

WILDLIFE

IN MANAGED FORESTS

Fisher and Humboldt Marten



Wildlife in Managed Forests – Project Overview

This publication is part of a series from the Oregon Forest Resources Institute that aims to synthesize current research findings and make information available to foresters, wildlife managers and interested parties such as conservation organizations, regulators and policymakers. As part of the Wildlife in Managed Forests Outreach Project, information is disseminated through publications such as this one, as well as workshops, tours and conferences.

PROJECT PARTNERS:

Hancock Forest Management
National Council for Air and Stream
Improvement
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Oregon Forest & Industries Council
Oregon Forest Resources Institute
Oregon State University College of Forestry
Oregon State University Department of
Fisheries and Wildlife

Oregon State University Institute
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Port Blakely
Starker Forests, Inc.
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U.S. Forest Service
U.S. Forest Service Pacific Northwest
Research Station
Weyerhaeuser Company

For copies of this report or further information, contact:



**Oregon Forest
Resources Institute**

Oregon Forest Resources Institute
317 SW Sixth Ave., Suite 400
Portland, OR 97204
971-673-2944

KnowYourForest.org

PREPARED FOR THE OREGON FOREST RESOURCES INSTITUTE BY:

Fran Cafferata Coe, Cafferata Consulting, Hillsboro, Ore.

Project Manager:

Julie Woodward, Senior Manager of Forestry Education, Oregon Forest Resources Institute

Photo credits for the cover:

Fisher: Lynn Rogers, North American Bear Center

Marten: Katie Moriarty

Photo credit for page sidebars and inside back cover:

Katie Moriarty

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Fisher kits captured and released as part of a research project in Northern California.
Photo: Sean Matthews

1.0 Introduction



The fisher is being considered for listing under the federal Endangered Species Act. Note rounded ears.
Photo: Mark Higley



All forest-dwelling carnivore species play key roles in the ecosystems they inhabit. Their roles as predators influence the food webs and ecosystem balance. In many cases, forest carnivores are both predator and prey, and therefore influence the health and population of a variety of interconnected species. Forest carnivores of interest to many Oregon forest landowners include the fisher (*Pekania pennanti*) and a subspecies of the Pacific marten, the Humboldt marten (*Martes caurina humboldtensis*). Both species inhabit forested areas of Oregon and are thought to have small population sizes. Historical population declines are assumed to result from over-trapping, generally low reproductive rates, and habitat alteration and fragmentation.

Due to their small geographic range and low numbers, fisher and Humboldt marten are being considered for listing under the federal Endangered Species Act (ESA). Much of the uncertainty surrounding these species stems from the fact that relatively little is known about their distribution, population size and trends, and emerging threats. New research being conducted throughout the state is looking to answer these questions. Table 1 summarizes the current listing status of both species at the time of printing.

Marten are fairly common in Oregon, but Humboldt marten are unique among the more widely dispersed Pacific marten. Pacific marten are found west of the Rocky Mountains of North America, including the Blue Mountains, Cascade Range, Coast Range and coastal forests of Oregon. Humboldt marten, a subspecies of Pacific marten, occur in two distinct populations in coastal forests of southern Oregon (see range map, page 9). The conservation status of Humboldt marten is in question, and is the focus of this publication along with fisher.

The Humboldt marten is a unique subspecies of the Pacific marten. Note triangular ears.
Photo: Katie Moriarty

TABLE 1. CURRENT FEDERAL AND OREGON STATE LISTING STATUS FOR THE FISHER AND HUMBOLDT MARTEN

SPECIES	FEDERAL STATUS*	STATE STATUS*
Fisher <i>Pekania pennanti</i>	Not listed	Sensitive Oregon Conservation Strategy Species
Humboldt marten <i>Martes caurina humboldtensis</i>	Not listed (proposed threatened as of Oct. 9, 2018)	Sensitive Oregon Conservation Strategy Species

*Listing status is current as of print date.

Why not wolverine, Sierra Nevada red fox, gray wolf, Canada lynx, bobcat or coyote?

The focus of this publication is on forest mesocarnivores whose biology and protection status may impact forest operations in Oregon.

What is a mesocarnivore?

A medium-size animal whose diet consists of 50 to 70 percent meat, with the balance consisting of non-vertebrate foods that may include invertebrates, fungi, fruits and other plant material.

1.1 HOW CAN PRIVATE LANDOWNERS IN OREGON INFLUENCE FISHER AND HUMBOLDT MARTEN CONSERVATION?

Species are listed under federal and state Endangered Species Acts (ESAs) when the science indicates their populations are at risk of becoming extinct throughout all or a significant portion of their range in the foreseeable future. Due to small population sizes and threats such as consumption of rodenticides, as well as habitat alteration, both fisher and Humboldt marten have been considered for listing under the federal ESA. When species become listed under the ESA, individuals and their habitat receive special protections under federal law. Listing these species may therefore limit forest landowners in their ability to actively manage their forests, depending on the rules that are implemented after listing. However, prior to and after listing, landowners and managers in Oregon play an important and unique role for mesocarnivore conservation. Involvement in research efforts and voluntary conservation efforts may even influence the listing outcomes for both species. Engaged landowners can promote conservation and understanding of both fisher and marten through the following methods:

1. Identify if the land you manage is currently in the known range of these forest carnivores, and coordinate with neighbors about carnivore conservation.
2. Allow access for research and monitoring, and partner with research teams.
3. Monitor for the presence of fisher and marten, and share monitoring results to help build the knowledge base of where and when forest carnivores occur.
4. Provide habitat features important for carnivores (see section 4 for more information).
5. Consider enrolling in a Candidate Conservation Agreement with Assurances (see section 5 for more information).

This publication will summarize fisher and Humboldt marten biology, discuss their habitat needs, discuss current research and provide science-based habitat management recommendations for these species.

Research wildlife biologist Sean Matthews climbs a tree in order to capture and collar fisher to learn more about their behavior.

Photo: Rebecca Green



2.0 Fisher and Humboldt marten identification

Fisher and Humboldt marten share many similarities. Both fisher and Humboldt marten are members of the weasel family, and distinguishing between the species can be challenging. In general, fisher are larger (they weigh up to four times as much), with darker fur and longer tails. They also have more rounded ears, whereas Humboldt marten have more triangular ears. Humboldt marten have patches of yellow, orange or cream on their chin and chest, whereas fisher are generally dark brown to black with small white patches on their chest and belly. The photos show differences between these species.

Figure 1. Fisher
Note rounded ears, size of front feet and chest patch.
Photo: Lynn Rogers, North American Bear Center

Figure 2. Marten
Note triangular ears and orange chest patch.
Photo: Katie Moriarty



3.0 What does the current research say about fisher and Humboldt marten in Oregon?

Researchers are studying fisher and marten to learn more about their biology and their role in the environment, and to determine best management practices. Current research focuses on the use of managed forests by these species, as well as providing some insights about their tolerances to forest management activities. Studies completed in the last 10 years have shown that a mosaic forest of successional stages may be used by fisher. Additionally, some timber management practices, including those that result in earlier successional stages, may benefit fisher by increasing their prey base of small mammals such as mice and voles. Fisher may respond favorably to forest management that retains legacy structural components (such as large-diameter leave trees, snags and down wood) and slash piles that allow for resting. Other recent research has focused on learning more about the species in general, including habitat selection; home range size; behaviors such as recruitment, reproduction and dispersal; population abundance and growth; the potential effects of climate and vegetation change; and the effects of fire (both prescribed and wildfire) and fuel-reduction techniques.

Recent research focusing on Humboldt marten has been directed at the information gaps in distribution, population sizes and habitat use, and characteristics to better inform management and conservation actions. Research indicates there are primarily two distinct populations of Humboldt marten in Oregon, located on the central and southern coast of the state. Recent survey efforts suggest these populations are small (Linnell *et al.* 2018). Other recent research efforts on Humboldt marten have explored recently documented use of coastal dune habitats by the species, as well as movement behavior in response to forest management, and the effects of thinning for fuels reduction.

Oregon Carnivore Working Group

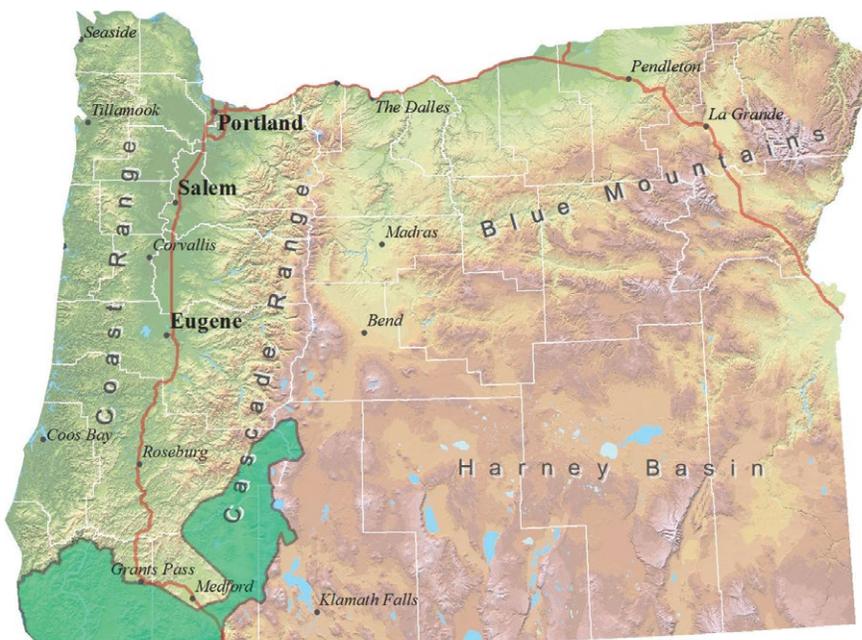
The Oregon Carnivore Working Group was organized by the Oregon Department of Fish and Wildlife to coordinate research efforts (16 ongoing projects on mesocarnivores in Oregon) and discuss emerging research needs. The group is made up of representatives from many interested groups,

including government entities, academic researchers, private industry and environmental advocates. Anyone is welcome to join the mailing list for the Carnivore Working Group. Contact Derek Broman with ODFW for more information: derek.j.broman@state.or.us.

3.1 THE FISHER STORY IN OREGON

Fisher are medium-size carnivores averaging 28-46 inches in length, with weight varying depending on sex and ranging from about 4 to 20 pounds. Though they are often referred to as a fisher “cat,” they are members of the weasel family. Fisher have powerful jaws, long well-furred tails, and dense dark brown to black fur, which is thicker and glossier in the winter. Recent research has led to a re-classification of the species, as it is now thought to be more closely related to the tayra (a South American member of the weasel family) than to marten (Proulx and Aubry 2014). Both fisher and marten are more closely related to the wolverine than they are to each other, but marten more so than fisher.

Figure 3. Approximate Range of Fisher in Oregon



There are two distinct fisher populations in Oregon: an indigenous population in the southwest and a reintroduced population in the southern Cascades (see range map left). Researchers conducted surveys using cameras and scat-detection dog teams to assess the distribution and detectability of fisher. The study included 1,855 camera survey stations, with the collection of more than 4 million photographs (not all of fisher). The researchers confirmed the presence of both the indigenous and introduced populations. According to

the data, it appeared the reintroduced population may have shifted or contracted. The sampling effort showed little evidence of population expansion into historically occupied forests in the Cascades, despite predicted habitat suitability (Barry 2018).

Small and isolated populations have been identified by researchers as the most challenging threat to the conservation of fisher in the Pacific Northwest. In a paper by Lofroth *et al.* (2010), researchers suggest the most effective conservation strategy to reduce the risk of fisher extinction involves protecting existing populations and encouraging them to expand beyond their current boundaries.

Habitat: Fisher habitat in Oregon includes forests with extensive canopy cover in areas with an abundance of available rest sites and dens, such as mistletoe clumps, hollow trees and tree cavities, logs and stumps, large down trees, and slash or brush piles. When using dens located in live trees or snags, fisher often show a preference for those found in the largest, most complex structure available on the landscape. Rest sites and dens may be a limiting factor for fisher habitat, as they are often rare features on the landscape. Once dens are found, fisher will reuse them. During a denning season, fisher may use as many as seven different dens, and have been shown to use artificial den structures as well.



Fisher require cavities for denning. Leaving large legacy trees provides habitat for fishers.
Photo: Kerry Rennie



Fisher have been known to use artificial dens like the one shown here.
Photo: Rebecca Green

Home range

An animal's home range is the area used by the individual in its normal activities of finding food, mating and raising young.

Researchers located resting sites and dens for radio-collared sub-adult and adult fisher in southern Oregon from October 2015 to June 2018. They were able to find 119 unique rest structures and 22 den and maternal structures. Fisher used live trees, snags, logs, slash piles, stumps, subnivean spaces (areas below snowpack) and rock piles. They were most frequently found in sites with mistletoe brooms and cavities. The size of the live tree, snag and log structures varied, ranging from about 8 to 83 inches in diameter. Researchers found den and maternal sites in the largest-diameter features. Dens were found in cavities until the kits were weaned and semi-mobile. At this time, researchers found and documented females using both slash piles and logs as maternal rest structures. Researchers concluded that there is a strong association with fisher and large structures that have cavities or mistletoe brooms (Moriarty *et al.* 2018).

Diet: Fisher are opportunistic foragers and prey upon a variety of species, including squirrels, mice and snowshoe hares, and have been known to specialize on porcupines. Fisher will also eat birds, insects and reptiles. For survival, adult fisher need the equivalent of about one small squirrel per day (Martin 1994).

Behavior: Fisher are territorial, with little overlap of home ranges between members of the same sex (Powell 1993). However, territorial overlap with the opposite sex is extensive (USFWS 2016). Fisher are polygynous, meaning one male will breed with various females during the mating season. Males may go to great lengths to expand their home ranges during mating seasons, with some male fisher expanding their home ranges as much as two and a half times (USFWS 2016).

Threats: Factors likely limiting fisher populations include predation, low reproductive rates, large home ranges and the need for highly specialized maternal dens. In addition, competition for food, mortality from consuming rodenticides, and altered forest composition and configuration are also likely factors.

Denning: Researchers in California have attempted to locate fisher using resting sites and dens during the early den season (March 1-April 15). Denning behavior is indicated by a sudden change in activity, from using numerous rest sites across the entire home range to more restricted movements in a small portion of the home range. Researchers tracked radio-collared fisher and documented their location and use of den and rest structures. Female fisher move kits to multiple den sites within the denning season. Den sites were an average of a half-mile from the previous denning location (Matthews *et al.* 2013).

From 2004 to 2011, researchers in California captured 179 individual fisher (94 females and 85 males). Those fisher exhibited denning behavior between March 22 and May 25. Approximately 23 percent of the denning females failed to produce kits. Failures were primarily due to predation, or death of the denning female from either disease or poisoning. Several den failures were from an undetermined cause. Approximately 65 percent of the denning females were successful at weaning at least one kit. The fate of the remaining denning females is unknown in this study, as researchers were not able to monitor them closely enough to determine their fate. Researchers summarize that in the Pacific Northwest, fisher begin denning from the last two weeks of March through the first week of April, with an average litter size of two kits. They also found that older females are more successful than younger females at raising kits to weaning age (Matthews *et al.* 2013).

Management hint:

Retaining existing large legacy structures as leave trees, as well as recruiting new legacy trees, is important for helping carnivore populations.



Resting structures are crucial for both fisher and marten. This is a female fisher resting.
Photo: Rebecca Green

RESEARCH SPOTLIGHT:

The Effects of Mixed-Severity Wildfire on Fisher Population Dynamics (Green, *et al.* 2018)

This study is investigating the effects of naturally occurring, mixed-severity wildfire on a population of fisher in northern California and southern Oregon. Researchers collected genetic data and estimated fisher density the year before the fires, the year of the fires, and the two years post-fires. According to the data collected by the researchers, the population of fisher showed no decline in numbers the same year of the fires but declined

by 35 percent within two years after the fire. It appeared the fisher decline was most pronounced in areas that experienced more than a 50 percent change in canopy cover. The research in this study is ongoing, but the findings will help us understand how fisher are affected by landscape-level ecological disturbances, and may also help inform management decisions for this species.

What about reintroduction as a tool for increasing and expanding fisher and marten populations in Oregon?

There are two large-scale fisher reintroduction projects in California and Washington state, where fisher were extirpated (Lewis *et al.* 2016; Facka 2016). The multi-agency team has been working hard to re-establish self-sustaining fisher populations in three large areas of the historic range in western Washington: the Olympic Peninsula, the Southern Cascades, and the Northern Cascades. Fisher were reintroduced from 2008 to 2016, and

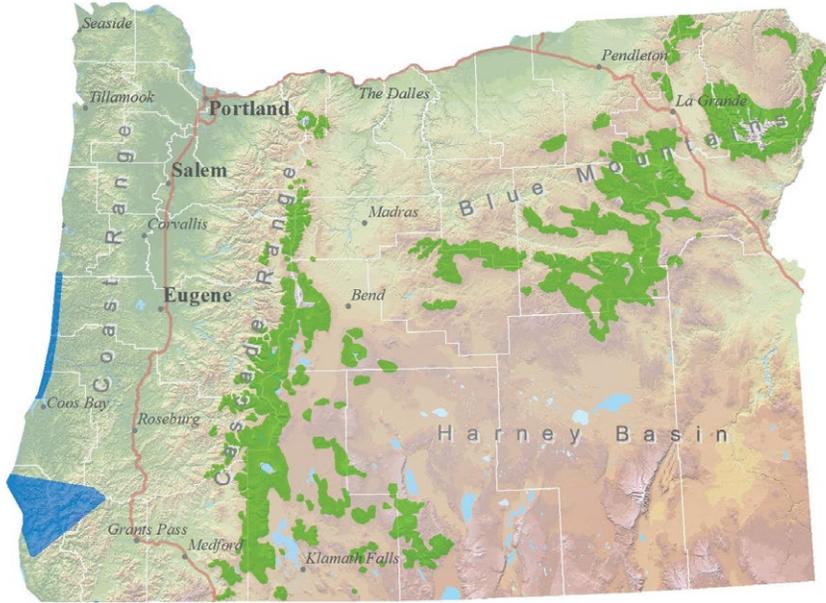
have generally survived but not expanded their range. Several researchers in Oregon expressed concern with reintroductions due to issues such as spread of disease, predation, available habitat and other factors. Relocation may be a valuable tool for survivability of fisher and marten in Oregon, but reintroduction projects would need careful consideration.

3.2 THE HUMBOLDT MARTEN STORY IN OREGON

Humboldt marten are small members of the weasel family, averaging 20-29 inches in length and weighing 1-3 pounds. Very little is known about the Humboldt marten, and therefore information presented here is a compilation of data from current and historical research. They historically occurred throughout coastal forests of Oregon and northern California. Researchers surveyed for marten during the 2014-2015 survey seasons, to confirm the persistence of historical populations and determine the limits of current distribution in the region (see range map, page 9). Researchers surveyed 348 sample units using a total of 72 track plates and 908 remote camera stations within an approximate 9,780 square-mile area. This study represented the largest carnivore survey conducted in Oregon at that time (Moriarty *et al.* 2015), but since then these surveys have expanded throughout the range of the marten.

The results of the study point to two distinct populations of Humboldt marten in Oregon (Moriarty *et al.* 2016): The central coast population, occurring only west of Highway 101, and the south coast population, possibly connected to populations in California (see range map, page 9).

Figure 4. Approximate Range of Marten in Oregon



Management hint:

The best way to help manage for healthy marten populations is to protect existing populations, re-establish populations in areas with suitable habitat, and improve habitat conditions for marten in areas near occupied territories.

- Pacific Marten
Martes caurina
- Humboldt marten
Martes caurina humboldtensis

Sources: Humboldt marten range from USFWS. Pacific marten range depicted from generalized elevation (>1500m) and forest cover (>40% canopy) masks and DataBasin watershed distribution information.

Habitat: Humboldt marten inhabit diverse forests, and appear dependent upon complex understories with heavy brush and high densities of down wood and other forest structure, for hunting and for cover from predators, and for dens and rest sites (Slauson *et al.* 2007). Suitable cover and den sites may include dense shrubs, down logs, mistletoe clumps, snags and trees with cavities (Kirkland 2016; USFWS 2015). Humboldt marten will generally avoid forest openings and thinned areas (Moriarty *et al.* 2016).

Diet: Humboldt marten will eat a variety of food and prey items, including fish, berries, birds, insects and amphibians, but their diet consists primarily of small mammals such as voles, squirrels and hares. Diets do vary by geographic region. Foraging is critical to the livelihood of marten; every day they need to forage between 17 and 29 percent of their body weight to survive (Gilbert *et al.* 2009).

Behavior: To meet caloric needs, marten forage daily, often switching between foraging and resting throughout the day. Recent research suggests that marten can travel long distances relative to their body size, in some cases traveling up to 16 miles a day (Moriarty *et al.* 2016).



Marten spend most of their time looking for food. Rest structures are crucial so they can recover between hunts.
Photo: Mark Linnell



Based on the number of marten detections and their movements, marten home ranges in coastal forests are small, and their range is limited when compared to known ranges of marten elsewhere. In addition, Humboldt marten are territorial and traverse their home range perimeter weekly (Moriarty *et al.* 2017).

Threats: Limiting factors to the Humboldt marten may include competition for food, rodenticides, and forest composition and configuration. Humboldt marten are also frequently subject to becoming roadkill as human development expands (Linnell *et al.* 2018).

Denning: Dens and rest sites are key to the survival of marten, as they act as a refuge from predators and weather. Marten live between 7 and 12 years in the wild (Derek Broman personal communication, June 2018). Breeding is from June to September, and kits are typically born from early April to mid-May.



Den and rest sites are key for the survival of marten. Photo: Matthew Delheimer

RESEARCH SPOTLIGHT:

Population Status and Viability Analysis of Humboldt Marten in Coastal Oregon (Linnell *et al.* 2018)

Research continues to deepen our understanding of current populations of Humboldt marten in Oregon. Researchers used GPS telemetry, remote cameras and other methods to estimate home range sizes, density and population size of marten

within the current extent of the central coast Oregon population in the Oregon Dunes National Recreation Area. Researchers believe the biggest threat to Humboldt marten in coastal Oregon is the small population size.

Figure 5. Humboldt marten study area



3.2.2 Case Study: Humboldt marten on a managed forest landscape

Green Diamond Resource Company (Green Diamond) has been studying Humboldt marten on their lands in California. Humboldt marten were historically found throughout northern coastal California. They were thought to be extirpated from their range, but a remnant population was rediscovered in 1996 on the Six Rivers National Forest (Figure 5). Green Diamond owns and manages approximately 360,000 acres of industrial timberlands to the west of the remnant population in coastal northern California. Green Diamond ownership in this area is managed in even-aged stands, with a rotation age ranging from 45 to 60 years. This managed landscape comprises second- and third-growth forests.

Marten were not present in the early 1990s on the managed forests owned by Green Diamond (according to their track plate surveys), but started showing up in the early 2000s. Beginning in 2004, Green Diamond's camera traps discovered marten in two of their watersheds. Green Diamond continues to study this marten population to refine their understanding of Humboldt marten habitat use in managed forests. Most recent study efforts included camera traps and live



trapping. Marten were trapped from fall 2012 through fall 2015. In total they captured 33 individuals (18 males and 15 females). Of those, 24 were radio-marked (13 males and 11 females). Captured marten were measured, weighed, tagged and released. Additional unmarked individuals were detected in the study area. Over the study period, researchers recorded more than 2,000 telemetry locations, with a total of 125 resting sites and 33 dens. Rest structures on the managed forest included live trees, snags, slash piles, hollow logs and rock piles.

This study confirmed that marten tend to den in late winter/early spring, with the earliest kit documented on April 9. Green Diamond found that the den structures used were mostly live trees. However, snags, log and rock piles, artificial rest boxes and in-ground dens were also used. Additionally, the dens were almost always located in a cavity.

The live-tree characteristics that were consistent among the resting sites and dens showed that marten typically use large-diameter live trees. The average den tree was about 3 feet diameter at breast height (DBH). Additionally, these trees had broken or dead tops, large limbs, complex branching, basal hollows and multiple cavities. This shows the importance of maintaining large legacy trees where they exist, as leave trees, across the landscape throughout the cycle of forest management. Marten will use these structures in an otherwise relatively young stand.

Researchers plan to continue monitoring radio-marked individuals, mark new individuals, continue to collect rest and den site information, and continue to collect vegetation plot data at rest and den sites, to examine habitat characteristics. Future research may also include “use versus availability” studies on rest/den structures, including the use of slash piles as denning/rest sites. Researchers suggest everything they are learning about marten habitat in managed forests can be used to inform managers about how to help conserve marten on private lands.

Above: Large live wildlife trees like this one in the case study provide maternal dens sites for marten.

Left: Close-up of maternal den site.
Photos: Max Marquez

What does this mean for managing working forests?

Retaining large-diameter live trees where they exist, as leave trees, slash piles and legacy structures throughout timber harvests, is important for many wildlife species but may be critical for marten.



Photo: Mark Linnell



4.0 Current management recommendations for fisher and Humboldt marten

Despite an incomplete understanding of the effects of forest management on fisher and marten populations in Oregon, there are many opportunities for forest land managers to help develop and maintain suitable habitat for these species. We recommend the following options for a land manager interested in fisher and marten conservation:

- Maintain existing snags, logs and live legacy trees across the landscape. Large-diameter trees with complex structure (broken or dead tops, large limbs, complex branching, basal hollows and multiple cavities) are especially important to consider as leave trees.
- Strategically leave or create large slash piles near mature stands of timber, for rest sites and dens.
- Grow wildlife leave trees to maturity, to recruit the next generation of legacy trees and logs.
- Maintain mast and fruit-bearing trees and shrubs across the landscape, to help grow the prey base and provide food sources.
- Implement fuel-reduction projects with caution and strive to retain a mixture of conditions across the landscape, since fisher are often found resting and denning in mature stands that have dense understory vegetation and abundant ladder fuels.
- Consider installing game cameras, and report findings to current carnivore researchers if fisher or marten are detected. Also report if dead or injured fisher or marten are found on your property.
- Protect known populations by implementing voluntary timing restrictions during the denning season, and/or habitat buffers around known dens.
- Focus habitat improvements (retention of slash piles, legacy structures and large-diameter live trees) near or adjacent to known population sites, to encourage range expansion of the species.
- Limit rodenticide use.
- Restrict animal-control activities near occupied den sites.
- Consider enrolling in a Candidate Conservation Agreement with Assurances (CCAA) for fisher (See section 5 for more information).
- Consider cooperating with research organizations by allowing research and monitoring activities on your property, and stay informed on carnivore research.

Downed wood and slash around ground-based den sites are especially important as fisher and marten kits become mobile and too big for adults to move into tree den sites. Note the complex cover around the fisher kit in this photo.

Photo: Caylen Kelsey



5.0 Candidate Conservation Agreement with Assurances for the fisher in Oregon

The Candidate Conservation Agreement with Assurances, or CCAA, gives private landowners the opportunity to manage their lands proactively for fisher. In exchange for removing or reducing threats to fisher, enrolled landowners gain benefits in the form of an assurance from the U.S. Fish and Wildlife Service; this assurance states that if the fisher becomes listed as threatened or endangered in the future, the landowner will not be required to adhere to any further regulations as long as the CCAA remains in place and is being fully implemented. The goal of the CCAA is to both conserve and contribute to the recovery of fisher in Oregon, and to alleviate landowner uncertainty for future potential regulations. The objectives are intended to eliminate, reduce or minimize threats to the species in Oregon. To promote consistency and encourage enrollment in the CCAA, the USFWS drafted a template CCAA for Oregon that landowners can opt to join. The goals of the CCAA include the following:



- Gain knowledge about fisher demographics and responses to forest management activities.
- Promote conservation measures that reduce harm to fisher and their habitat.
- Provide a program of proactive recovery efforts.
- Assure enrolled landowners they will not have to hold the responsibility of implementing additional conservation methods.

CCAs are expected to benefit fisher in the following ways:

- Expand our knowledge of fisher distribution and interaction with existing populations.
- Aid in acquiring more accurate information on fisher densities.
- Better understand how fisher respond to vegetation control.
- Protect known fisher and their offspring.
- Facilitate cooperation and collaboration among enrolled landowners.

For more information or to enroll in a CCAA, visit the USFWS website:

<https://www.fws.gov/oregonfwo/Documents/CCAA/FinalFisherCCAA.pdf>.

Leaving existing snags on the landscape helps fisher and marten, as well as many other species.

Photo: Sean Matthews



6.0 Summary

Forest carnivores play an important role in the ecosystems they inhabit, and are at risk of being listed as threatened or endangered, making them species of extreme interest.

Fisher and Humboldt marten in Oregon have been considered for listing under the federal ESA. When species become listed under the ESA, their habitat (in this case, forests) may become regulated, and forest landowners may be limited in their ability to actively manage their forest, depending on rules that are implemented. Landowners and managers of forests and wildlife agree that healthy forests and healthy wildlife populations are a common goal. Landowners and managers in Oregon play an important and unique role for carnivore conservation. Landowners can do the following:

- Monitor their own land for the presence of forest carnivores. They can share these results with researchers or agencies to help build the knowledge base of where and when forest carnivores occur.
- Cooperate with existing research efforts by allowing access or partnering with research teams.
- Know if the land they manage is currently in the known range of the fisher or Humboldt marten, and coordinate with neighbors about carnivore conservation.
- Retain legacy structure and provide other habitat features important for carnivores.
- Consider enrolling in a conservation agreement.

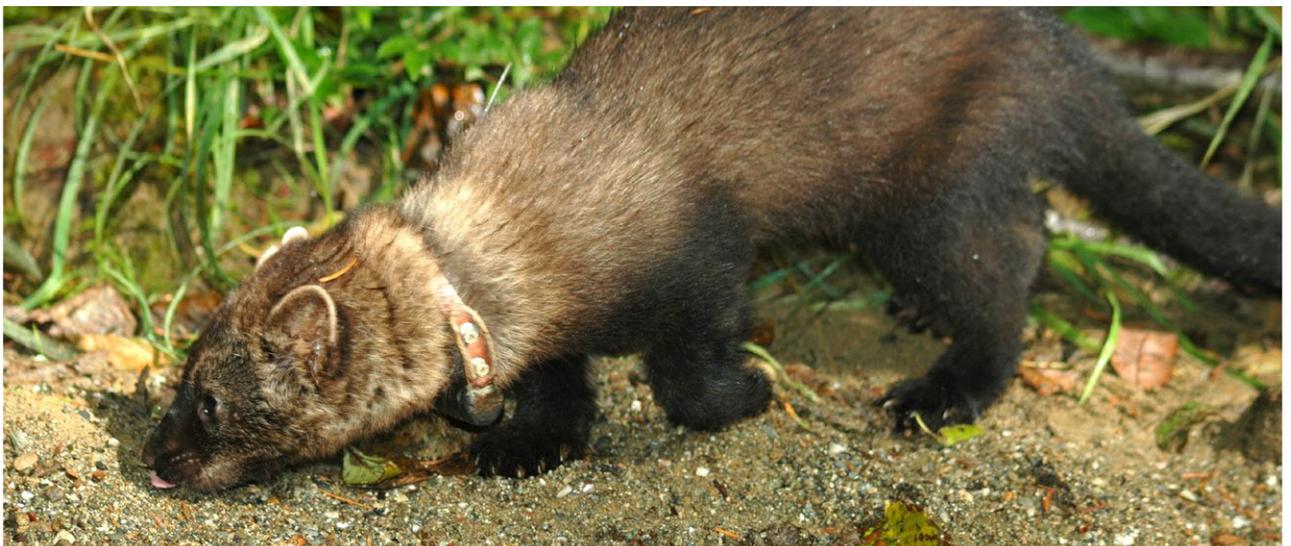


Research is ongoing for the marten. Researchers use live traps like this one to learn more about marten behavior.
Photo: Sean Matthews.

7.0 Resources

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Radio-collared fisher sniffing – likely looking for food.
Photo: Mark Higley



Oregon Forest Resources Institute

Oregon Forest Resources Institute
317 SW Sixth Ave., Suite 400
Portland, OR 97204
971-673-2944

OregonForests.org

Julie Woodward, Senior Manager of Forestry Education

Mike Cloughesy, Director of Forestry

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