Wildlife in Managed Forests: Forest Carnivores and their Habitats
A focus on marten, fisher, and fox
POSTER BIOS AND ABSTRACTS
October 19, 2017

IDENTIFYING RESTING LOCATIONS OF SMALL, ELUSIVE, FOREST-DWELLING CARNIVORES USING GPS CLUSTERS

Katie M. Moriarty; **Caylen Cummins**; Bruce Hollen

Biography: Caylen Cummins has her B.S. in wildlife biology from Colorado State University. She recently completed her M.S. degree at Humboldt State (2016). She has worked on a variety of research projects, ranging from snowshoe hares to mountain lions, but primarily has been studying fisher ecology since 2011. Most recently she is researching fisher ecology in Oregon's southern Cascade Range.

Abstract: Conservation of wildlife populations on managed landscapes requires the capacity to describe features correlated with individual persistence without bias. Fishers (Pekania pennanti) are forest-dependent carnivores (1-6kg) and select habitat at multiple scales, including the microsite where they rest, den, and forage (4th order selection). We collected fine-scale location data (15 minute interval) intermittently on adult fishers (Oct 2015-Apr 2017, n = 9). We used simple algorithms to identify periods when they were presumed resting (e.g., clusters of locations with minimal movement for >3 hours). From clusters, we spatially buffered an area using mean GPS error, presuming the area encompassed the resting structure ("rest zone"). We tested our assumption by spatially identifying resting structures found using VHF telemetry and by randomly selecting rest zones and deploying remote cameras (n = 12 rest zones with increased probability of use, 3 individuals). We conservatively quantified metrics to describe fisher resting ecology in the Cascade range of southern Oregon. Of the areas with both VHF and GPS telemetry, 42% of rest zones had a VHF identified resting structure within the predicted rest zone. We documented fisher occurrence at 92% of the rest zones using remote cameras. We identified 574 rest zones, 63±24 (mean±SD) per individual and 22.3±6.9 per individual/month. Reuse estimates were 83%, starkly contrasting with prior reported estimations <25%. Approximately 50% of rest zones were used >5 occasions within a month, and 10% were used by >1 fisher. Spatially, nearest neighbor estimates for rest zones were on average 378 meters (maximum distance = 2.8km). We were unable to locate all VHF resting locations with short term GPS deployments (42%), but suspect fairly high accuracy based on camera verification. Our novel application using fine-scale GPS data provided a complementary method to quantify the habits and habitat of an elusive forest carnivore.

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PACIFIC FISHER DISTRIBUTION AND DETECTABILITY IN SOUTHWESTERN OREGON.

Brent Barry, Katie Moriarty, and Taal Levi

Biography: Brent is a graduate student at Oregon State University in the Levi Lab. His work focuses on the distribution of fisher (*Pekania pennanti*) in southwestern Oregon and is nested in a multi-species monitoring framework. Fisher are rare forest carnivores with relatively unknown distributions in Oregon. Brent uses remote cameras and genetic sampling to survey landscapes for these animals and ask additional questions about the ecology of carnivore guilds in the area.

Abstract: Fishers (*Pekania pennanti*) are medium sized members of the weasel family endemic to North America. In the Pacific states fishers were deemed warranted but precluded in 2014 for Federal listing under the Endangered Species Act (ESA), however, the listing was withdrawn in 2016 and that decision is under litigation. Two fisher populations persist in Oregon: a remnant indigenous population in the Klamath Mountains of southwestern Oregon, and a reintroduced population near Crater Lake in the southern Cascades. Despite candidacy for the ESA, current information on fisher populations in Oregon is scarce. We conducted surveys using motion-activated cameras and scat detecting dogs to assess the distribution of fisher populations and detectability of fishers. We deployed over 198 camera sample units, equating to over >2000 survey stations, collecting data for a minimum of 35 days in winter and 60 days in summer. We obtained > 3 million photographs, amassing one of the largest systematically-surveyed photo datasets. Fishers were detected at 54 unique sample units and 99 individual survey stations, confirming the presence of the indigenous and introduced populations. Detectability varied between three bait types and season. Distributional results yield a shift or contraction of the southern Cascades reintroduced population, and a larger indigenous population with a reduced range in the coastal ranges. Neither population showed significant signs of expansion into historically occupied forests.

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THE EFFECTS OF MIXED-SEVERITY WILDFIRES ON FISHER POPULATION DYNAMICS

David Green, Oregon State University

Biography: David is a Postdoctoral Scholar at Oregon State University studying mesopredator ecology, conservation, and management.

Abstract: The combination of many years of fire suppression and global climate change is predicted to increase the frequency and intensity of wildfires in certain parts of the world, especially in the western United States. Large-scale wildfires have the capacity to reduce, fragment, or permanently change habitat, and are a major source of conservation and management concern for forest obligate carnivores. Here we used data collected from a long-term monitoring program to investigate the effects of two naturally-occurring mixed-severity wildfires on a population of fishers (*Pekania pennanti*) in northern California and southern Oregon. Using genetic data collected non-invasively with hair snares, we applied spatial capture-recapture models to estimate fisher density the year before the fires, the year of the fires, and the year immediately following the fires. We present the short-term effects of these wildfires on the density of fishers over time and how this variation in density was affected by spatially-explicit fire severity. Our findings help identify how a species of conservation concern are affected by landscape level ecological disturbances, and can also help to inform fire management decisions in the western United States for forest obligate species.

CONSERVATION CANINES AND FOREST CARNIVORE RESEARCH

Jennifer Hartman, Research Scientist/Trainer/Handler/Communications Coordinator

Biography: Since 2009 Jennifer, and her canine companions, have traveled throughout the world collecting scientific information. She has taken over Caleb Stanek's role of being Oregon's point person, surveying for marten, fisher, and Sierra Nevada red fox. Recent projects also include surveying for fisher in the southern Sierras, a suite of carnivores in northeast Washington, pangolins in Vietnam, and multiple species in Africa. With a degree in English literature, she's become the defining voice of Conservation Canines.

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Abstract: For 20 years the University of Washington's Center for Conservation Biology has been committed to selecting the best dogs and handlers, teaching them the diverse skills necessary to provide the highest quality data to researchers and natural resource managers. Further, all dogs have been rescued from pounds, their extensive energy now focused on providing data to solve complicated problems.

Our dog-handler teams are capable of providing a service, unlike any other field of research practice. Instead of approaching an issue one factor (or species) at a time, we locate and provide data on multiple facets of any given ecosystem – from locating hard to find scats to identifying invasive plants. This broad-scale information provides a foundation of information, guiding researchers and managers with data for potential restoration and increasing long-term resilience of species against future impacts.

USING FINE SCALE RESOLUTION VEGETATION DATA FROM LIDAR AND GROUND BASED SAMPLING TO DESCRIBE PACIFIC MARTEN RESTING HABITAT

Patrick J. Tweedy, Oregon State University

Biography: Patrick is in his second year of his master's program at Oregon State University in the Department of Forest Engineering, Resources and Management. His primary research focus is on multi-scale habitat selection around Pacific marten rest structures in Lassen National Forest, California. Methods from his research can be used for management planning and restoration prioritization. Originally from South Dakota, Patrick fell in love with the Sierra Nevada and Cascades mountains after completing his undergraduate degree from the University of Minnesota. Patrick has lived in California and Oregon since 2009 working with a variety of species including martens, fishers, small mammals, and spotted owls. In his off time, he enjoys hiking and skiing with his dog, Ollie.

Abstract: Conservation of wildlife populations on managed landscapes requires planning at the appropriate spatial scale since selected scales dramatically affect results and thus interpretation. We examined multi-scale habitat relationships at Pacific marten rest structures in Lassen National Forest using fine-resolution vegetation data (30m

airborne LiDAR). Using a moving-window framework to compare selection, we optimized 14 covariates at 12 spatial scales (30m-990m) centered on each rest structure. We monitored martens from 2009-2012 and 2015-2017 (n=312 resting structures, 31 martens), and then compared used vs. randomly sampled locations (n_{rand}=624) in order to develop multivariate habitat selection models. There was a positive relationship with trees per acre (990 meter scale) and elevation (900m) as evidence of martens selecting for increased tree cover at higher elevations at the home-range scale. Increased structural complexity and stand density surrounding rest structures (270 and 180 meters, respectively) increased probability of selection; therefore, that distance range may be an appropriate scale to consider for rest site management, for instance, leave islands or focal areas for restoration. We provide the first evaluation of marten habitat using LiDAR, which can be broadly and accurately extrapolated for management planning and restoration prioritization.

PRELIMINARY DETECTION DATA FROM REMOTE CAMERA SURVEYS IN WESTERN OREGON

Jordan Ellison, Katie Moriarty, and Brent Barry

Biography: Jordan Ellison is a research fellow with Oak Ridge Institute for Science and Education. She graduated from Oregon State University in 2015 with a Bachelors in Fisheries and Wildlife Science. She works with the US Forest Service Pacific Northwest Research Station on fisher research in Southwest Oregon. Jordan has been involved in fisher and marten research in Oregon since 2014, working as data manager and field technician for surveys on the coast, the Siskiyou Mountains, and the south Cascades.

Abstract: The Pacific Northwest Research Station, Oregon State University, and partners conducted a series of large-scale camera survey efforts during 2015, 2016, and 2017, targeting Pacific Marten (*Martes caurina*) and Fisher (*Pekania pennanti*). Our survey efforts in the coast range, southern Cascades and northern Cascades of Oregon have provided over 4 million photographs. Species detections include a suite of Oregon's carnivores, such as Cougar (*Puma concolor*), Bobcat (*Lynx rufus*), and Grey Fox (*Urocyon cinereoargenteus*). We are processing the photographs to assess species distribution and detectability. We have used our preliminary field assessment of the photographs to produce distribution maps of nine of Oregon's carnivores, overlaid with additional preliminary detections from detection dog surveys performed by Conservation Canines. For the selected carnivores, we summarize 2015 and 2016 remote camera detection locations by ecoregion as a function of elevation, canopy cover, and stand age. We hope our preliminary maps and summaries can assist in catalyzing conversations about mammal distributions and landscape connectivity.