for wolverines (Aubry et al. 2007). Although evidence suggests that much of the Oregon Cascades may be suitable for dispersing wolverines, there may also be smaller areas where wolverines persist (R. Inman, Wildlife Conservation Society, unpublished data). Questions related to confirmations of wolverines in Oregon and adjacent states include whether wolverines are present in the Cascades and if so, what is their origin; do wolverines use the Cascades as corridors for dispersal; and is there a persistent breeding population of wolverines in the Cascades. Our objectives include addressing these questions, specifically for the northern Cascades of Oregon.

Other relatively rare and sensitive forest carnivores exist in the Oregon Cascades, including a montane subspecies of red fox (*Vulpes vulpes* sp.) and the American marten (*Martes americana*). The Sierra Nevada red fox (*V. v. necator*) is presumed to be the montane red fox subspecies present on our study area. This subspecies is currently under review for potential protection under the federal Endangered Species Act (USFWS 2013b). The American marten is listed as a Sensitive Species (Vulnerable Category) under the Oregon Conservation Strategy (ODFW 2005). Our objectives also include to assess habitat use of montane red fox on our study area and to use genetic information to determine the subspecies. We are also collecting data to model habitat use of marten on our study area.

## Study Area

Monitoring activities are scheduled to occur for 2 field seasons (Oct 2012–May 2013, Oct 2013–May 2014) in the Willamette National Forest (about 6,900 km<sup>2</sup> [1.7 million ac]) and the Deschutes National Forest (about 7,300 km<sup>2</sup> [1.8 million ac]) in the northern Cascade Mountain Range of Oregon (Fig. 1). Efforts are focused within the Mt. Jefferson, Mt. Washington, and Three Sisters wilderness areas, which are primarily located in Deschutes County west of Sisters, Oregon. The Mt. Jefferson Wilderness Area is the northernmost study site and covers 423 km<sup>2</sup> (104,523 ac) with a range in elevation from 914 m (3,000 ft) to 3,199 m (10,497 ft) above sea level. The Mt. Washington Wilderness Area, south of Mt. Jefferson, covers 220 km<sup>2</sup> (54,278 ac) and elevation ranges from 914 m (3,000 ft) to 2,376 m (7,794 ft) above sea level. The Three Sisters Wilderness Area is the southernmost study site and covers 1,138 km<sup>2</sup> (281,190 ac) and

elevation ranges from 610 m (2,000 ft) to 3,157 m (10,358 ft) above sea level. Forests in these wilderness areas are dominated by Douglas-fir on the west slope of the Cascades, and ponderosa pine on the east slope of the Cascades. Other vegetation types include silver fir, sub-alpine fir, mountain hemlock, western hemlock, lodgepole pine, and alpine meadows. Santiam Pass (1,468 m [4,817 ft] in elevation) to the north generally experiences snowfall during 10 months of each year, with a monthly peak of 262 cm (103 in) of snow depth during March (Western Regional Climate Center 2011); snowfall and snow depth typically increases with increasing elevation in the study area.

## Methods

We used 2 types of baited camera stations (elevated, ground; see below) to detect forest carnivores during October 2012–May 2013.

*Elevated stations.*—We generally followed Magoun et al. (2011) to implement an elevated system using motion-detection cameras at bait stations to identify individual wolverines, sex of individuals, and lactation status of females based on digital imagery, if any wolverines are detected. This also incorporated a hair-snag system at bait stations for collection of samples for DNA analysis. This system is also useful for detecting arboreal and climbing forest carnivores (e.g., American marten).

*Ground stations.*—We also implemented a ground-level system using motion-detection cameras at bait stations and a hair-snagging system that uses gun brushes (California Department of Fish and Game, unpublished report; Fig. 2). This system has been used for detection of a diverse range of carnivores, including American marten and red fox. We generally implemented ground-level systems for 2-week periods.

*DNA analysis.*—DNA analysis of collected hair samples can be used to verify the identification and sex of the individual wolverine(s) photographed at bait station(s). Additionally, DNA analysis may detect specific familial relationships and further determine the potential source population or a genetically distinct population in the Cascades of northern Oregon (Magoun et al. 2011). We also collected hair samples from ground stations and collected scat samples during backcountry travel for station maintenance. Hair and scat samples are being analyzed to assess subspecies (if red fox), individual identification, and other information. All bait stations are being used to collect information on presence of marten for habitat modeling purposes.

## Results

During October 2012 to May 2013, a total of 21 elevated stations and 11 ground stations were constructed and monitored within the study area (Fig. 1). Elevated stations were distributed throughout the study area and locations were based on topographical and ecological features, as well as field access, in an effort to maximize the probability of detecting wolverines, if present. Locations of elevated stations ranged in elevation from 1,014 m (3,326 ft) to 2,237 m (7,340 ft). Ground stations were generally implemented in areas of known or suspected fox activity and ranged in elevation from 683 m (2,240 ft) to 1,821 m (5,973 ft).

A total of 2,139 camera-days as of 25 May 2013 has resulted in collection of >25,860 digital images and >21 hours of video footage. At least fourteen different mammalian species (squirrels not identified to species level; mammals smaller than chipmunks not included) were detected during the first field season (Table 1). American marten were detected at 72% (23 of 32) of stations and montane red fox were detected at 3 ground stations (Fig. 2). Also of note was the detection of a raccoon at an elevated station at 1,814 m (5,950 ft) of elevation in Three Sisters Wilderness Area during January 2013; this detection will be submitted as a research note to a regional peer-reviewed scientific journal. At the time of this report, one elevated station remains in the field because high avalanche risk prevents site access.

DNA samples, including hair and scat sources, were collected throughout the field season and final laboratory processing is underway. Preliminary DNA analysis results suggest four samples are from native red fox. These samples ranged in elevation from 1,552 m (5,092 ft) to 1,815 m (5,954 ft). Three samples were collected in Mt. Jefferson Wilderness Area and one sample in the Deschutes National Forest near Three Sisters Wilderness Area. Final results to determine subspecies, individual identification, and other information are pending.

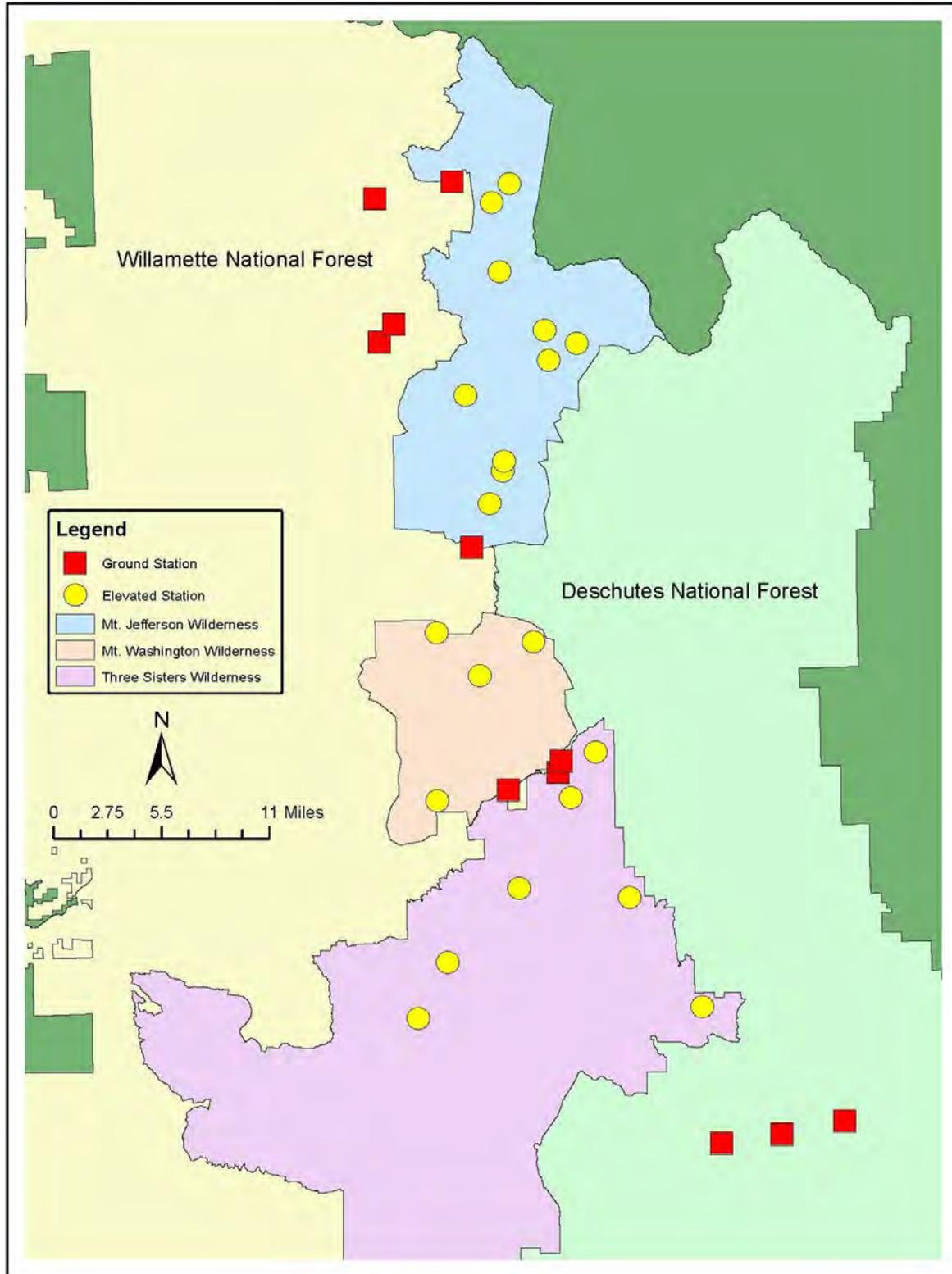


Fig. 1. General locations of elevated and ground baited camera stations used to detect forest carnivores in the Mt. Jefferson, Mt. Washington, and Three Sisters wilderness areas, northern Cascades of Oregon, USA, during October 2012–May 2013.



Fig. 2. Selected images from baited camera stations on wolverine-forest carnivore research project, northern Cascades of Oregon, USA, Feb 2012–May 2013, including (left to right, top to bottom) montane red fox, American marten, coyote, bobcats, long-tailed weasel, and chipmunk.

Table 1. Number of sites with wildlife detections by species as recorded on digital images and video footage at 2 types of baited camera stations during wolverine-forest carnivore research project, northern Cascades of Oregon, USA, October 2012–May 2013.

Species	Number of Elevated Stations ( <i>n</i> = 21)	Number of Ground Stations ( <i>n</i> = 11)
Montane red fox ( <i>Vulpes vulpes</i> )	0	3
American marten ( <i>Martes americana</i> )	19	4
Mink ( <i>Neovison vison</i> )	0	1
Long-tailed weasel ( <i>Mustela frenata</i> )	0	1
Black bear ( <i>Ursus americanus</i> )	2	1
Coyote ( <i>Canis latrans</i> )	3	0
Bobcat ( <i>Lynx rufus</i> )	3	3
Raccoon ( <i>Procyon lotor</i> )	1	0
Deer ( <i>Odocoileus hemionus</i> )	0	1
Snowshoe hare ( <i>Lepus americanus</i> )	0	2
Northern flying squirrel ( <i>Glaucomys sabrinus</i> )	6	5
Tree or ground squirrel	3	3
Chipmunk	0	1
Avian	12	5

## Future Plans

The second field season is scheduled to include similar efforts during October 2013 to May 2014, depending on funding levels, to meet project objectives. Our efforts will continue to focus on potential detection of wolverine(s), but we intend to increase our efforts to collect data on montane fox. Following completion of this 2-year study, analysis of data and preparation of manuscripts for submission to peer-reviewed scientific outlets will begin.

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