

Title: Distribution of Rare Forest Carnivores (Fisher, Marten) in Coastal Southern Oregon

Investigators:

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Project Duration:

2016 – Conduct non-invasive fisher (*Pekania pennanti*) and Pacific marten (*Martes caurina humboldtensis*) surveys with scent detection dog teams in the landscapes within Curry County. Send in scats for genetic evaluation. Produce progress report.

2017 – Complete detection dog surveys in Curry and Coos counties. Send samples to genetics lab and evaluate distribution and ideally identify areas to quantify abundance and population boundaries of each species.

Objectives:

We have three objectives to achieve the overall goal regarding a better understanding of whether and how forest management affects fisher and marten occupancy in the southern Oregon Coast Range Mountains:

1. Survey areas using scat detection dogs in strategic areas, filling significant spatial gaps in survey efforts for fisher and marten (e.g., gaps remaining following earlier surveys, see Moriarty *et al.* 2016).
2. Use genetic techniques to verify species, and (ideally) the sex and number of individuals.
3. Supply distribution data to collaborators to ensure quick decision making on pressing issues.

Summary of Accomplishments:

During spring 2016 a scent detection dog team surveyed 16 sample units (about half of our goal) for a total of 179 km traveled. The team (Jennifer Hartman and “Scooby” from Conservation Canines) collected 110 scats, potentially targeting fisher, marten, lion, bobcat, and porcupine. These were sent to the Levi Lab (OSU), 66 were confirmed marten and 6 were verified as bobcat. Of the scats Jennifer identified as high or medium confidence in the field, she was accurate 96% of the time for marten identification – suggesting 2 scats were fisher but genetic results confirmed them as marten. She was accurate 67% of the time identifying bobcat – she suggested 2 samples were lion but genetic results confirmed the species identification as bobcat.

Spring 2016 surveys identified marten in two locations further east than known by any prior survey (Figure 1). The Levi lab was able to identify scats to species promptly and with over 70% amplification rate to species (mitochondrial sequencing). In March, the lab will be using Illumina sequencing, which is a high-powered Next-Generation sequence system, to assess individual and sex identification for a portion of the marten samples, as well as to explore not only at what rate scat samples can be used for such a task – but also to better understand the minimum number of individuals.

Problems, Barriers, Proposed Changes to Objectives:

We were only able to survey half of our suggested units because there was a mismatch between when funding was provided (July) and when the detection teams could be available. We were able to survey for a portion in good faith that funds would come, but funds still need to be transferred to University of Washington.

Using traditional microsatellite techniques, scat amplification to sex and individual has been lower than expected. Results are upcoming from the study on marten detectability funded by the Oregon Forestry Industries Council in 2015; from that survey 157 scats were collected, 60 were verified as marten and 17% were sequenced to sex and individual (n=10). We're going to try Illumina sequencing to individual and, if that works, then it could revolutionize our capacity to document individuals (and thus abundance). Meanwhile, the Levi lab has made contributions in meta-barcoding for prey, also using the Illumina technology.

Planned Work:

During 2017 we will finish scent detection dog surveys in the southern coast, ideally moving most of the effort to industrial land owner partners or mixed ownership areas (our prior work was on public lands). Such surveys will be conducted during spring or early summer, following rains but before fire season. All scats will be sent to the Levi lab. A new grant was awarded by NCASI in which we will have the capacity to sample a majority of the marten, fisher, bobcat, and lion scats for prey using meta-barcoding. This technique also allows the species to be identified. Funds from genetic work will ideally be used to continue using Illumina sequencing to improve our capacity to obtain individual identification and sex information from scats. By fall, all scats will have been finished at least to species and we will write a final report.

Comprehensive Summary:

Not applicable – study concludes fall 2017.

Undergraduate Engagement in Project:

We have an undergraduate student working on photo-tagging and processing with the few cameras we set out in the coast range this year. Another undergraduate, Mark Stevens, is sorting through scats to identify berries and seeds. In this round, we did not include primers to identify this class of potential prey. The Levi lab also involves over 10 undergraduate students to help in both the lab work and with carnivore photographs – providing valuable experience using specific scientific protocols and preparing samples for analyses.

List of Presentation and Publications:

These data will be combined into our larger efforts to understand fisher and marten distributions and detectability.

Publications: (this does not include this current round of surveys, but all prior also funded by FWHMF)
Moriarty, K. M., J. D. Bailey, S. E. Smythe, and J. Verschuyt. 2016. Distribution of Pacific marten in coastal Oregon. *Northwestern Naturalist* 97:71-81.

Moriarty, K. M., M.A. Linnell, J.E. Thornton, and G.W. Watts III. In prep. Seeking efficiency with carnivore survey methods: a case study with elusive martens. ** should be in review by December, compares marten surveys with cameras and differing bait treatments and scent detection dogs; funded by OFIC*

Presentations (planned and completed):

Moriarty, K.M., M.A. Linnell, B.R. Barry. 2017. Distribution to Density: updates regarding coastal marten and fisher in Oregon and Washington. Western Section-TWS Annual Conference, Reno, NV.

Moriarty, K.M., Golding, J. and many others. 2017. Assessing surveying methodologies to address information gaps for forest carnivores. Oregon Forest Carnivore Working Group. (January).

Moriarty, K.M., Golding, J. and many others. 2016. Assessing surveying methodologies to address information gaps for forest carnivores. USDA Forest Service and Association of Fish and Wildlife Agencies Monthly Webinar Series (November).

Moriarty, K. M., S.M. Matthews, T. Levi, J. Thornton, J.D. Bailey, M.A. Linnell, B.R. Barry. 2016. Update and considerations for marten and fisher monitoring. Oregon-TWS Annual Conference, Forest Carnivore Meeting, Seaside, OR.

Moriarty, K. M., S.M. Matthews, T. Levi, J. Thornton, J.D. Bailey, M.A. Linnell, B.R. Barry. 2016. If we build it, will they come? Considerations for marten and fisher monitoring. Oregon-TWS Annual Conference, Seaside, OR.

Watts, G.W. III, K.M. Moriarty, and M.A. Linnell. 2016. Comparing the cost-effectiveness and reliability of scent detection dogs and remote cameras for sampling coastal martens in Oregon. Poster. Western Section-TWS Annual Conference, Pomona, CA. (largely funded by OFIC)

Literature Cited:

Moriarty, K. M., J. D. Bailey, S. E. Smythe, and J. Verschuyt. 2016. Distribution of Pacific marten in coastal Oregon. *Northwestern Naturalist* 97:71-81.

Figure 1. We did not detect fishers but did confirm a population of marten (orange circles) during our surveys in 2015 despite an effort that included 944 camera stations in the Coast Range (purple circles, largely funded by FWHMF, OFIC, and NCASI, Moriarty *et al.* 2016). Fishers were detected during the OSU surveys (grey squares, detections not shown). Our scent detection dog surveys funded by FWHMF for this report (black hexagons) also did not detect fisher, but found marten at 4 additional sample units (orange squares) – including 2 east of Powers. Teams will survey at least 20 more sample units (green squares) during summer 2017. In addition, the BLM will add to the 2017 survey effort (blue squares). Detection dog teams will target fisher, marten, bobcat, and mountain lion. Scats will be sent to the Levi lab (OSU) for species confirmation.

