

Cascades Carnivore Connectivity Project

2012 Progress Report



**Western Transportation Institute
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The Cascades Carnivore Connectivity Project: Evaluating Highway Barriers to Carnivore Movement in the Washington Cascades

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Project Funders and Supporters

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I. Introduction

The Cascades Carnivore Connectivity Project (CCCP) is a multi-partner effort to study and ultimately help reduce the barrier effects of major highways and development on carnivore movement in the North Cascades Ecosystem (NCE) of Washington (Fig. 1). More specifically, CCCP is assessing (1) where carnivore species of interest occur in this region; (2) whether highways are serving as barriers to genetic exchange among subpopulations; and (3) the locations of fracture zones and potential wildlife linkages throughout the NCE. Using noninvasively acquired genetic data, we are employing a suite of population and landscape genetic approaches to evaluate the effects of I-90, Route 2, and Highway 20 on genetic structuring among American black bears (*Ursus americanus*) and American martens (*Martes americana*)—our focal carnivore species. Ultimately, we foresee that our results will help inform future transportation and conservation planning in the region.

In 2011, we conducted our third year of noninvasive hair sampling for black bears and martens, with marten surveys continuing into the winter of 2011/12. We also helped implement Year 2 of a broader initiative to survey for grizzly bears (*Ursus arctos*) in the NCE, as part of the U.S. Fish and Wildlife Service’s long-term recovery planning process for this species. Because the same hair capture methods are used for black bears and grizzly bears, survey efforts dedicated to the latter (rare) species resulted in an extensive number of hair samples being collected from (relatively common) black bears (see Preliminary Outcomes below).

In late 2012, we will produce a comprehensive report describing the final results of our landscape genetic study. Meanwhile, in this report, we summarize our preliminary findings to-date, including the results of our hair-snagging efforts in summer 2011 and winter 2011/12. For a more extensive overview of our study area, survey objectives, and methods—and to view reports from previous years—please visit our website at www.cascadesconnectivity.org.

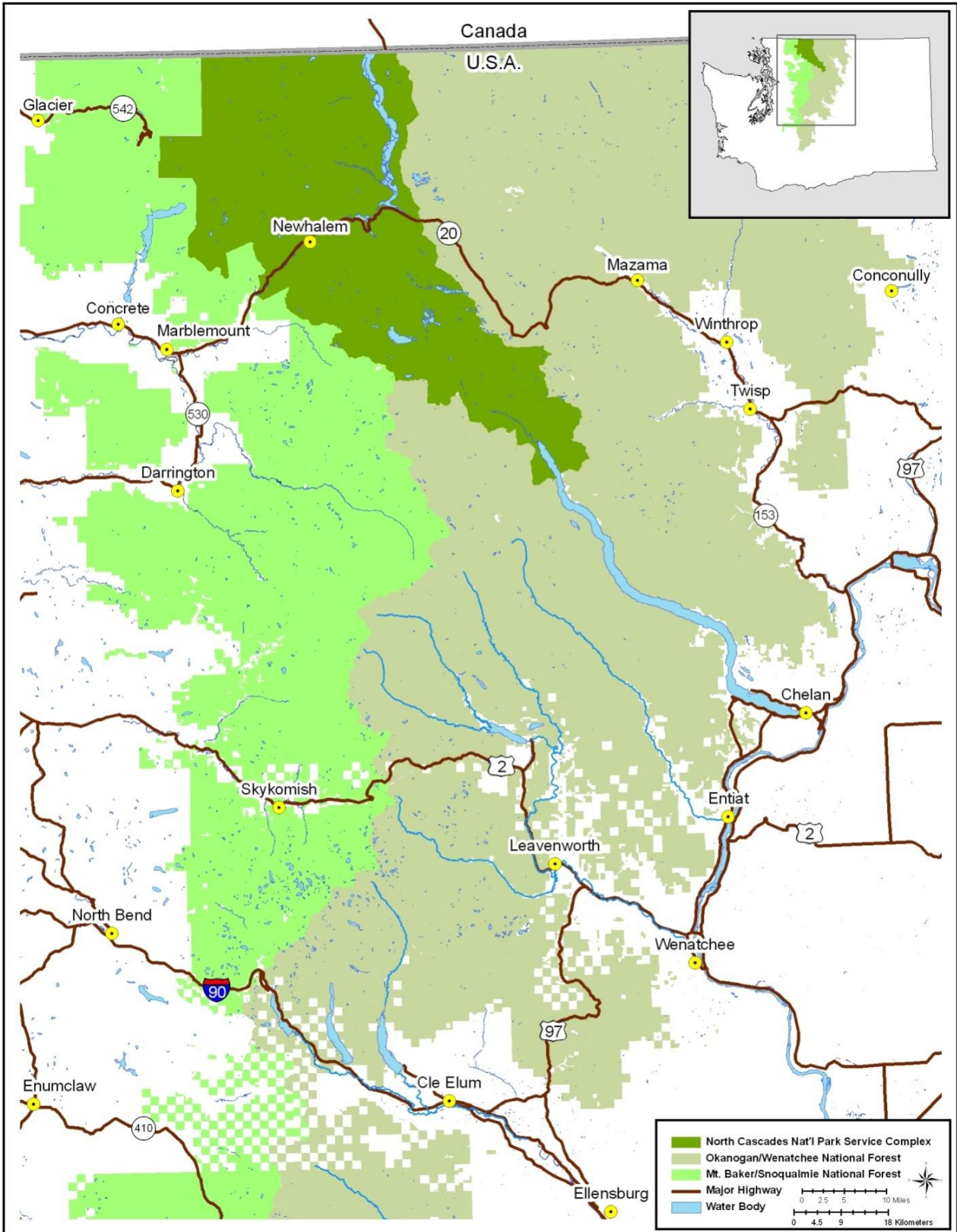


Figure 1. Map showing the Washington portion of the North Cascades Ecosystem and the three major east-west highways traversing it.

II. Brief Overview of Methods

To maximize sampling efficiency, we mapped 2,500 ha hexagonal sample units across the entire study area and surveyed sample units with a prescribed amount of effort. Each hexagon represents an area slightly smaller than the average size of a female black bear's home range in this region.

For bears, we typically deployed two barbed wire, corral-type hair snares within each sample unit surveyed (Fig. 2). We spaced corrals as far apart as possible within the sample unit, ideally at a distance of approximately 1 km or more from the edge of the unit. The corrals themselves were comprised of a single strand of barbed wire stretched around four or more trees at a height of 45–50 cm, with woody debris piled in the center and treated with one liter of liquid scent lure (cattle blood and fish). We revisited corrals at ~14 days and (a) removed them if a sufficient hair sample was present or (b) rebaited and left them again for ~14 days if no sample was present. (Given that one of our objectives was to detect rare grizzly bears, we deployed corrals in select remote areas for the full 28-day period even if we collected hair samples after the initial 14 days). In the field, we immediately placed hair samples in small coin envelopes that were then stored in plastic containers with desiccant. We deployed digital remote cameras (Reconyx, Inc., Holmen, Wisconsin) at a subset of stations.

For martens, we deployed 2–3 tree-mounted hair snares within each sample unit surveyed, spacing devices at approximately 500 m and targeting suitable marten habitat whenever possible (Fig. 3). We attached five hair-snagging devices (i.e., .30-caliber bronze gun-cleaning brushes) to each tree-mounted enclosure, which we baited with chicken and scent lure (Fig. 4). As with corrals, we generally revisited marten stations at ~14 days and (a) removed



Figure 2. A black bear crawls under the barbed wire at a corral site (a), leaving a tuft of hair (circled in yellow) in the process (b).



Figure 3. A marten visits a tree-mounted enclosure.



Figure 4. Marten hair snagged on a gun-cleaning brush.

them if a sufficient sample was present or (b) rebaited and left them again for ~14 days if no sample was present (but see next paragraph). Once again, we deployed Reconyx-brand digital remote cameras at a subset of stations.

For both bear and marten surveys, professional crews were provided and managed by Western Transportation Institute and other project partners. In addition, during winter 2011–2012, we trained volunteers from the North Cascades Institute and Conservation Northwest to conduct marten surveys in the Highway 20 and I-90 corridors, respectively. At I-90, we diverged slightly from the protocol described above such that stations were left intact for a total of three revisits—whether hair was present or not—and removed during the last visit. If our sample size is adequate, this “repeat sampling” approach will permit us to estimate the probability of detecting martens with our methods when they are indeed present, which may, in turn, allow us to conduct a cursory occupancy analysis for martens in the I-90 region.

III. Preliminary Outcomes

In the following sections, we summarize data collected during surveys conducted in 2011/12, and our study results to-date for black bears and martens.

Bears

In 2011, 194 corrals were deployed throughout the NCE, with putative bears detected at 139 corrals (Fig. 5, Table 1). A total of 1,294 hair samples were collected from these corrals, and DNA tests are pending on the 754 sub-selected samples sent to Wildlife Genetics International (Nelson, British Columbia). Twenty-locus black bear genotypes acquired from 2011 genetic samples will be combined with those from 2008–2010 ($n = 334$; Table 1) for our landscape genetic analysis. Note that, in 2010, we also genotyped 38 black bear tissue samples from the Washington Department of Fish and Wildlife (WDFW), which yielded 20-locus genotypes from

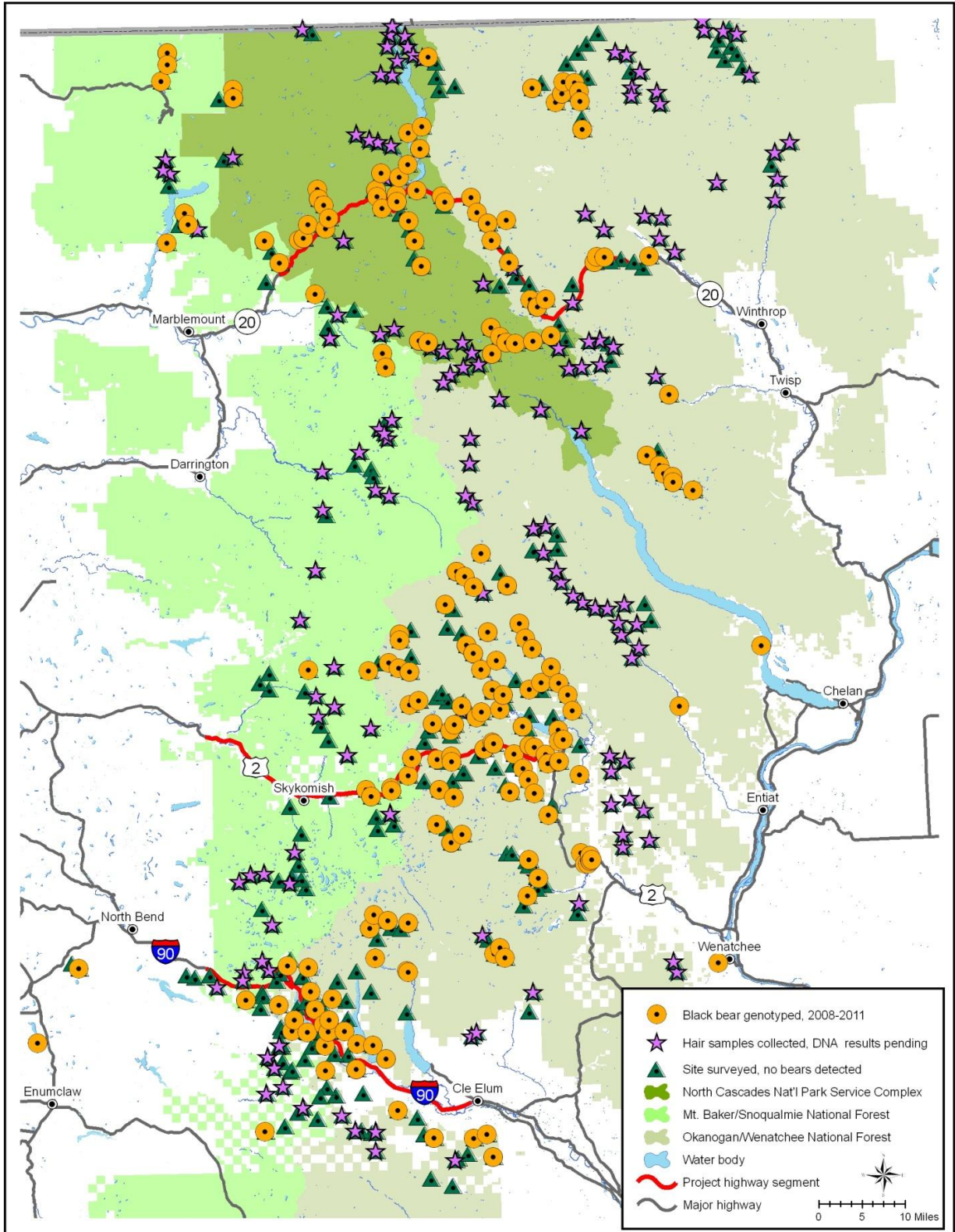


Figure 5. Map of the North Cascades Ecosystem showing sites where corrals have been deployed and associated results.

both the NCE (n= 14) and the Capitol Forest area of southern Puget Sound (n = 24). The latter will provide an interesting genetic comparison with NCE data. Lastly, remote cameras were deployed at 88 corral sites in 2011, yielding photos of dozens of black bears and numerous images of other species of interest (e.g., cougar [*Felis concolor*], wolverine [*Gulo gulo*]) (Fig. 6).

Table 1. Corral summary for 2011 and to-date.

	2011	Total
Corrals deployed	194	569
Corrals with putative bear hair samples	139	not calculated
Hair samples collected	1,294	2,866
Hair samples sent to genetics lab	754	1,743
Black bears genotyped	pending	334 + pending

Although no grizzly bears were captured by remote camera this year, the DNA testing of hair samples (including hundreds containing brown hairs) is still pending. Grizzly bear surveys will tentatively resume in 2012.

Martens

Sixty marten hair sampling stations have thus far been deployed in winter 2011/12, including 29 in the Highway 20 region and 31 in the I-90 corridor (Table 2). A total of 146 (Hwy 20 = 56, I-90 = 90) hair samples have been collected at these stations. Prior to this season, we had acquired 11-locus genotypes for 51 martens from across the NCE (Figs. 7, 8, 9). Once our winter surveys are complete, hair samples will be sent to Wildlife Genetics International and resulting genotypes will be added to the 51 cited above for our landscape genetic analysis.

Table 2. Marten enclosure summary for 2011 and to-date.

	2011	Total
Enclosures deployed	60 to-date	351
Hair samples collected	146 to-date	646
Martens genotyped	pending	51



Figure 6. Remote camera images from corral sites, with (from top) two young black bears (Newhalem Creek), a cougar (Agnes Creek), and a wolverine (Entiat River).

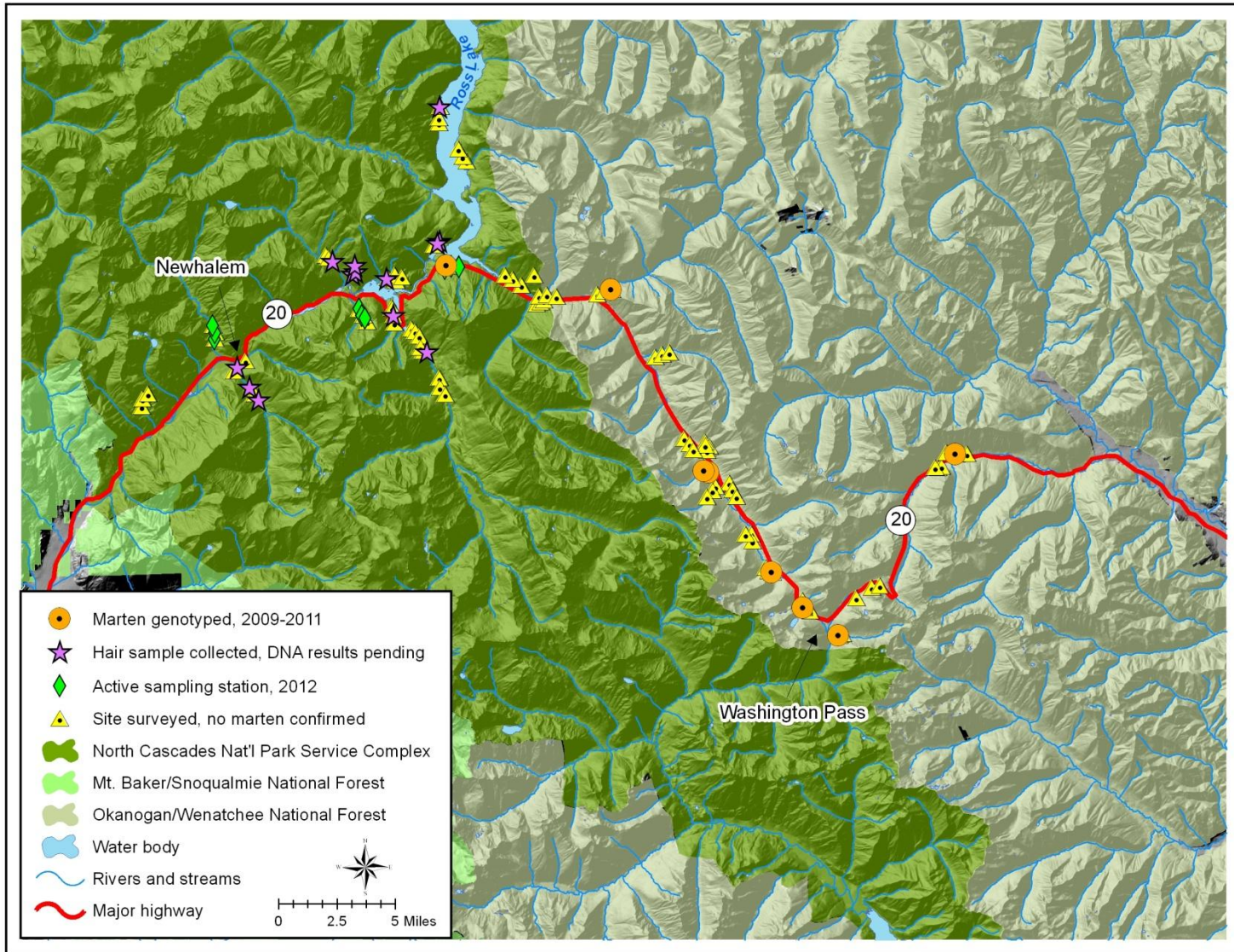


Figure 7. Map of the Highway 20 region showing sites where marten enclosures have been deployed and associated results.

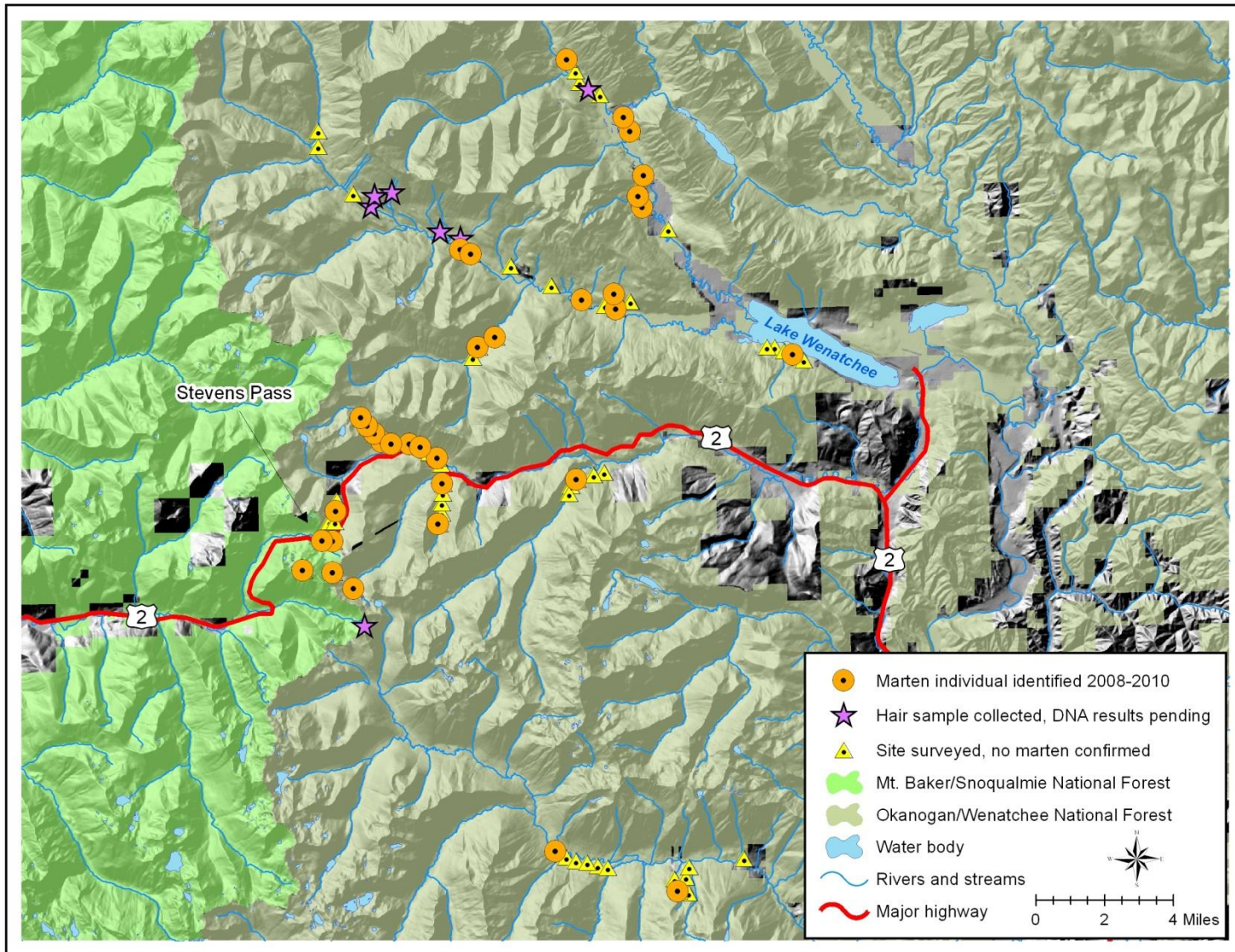


Figure 8. Map of the Route 2 region showing sites where marten enclosures have been deployed and associated results.

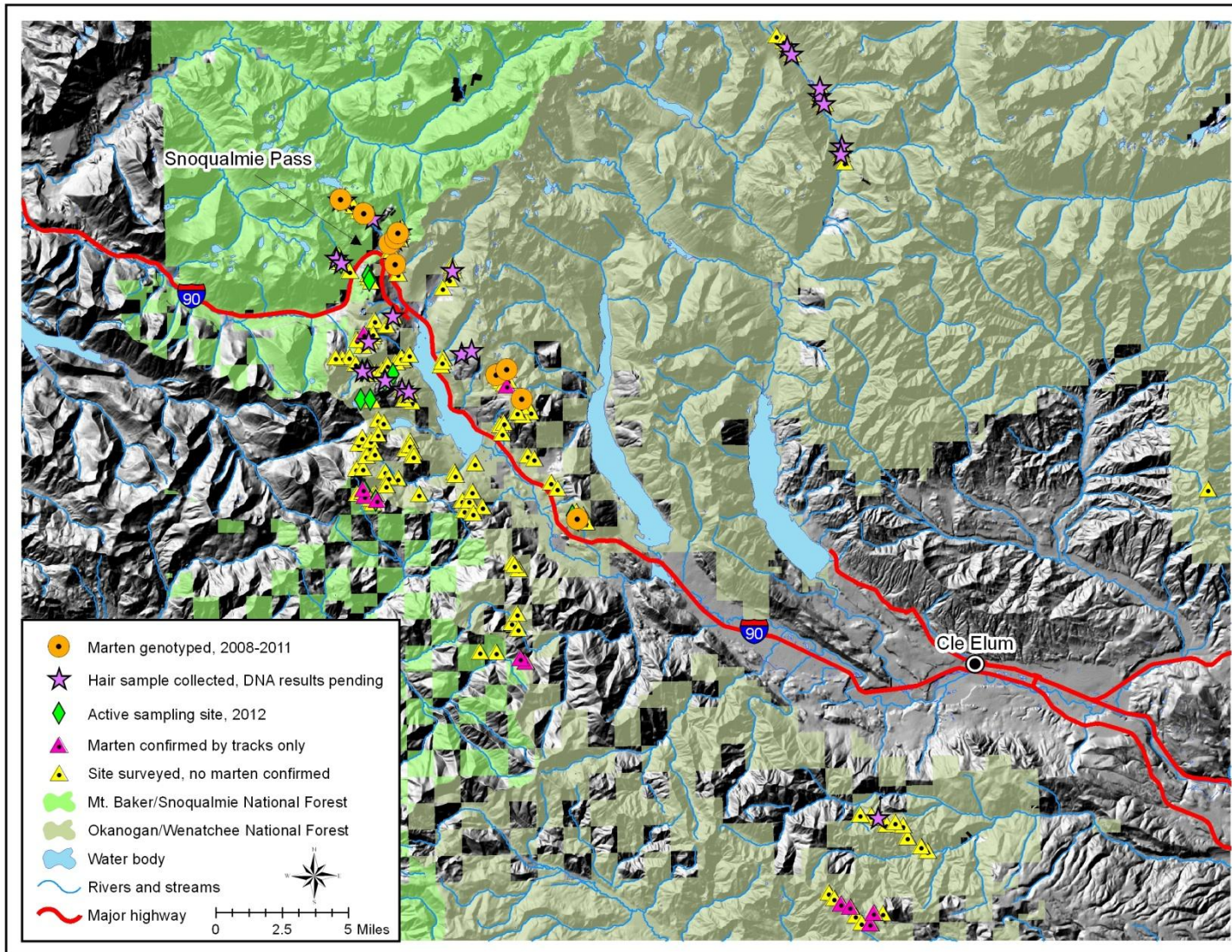


Figure 9. Map of the I-90 region showing sites where marten enclosures have been deployed and associated results.

IV. Outreach

In 2011, we presented a number of public talks about CCCP, including at the Golden West Visitor Center in Stehekin and at the Conservation Northwest office in Seattle. We also participated in numerous regional meetings pertaining to carnivore research and recovery, and created a website specifically dedicated to this project (www.cascadesconnectivity.org). In addition, our survey efforts were the focus of several media stories, including a multi-media piece created by *High Country News* (<http://www.hcn.org/issues/43.19/the-forgotten-north-cascades-grizzly-bear/how-to-snag-a-grizzly>).

V. Acknowledgements

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