

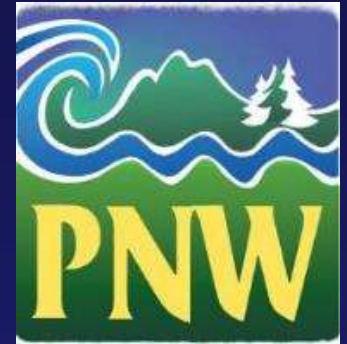


# Marten Update in Oregon

**Katie Moriarty**

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<sup>1</sup>Postdoctoral Research Wildlife Biologist, Pacific Northwest Research Station  
Certified Wildlife Biologist<sup>®</sup>



Mark Linnell, Taal Levi, Charlotte Eriksson, Matt Delheimer, Jake Verschuyf

Oregon Forest Resources Institute; Albany, OR

19 October 2017



# Carnivores are Captivating

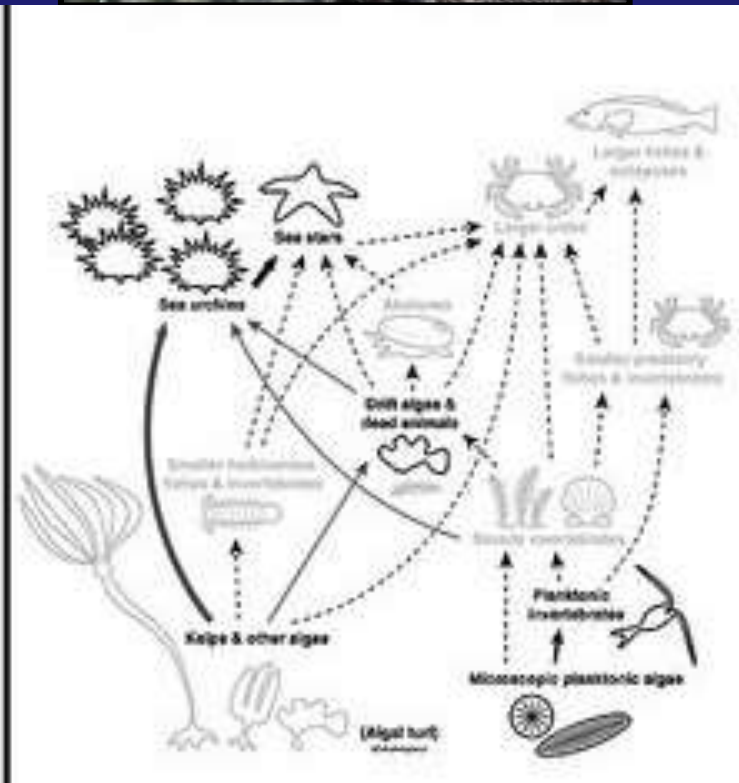
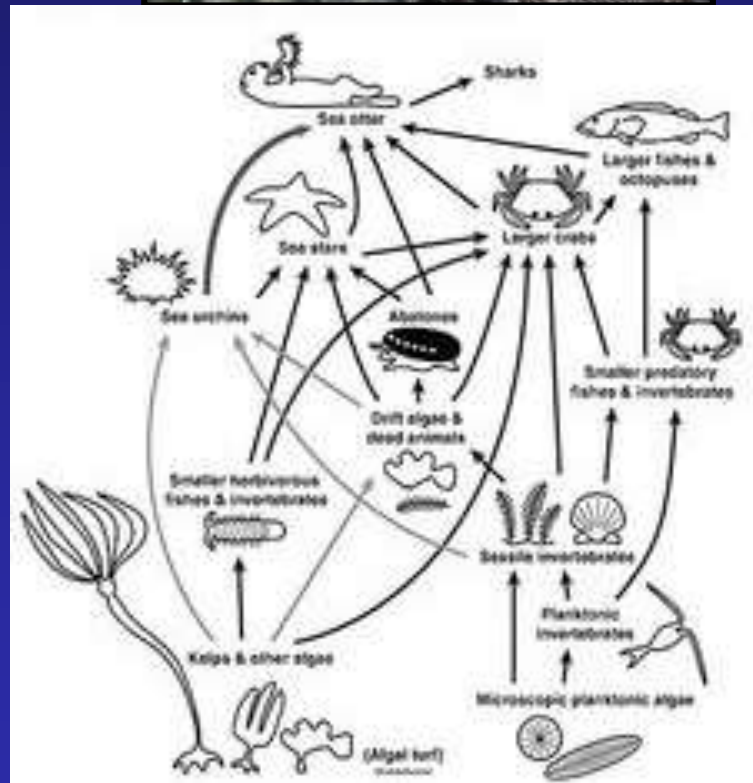


# Carnivores ↑ ecosystem resilience and biodiversity

Sea otter present



Sea otter absent



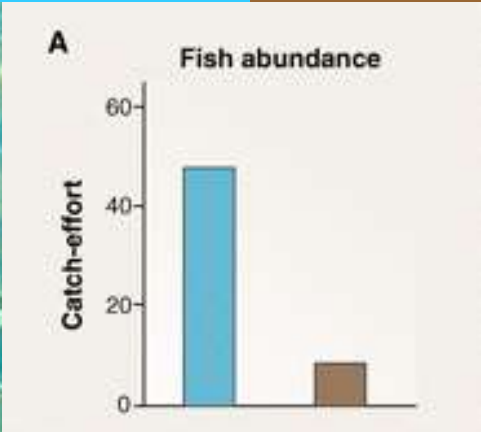


Estes et al. (2011) Science

Joseph Dougherty

# Otter Present

# Otter Absent

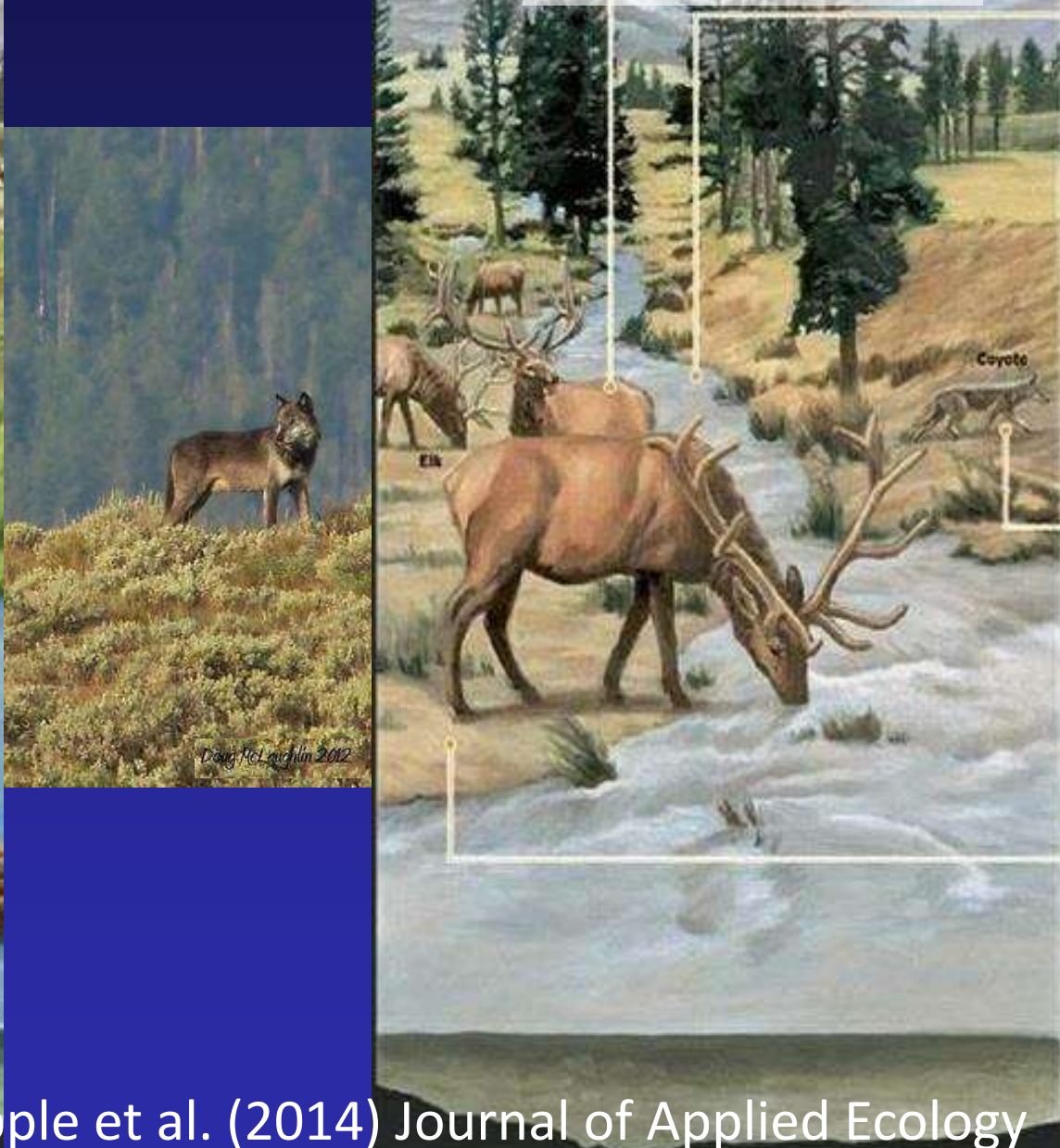


**Fish ~5 times more prevalent**

# Wolf Present



# Wolf Absent



Ripple et al. (2014) Journal of Applied Ecology

# PNW forest carnivores of potential interest



Wolverine



Fisher



Marten

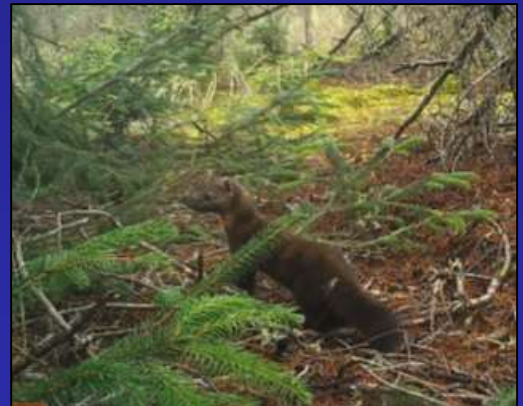


Red fox



Lynx

Rare, potentially declining or imperiled  
Often solitary, elusive, hard to study



# Quick comparison...



Marten



Spotted Owl

Weight

600-1300g

~600g

Sexual maturity

2 years

1 year (2-5 years)

Annual offspring

1-2

1-3

Critical reproductive

Feb - Sep

Feb - Jun

Mating system

Polygamous

Monogamous

Adult survival

53-63%

63-89%

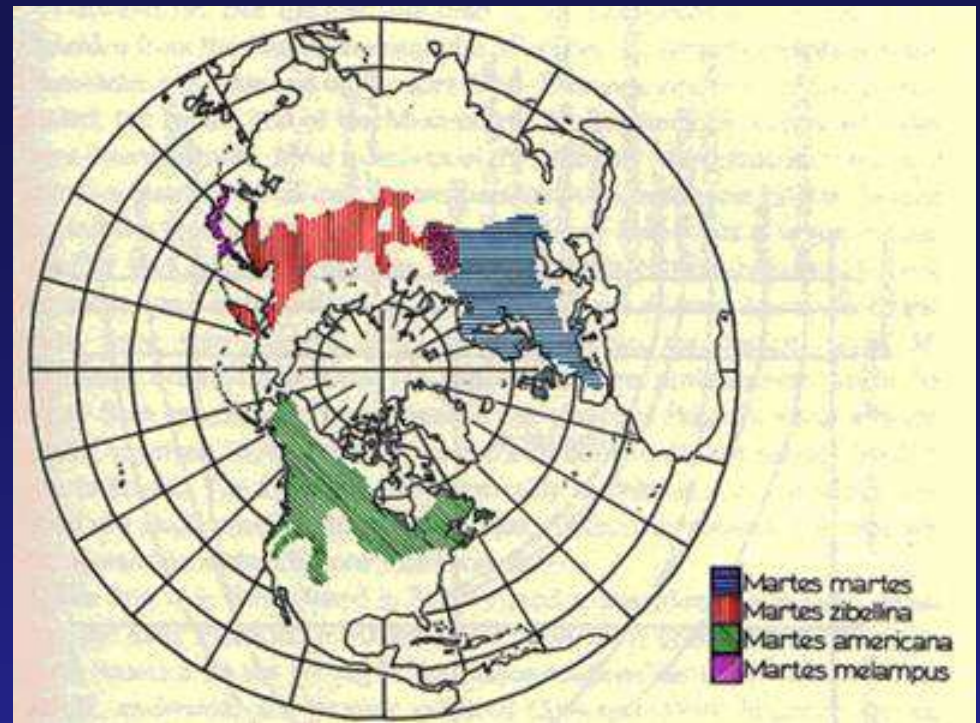
Life expectancy

7-8 years

16+ years



# Pacific marten



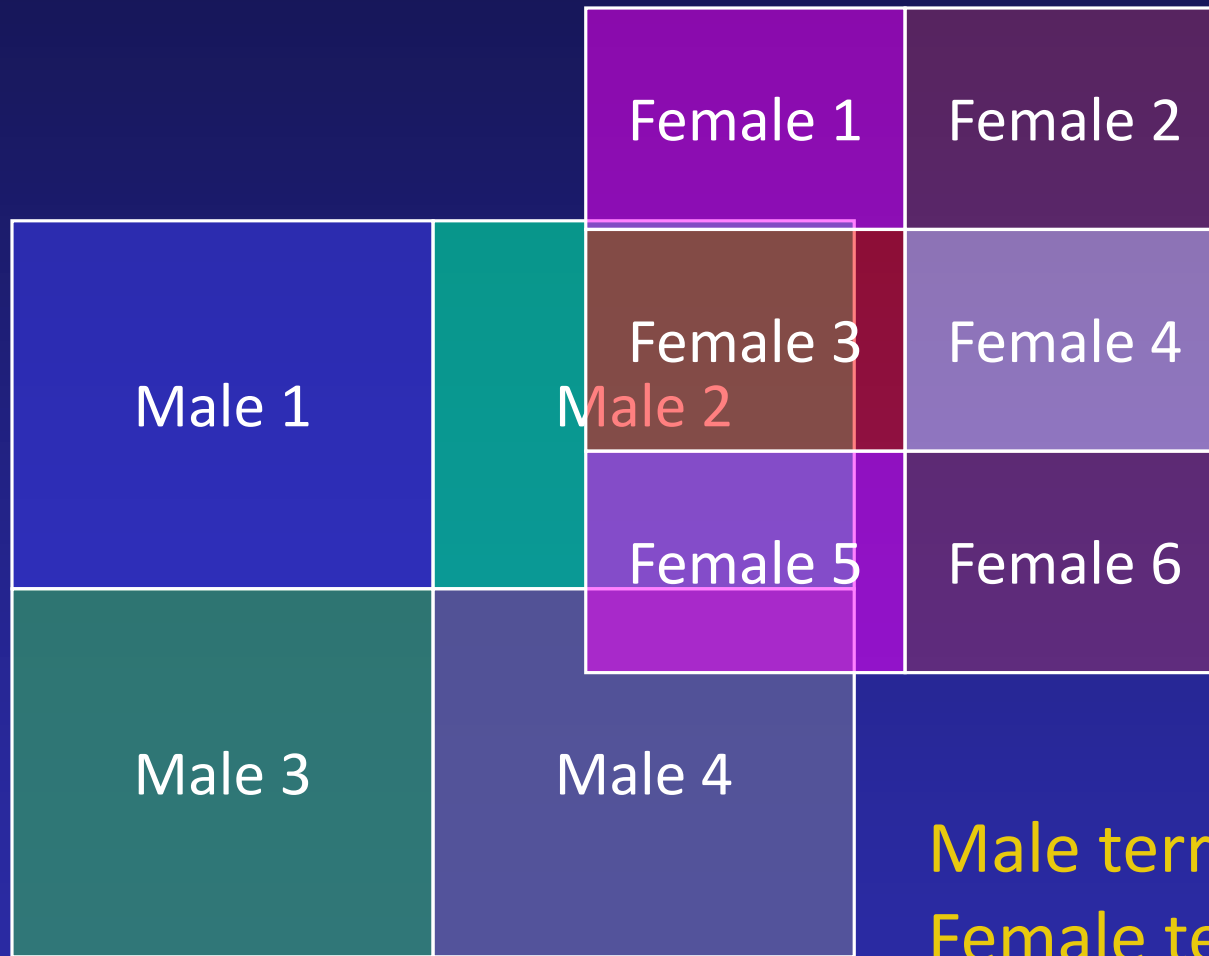
- Boreal ecotypes
- “K” selected



# R&D: Marten ecology – movement – activity

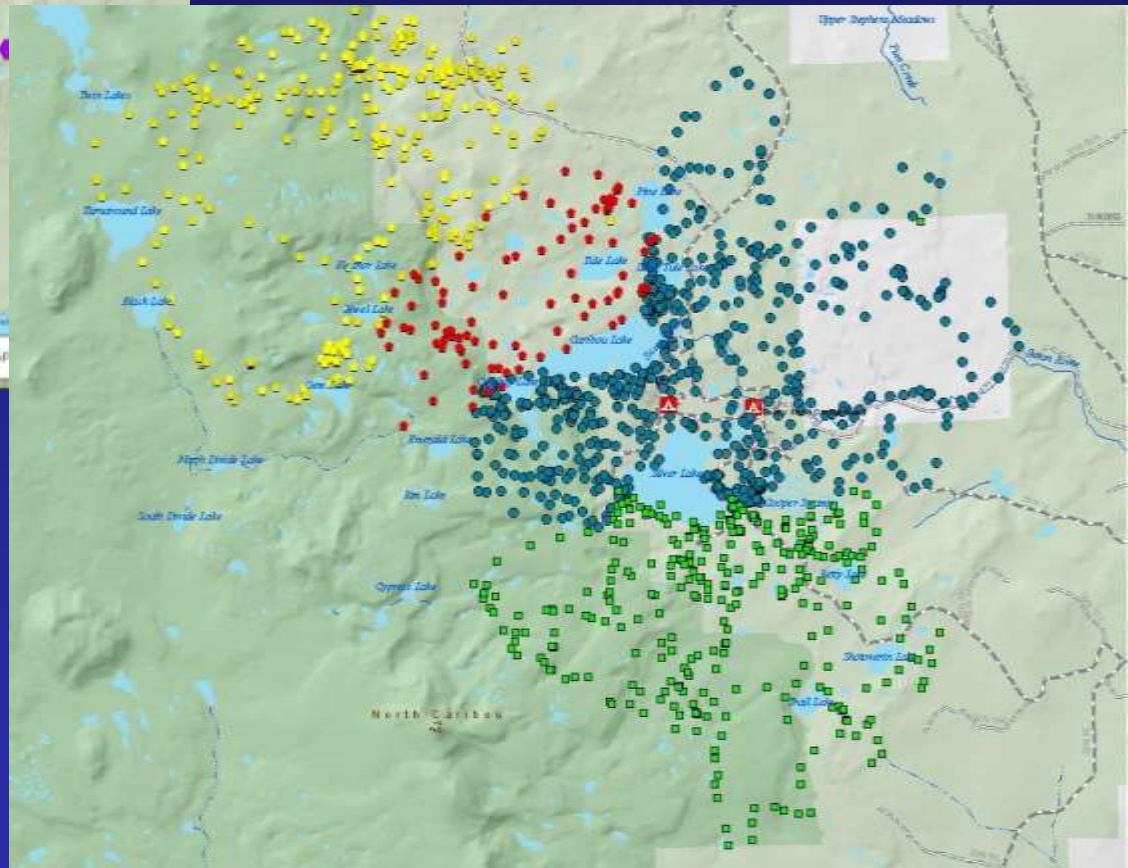
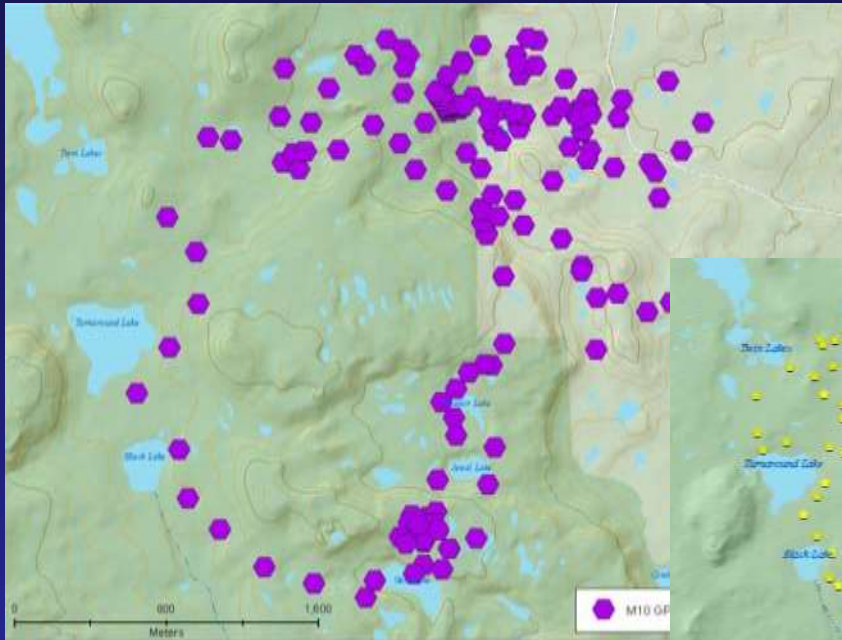


# Territoriality



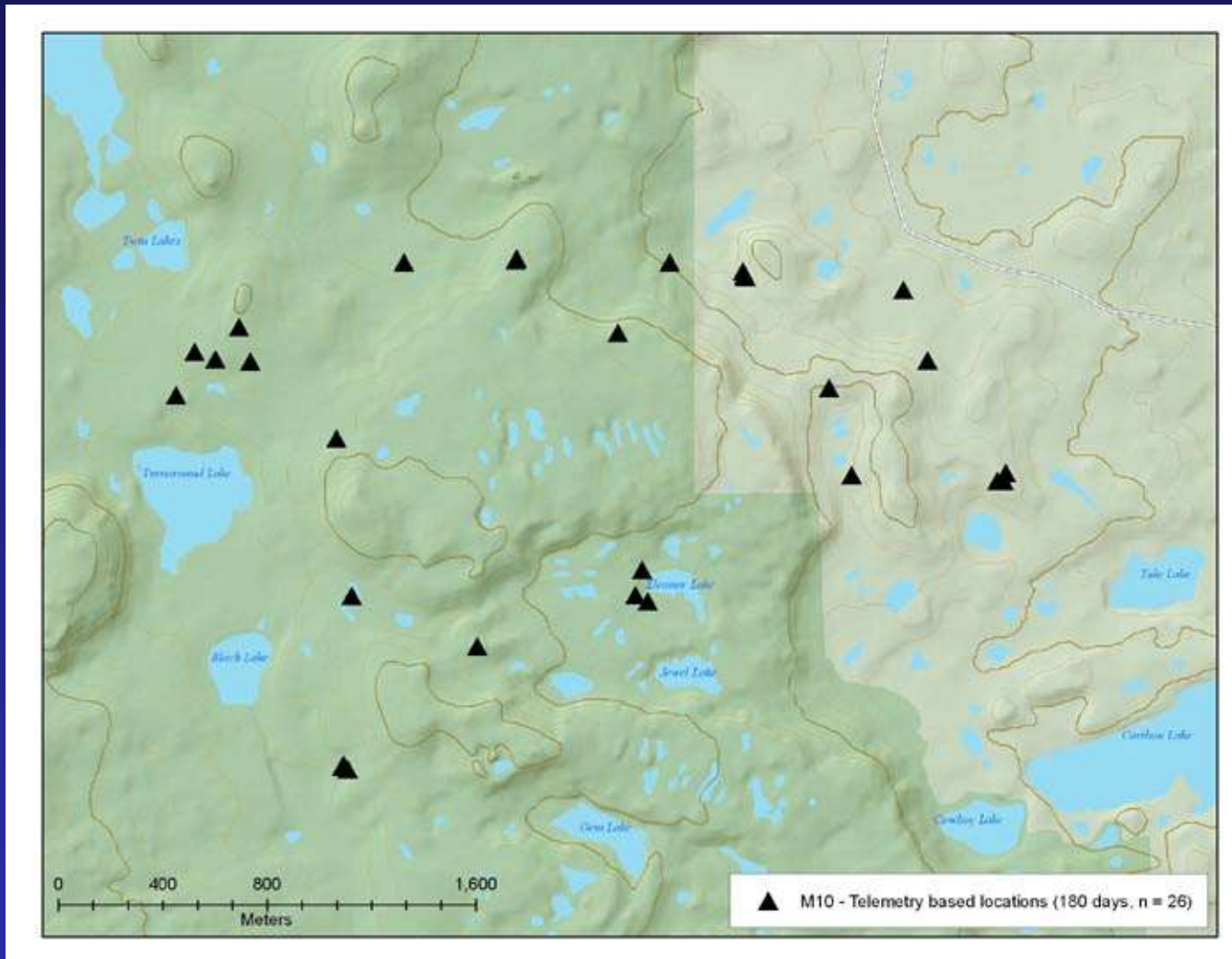
Male territory =  $\sim 12 \text{ km}^2$   
Female territory =  $\sim 6 \text{ km}^2$

# Movement: first use of GPS collars globally

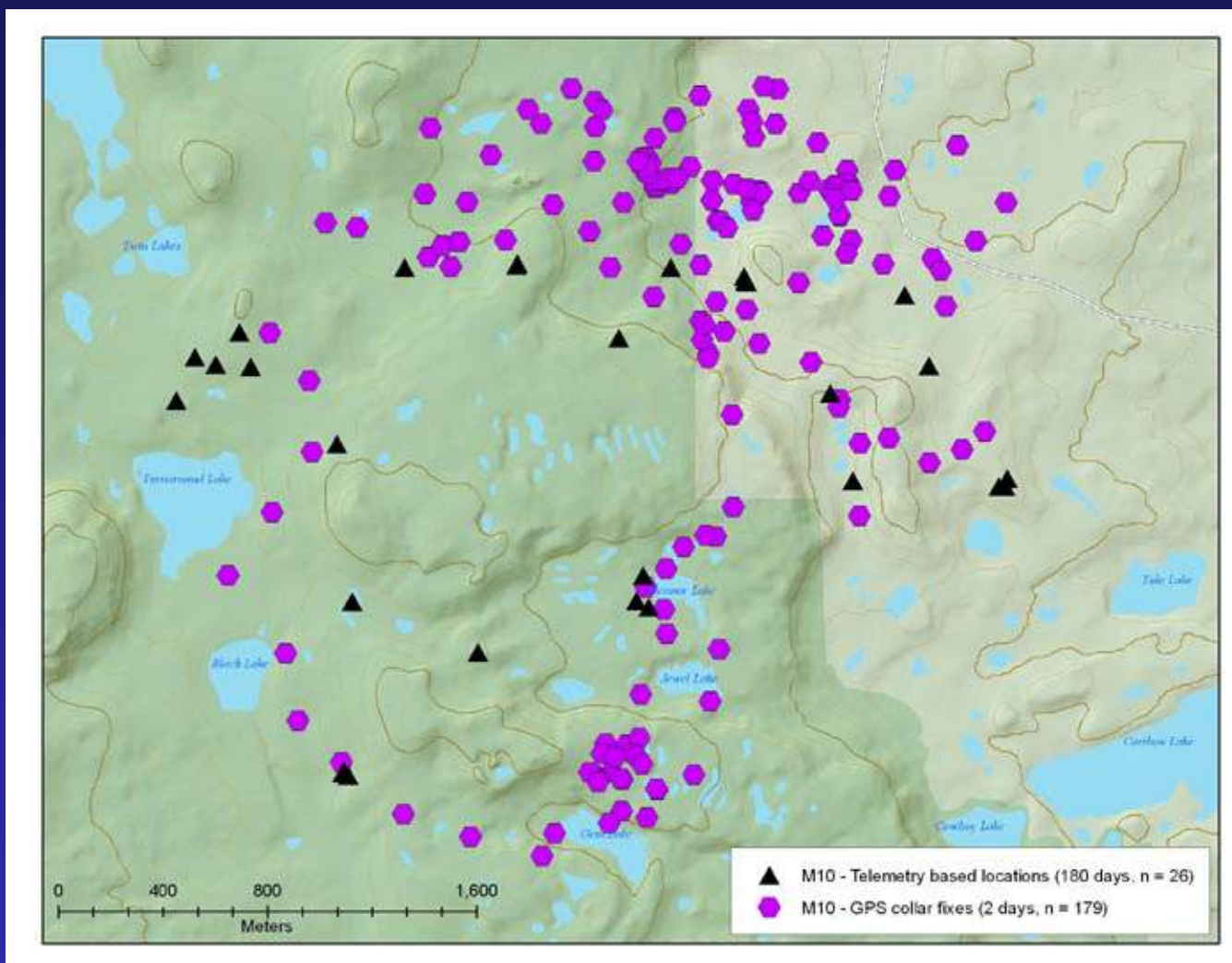


Moriarty et al. 2016. Journal of Wildlife Management

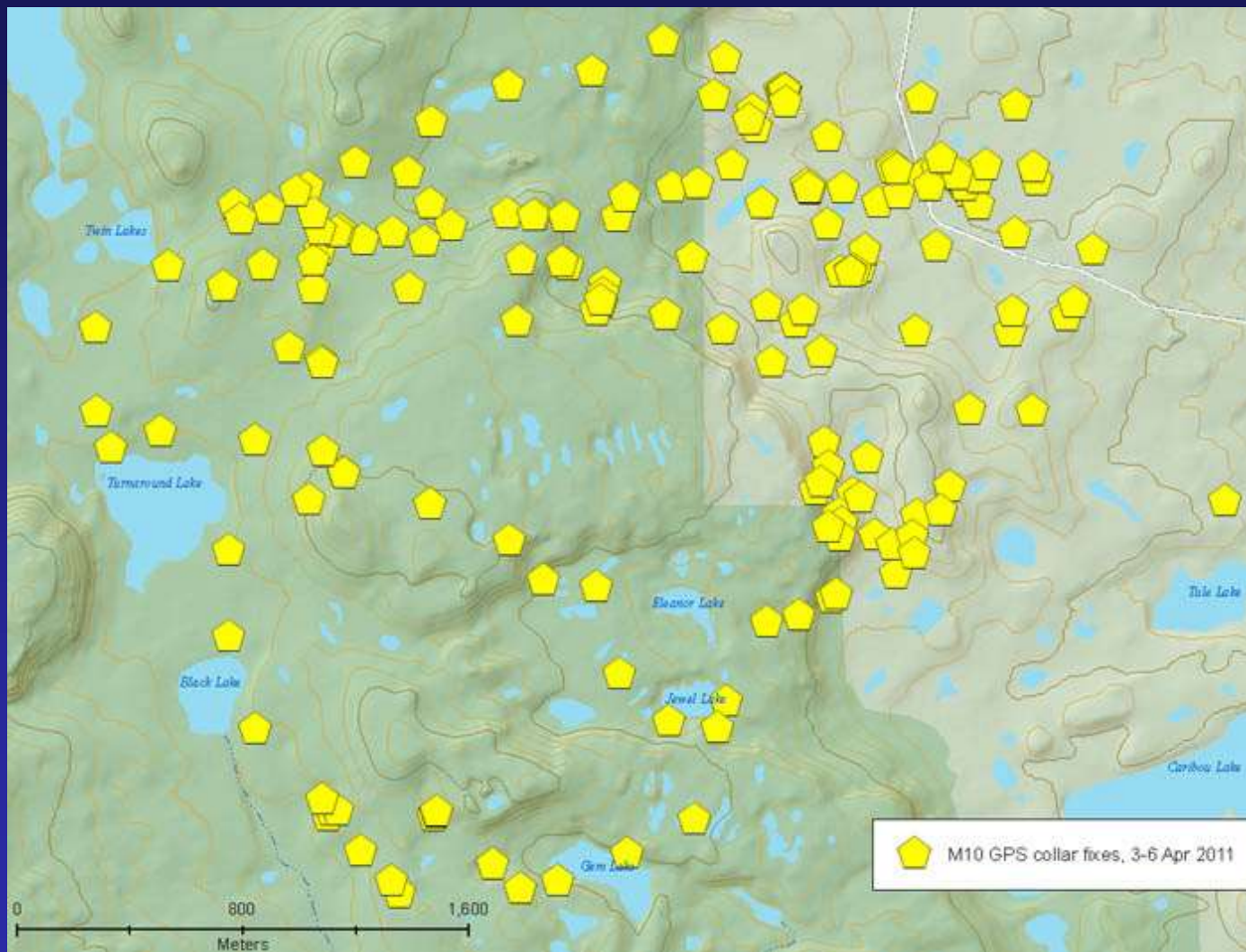
# VHF telemetry based locations, n = 26 in 6 months



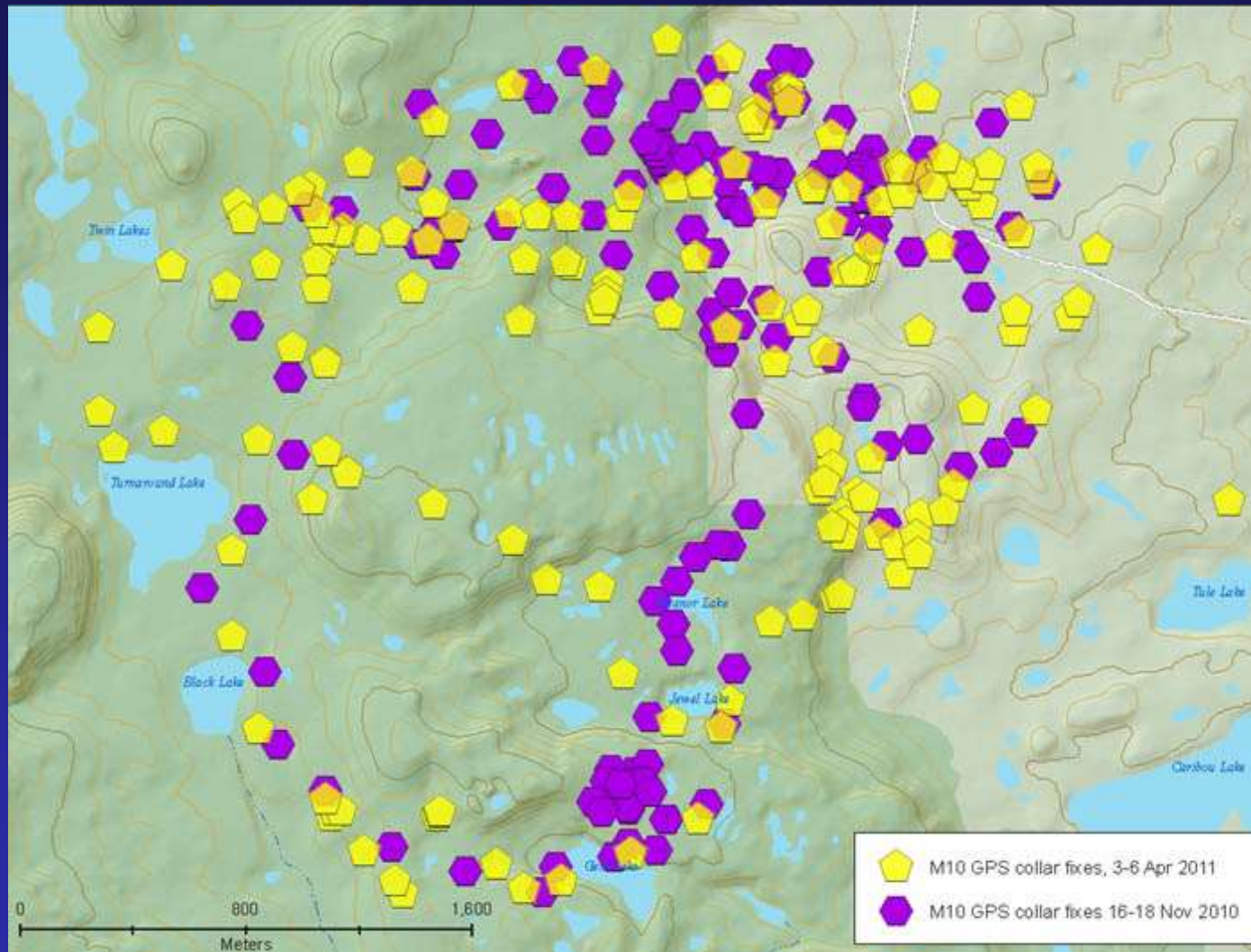
# GPS collar fixes, 16-18 Nov 2010, n = 179, 2 days



# GPS collar fixes, 03-06 Apr 2011, ~3 days

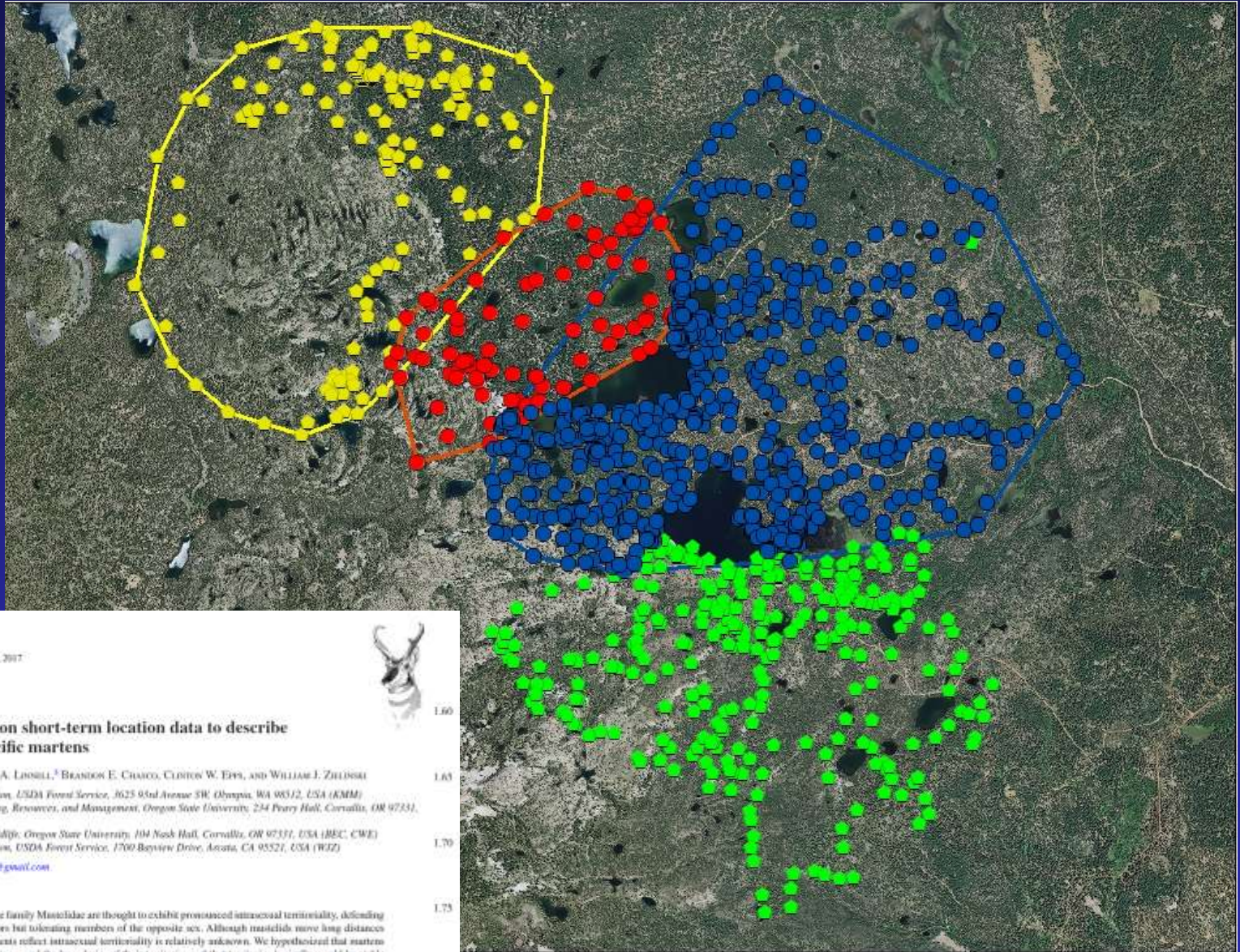


# GPS collar fixes, Nov and Apr (both seasons)





# Territorial defense/maintenance – 4 males



**JM**  
Journal of Mammalogy, vol. 88, no. 1, 2017  
DOI: 10.1093/mamm/88.1.164

**1.5** Using high-resolution short-term location data to describe territoriality in Pacific martens **1.60**

**1.10** KATE M. MORIARTY,<sup>1,2</sup> MARK A. LINDSEY,<sup>2</sup> BRANDON E. CHAIOS, CLIFTON W. EPPS, AND WILLIAM J. ZIEGLER **1.65**

<sup>1</sup>Pacific Northwest Research Station, USDA Forest Service, 3625 95th Avenue SW, Olympia, WA 98512, USA (KMM);  
Department of Forest Engineering, Resources, and Management, Oregon State University, 24 Peary Hall, Corvallis, OR 97331,  
USA (MAL)

<sup>2</sup>Department of Fisheries and Wildlife, Oregon State University, 104 Nosh Hall, Corvallis, OR 97331, USA (BEC, CWE)

**1.13** Pacific Southwest Research Station, USDA Forest Service, 1700 Bayview Drive, Arcata, CA 95521, USA (WJZ) **1.70**

\* Correspondent: kmoriarty22@gmail.com  
† Co-lead authors.

**1.20** Solitary carnivores in the family Mustelidae are thought to exhibit pronounced intrasexual territoriality, defending space against competitors but tolerating members of the opposite sex. Although mustelids move long distances daily, how such movements reflect intrasexual territoriality is relatively unknown. We hypothesized that martens **1.75**

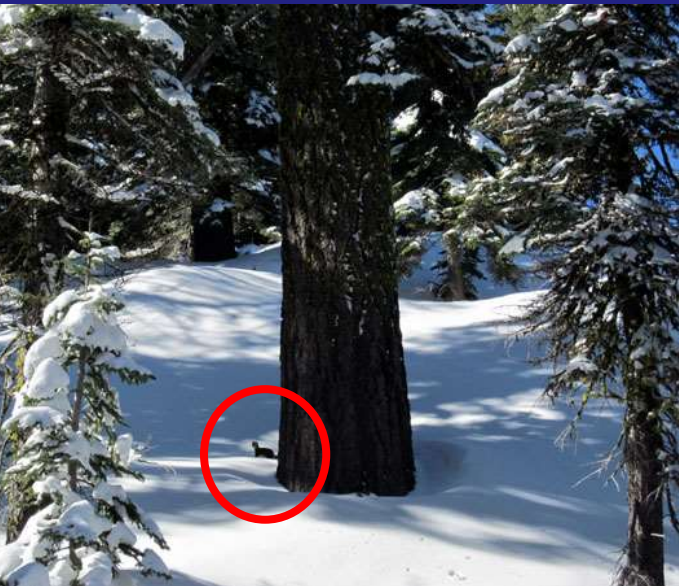
## Territorial movements are remarkable



# Habitat specialist: cavity denning obligate

Resting location provide elements key to survival:

- Refugia from predators
- temperature extremes
- precipitation



Ave = 36" DBH  
> 400 years old

Moriarty et al. (In review), Slauson and Zielinski 2009. Northwest Science

# Dietary generalist (winter likely limiting)



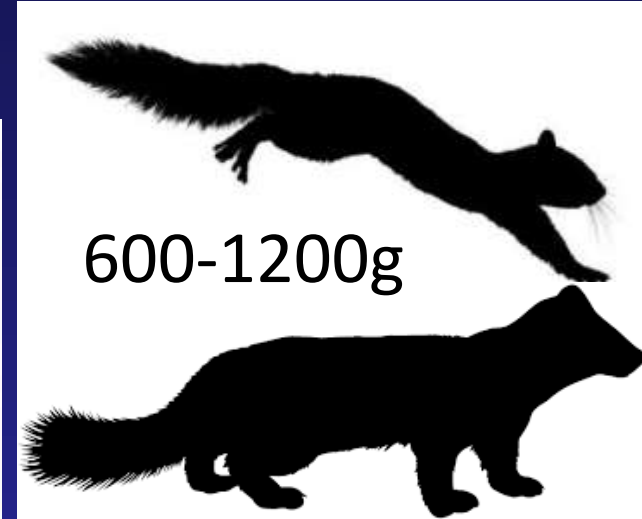
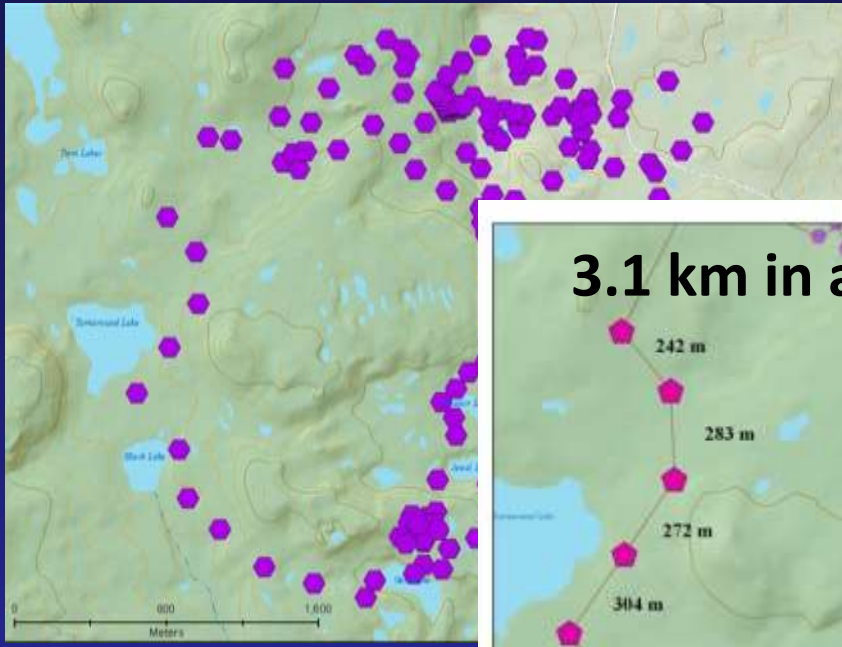
# Foraging: 17-29% of their body weight daily



Gilbert et al. 2009. American Midland Naturalist

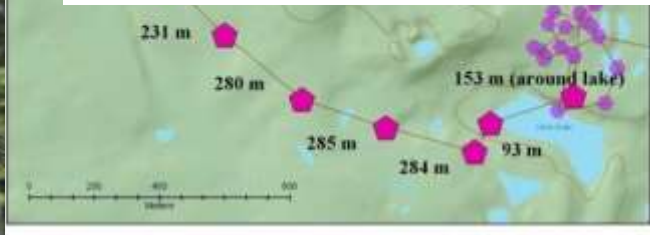
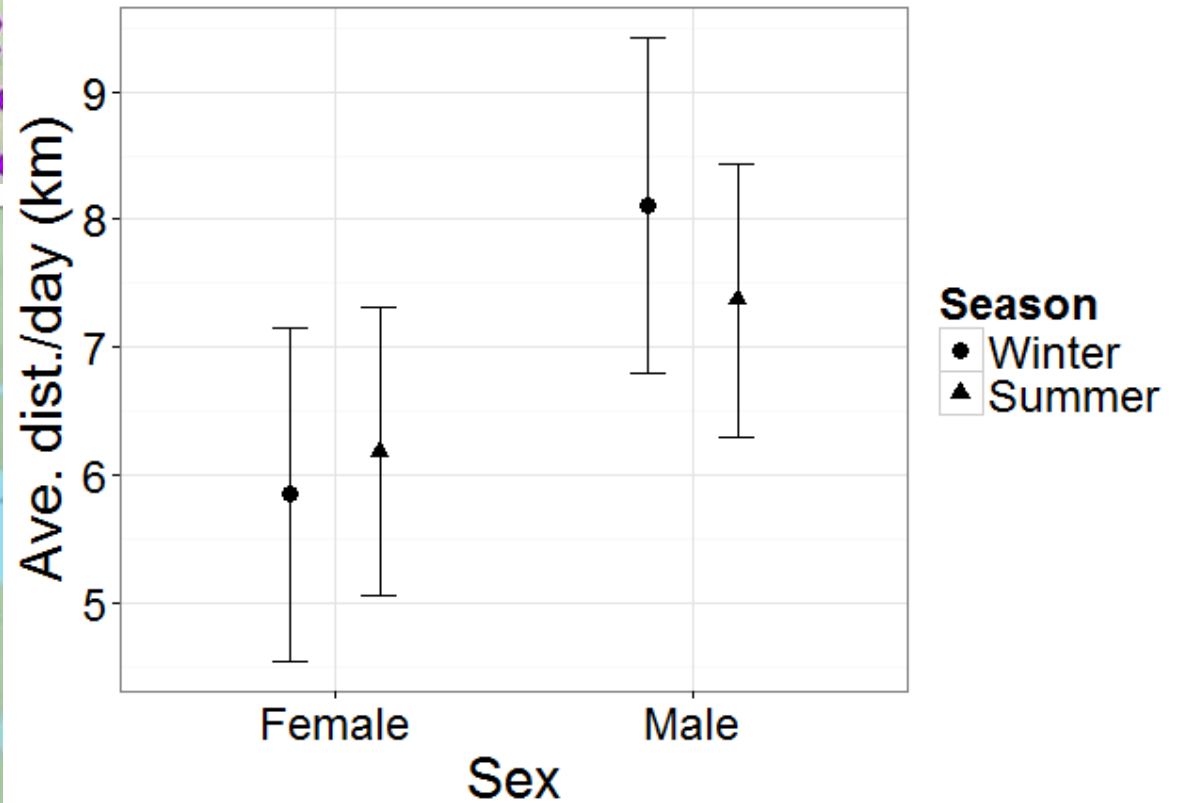


# Lots of movement, high metabolism



Longest Daily Distance  
Female ~ 11km  
Male ~ 27km

# Lots of movement, high metabolism



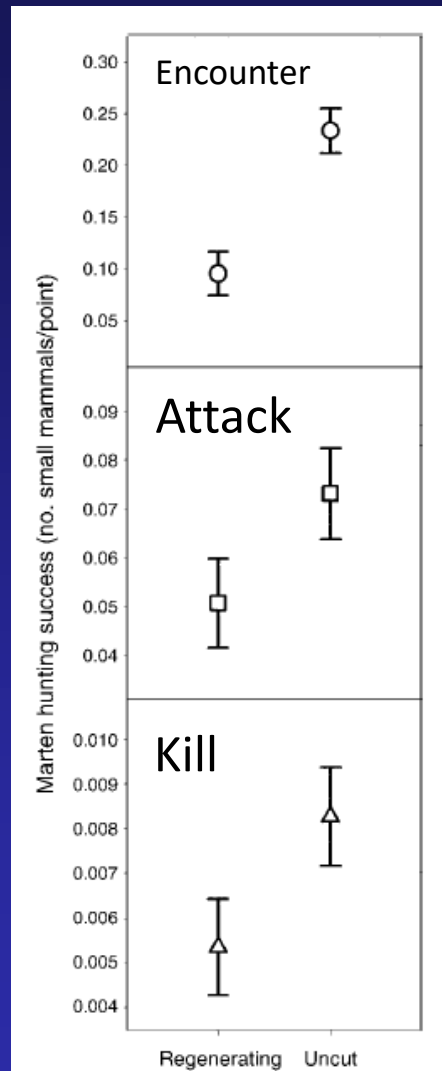
Longest Daily Distance  
Female ~ 11km  
Male ~ 27km



# Foraging – complex understory structure



USFS, PSW, Slauson



USFS, PSW, Slauson

# Foraging – complex understory structure



Recher 03-08-2015 08:20:15

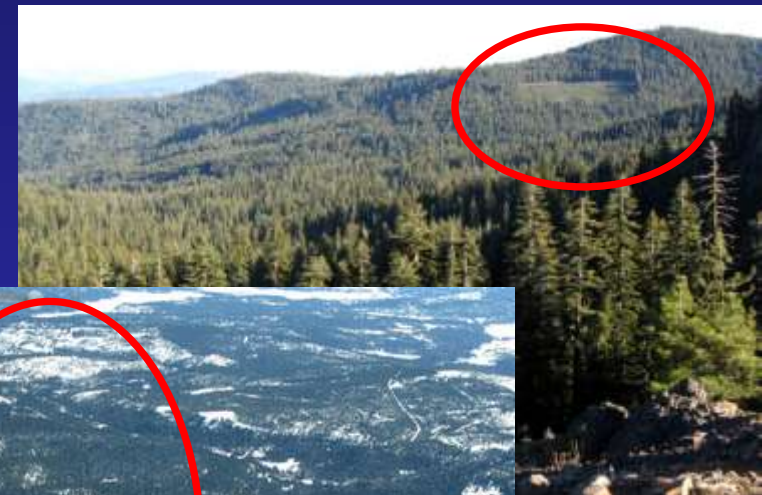
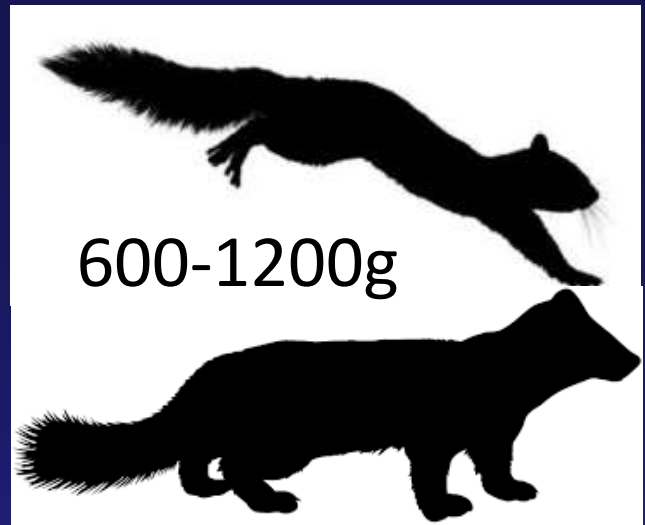


# Avoid thinned & open stands – predation risk?



Odds detection **1283 x less likely** in open (even 10m)  
**96 x less likely** in thinned stand

# Survival: the cutting edge



Larry Ostby



# Multiple spatial scales within a forest





# Marten declines in coastal Pacific Northwest

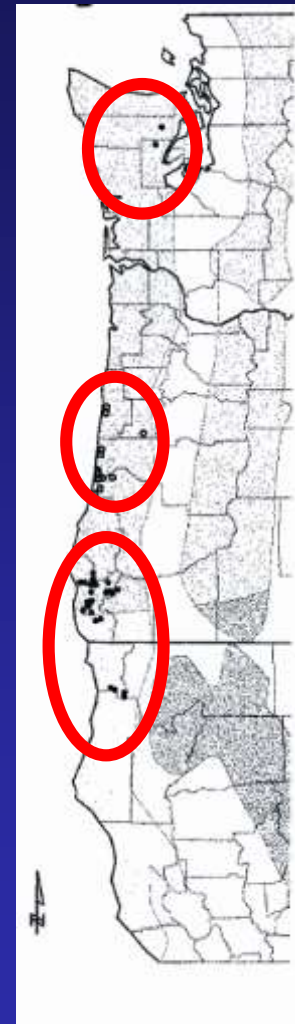
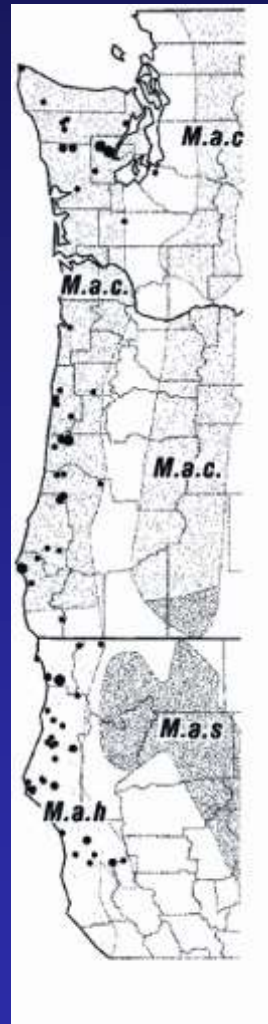
Historical  
Distribution

Contemporary  
Distribution

*Washington*

*Oregon*

*California*



# Pacific marten in coastal Oregon: 26 locations (Jan 2014)

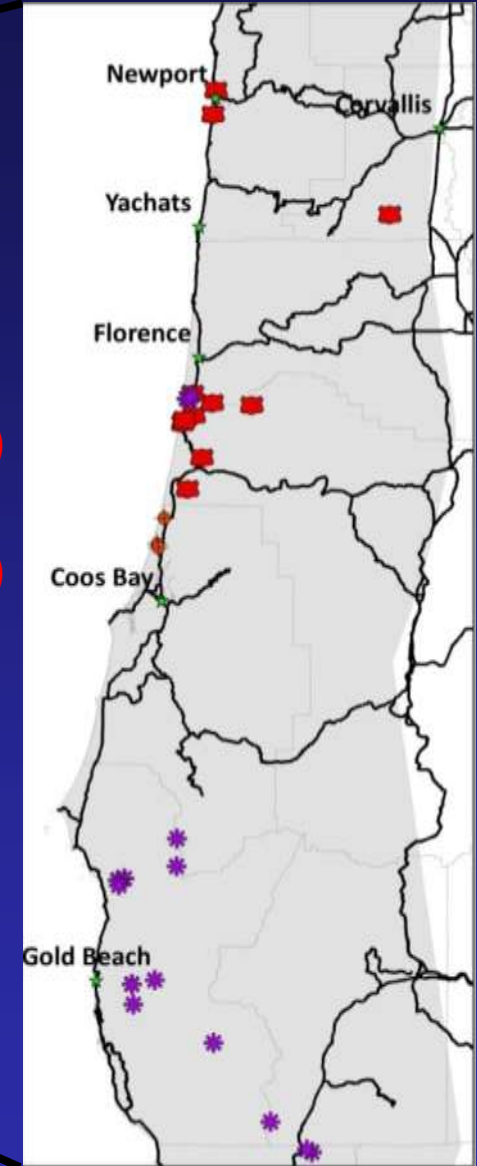


## Central Coast

- 14 roadkill (1985-2013)
- 3 trapped (2011-2013)

## South Coast

- 9 detections (~2000)

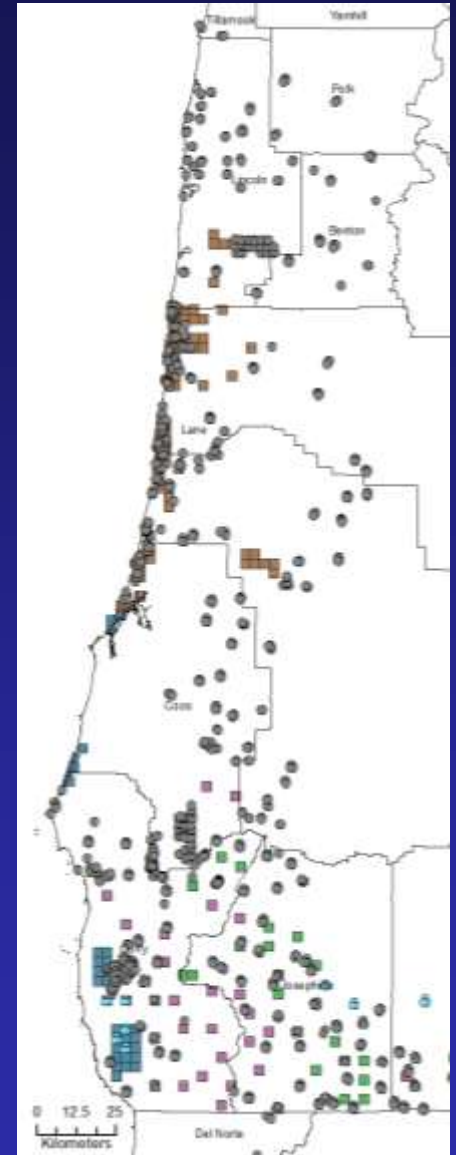




# 2014-2017: 1348 stations (503 sample units)



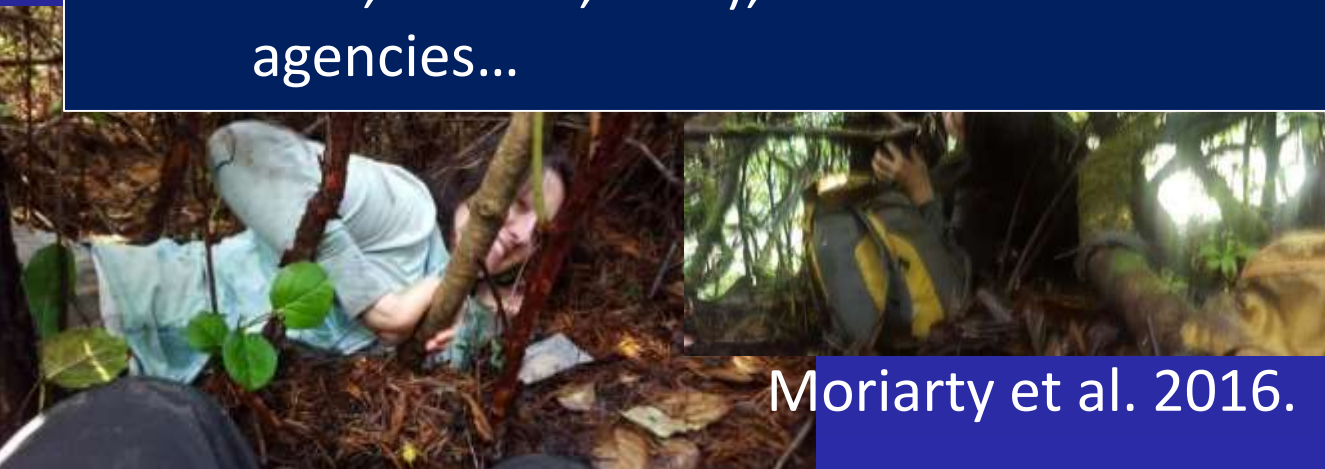
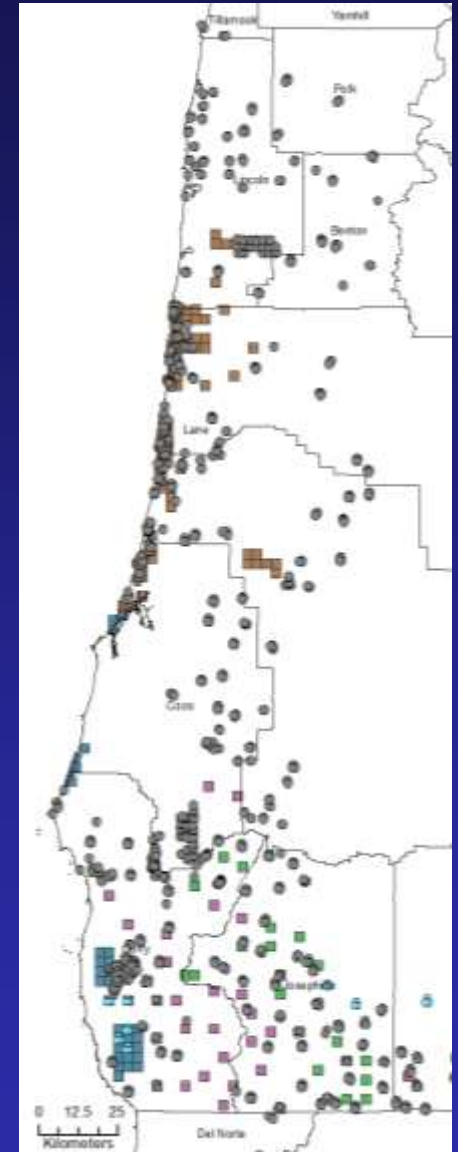
00-03-2015 13:28:23



Moriarty et al. 2016. Northwest Naturalist

# 2014-2017: 1348 stations (503 sample units)

- **7 field teams** (5 agencies)
  - OSU, Plum Creek, Hancock, ODF, Siletz Indian Confederation
- **Surveys on 10 ownerships**
  - USFS, BLM, State, Plum Creek, Hancock, Weyerhaeuser, Siletz Tribal, Roseburg, Lone Rock, Starker
- **10 funding agencies and donations**
  - E.g., vehicles from 4 agencies (USFS, OSU, USFWS, BLM); cameras from 6 agencies...



# New opportunities for surveying



# Scent detection dog teams?

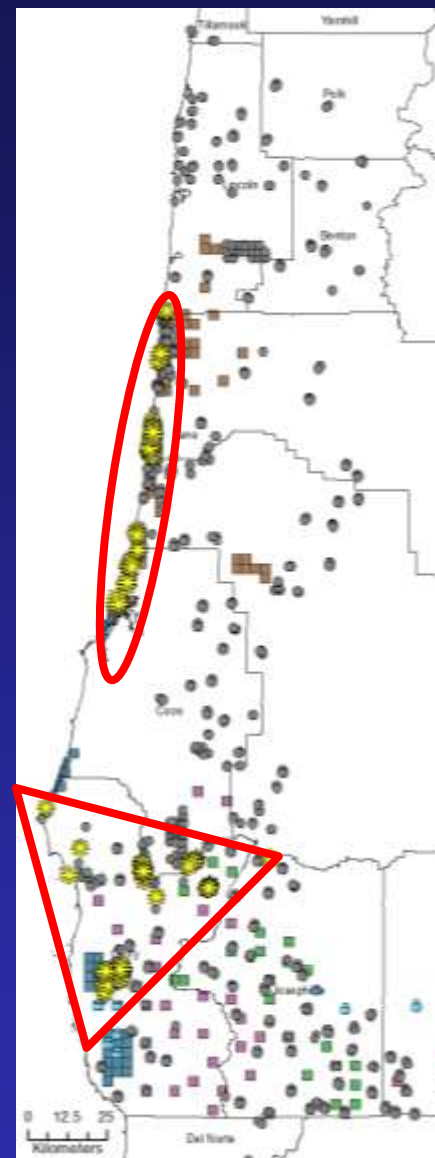


- Marten - target
- Fisher – target
- Red fox - target
- Porcupine – fisher prey
- Mountain lion - predator
- Bobcat - predator

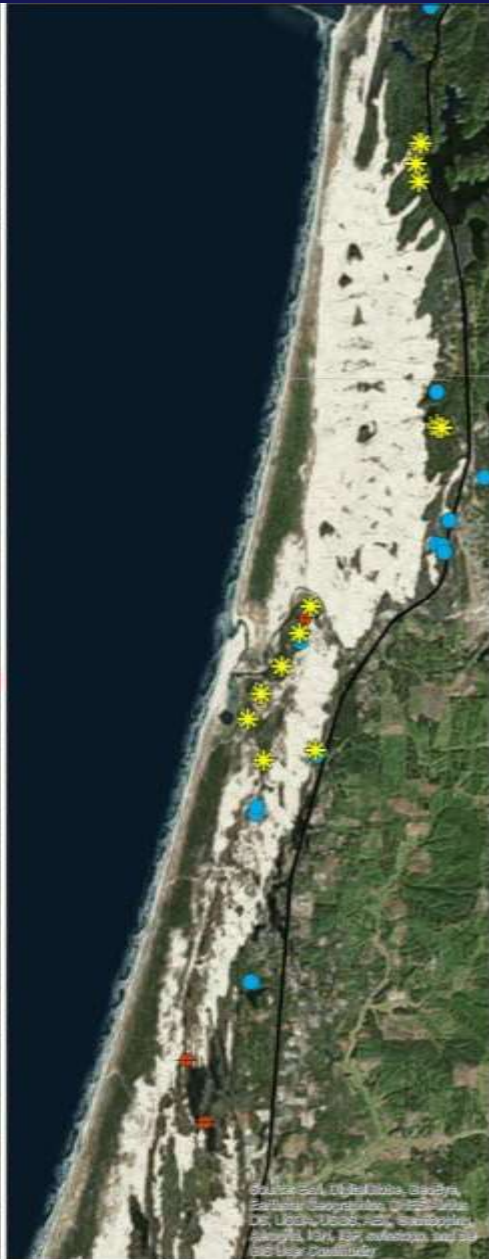
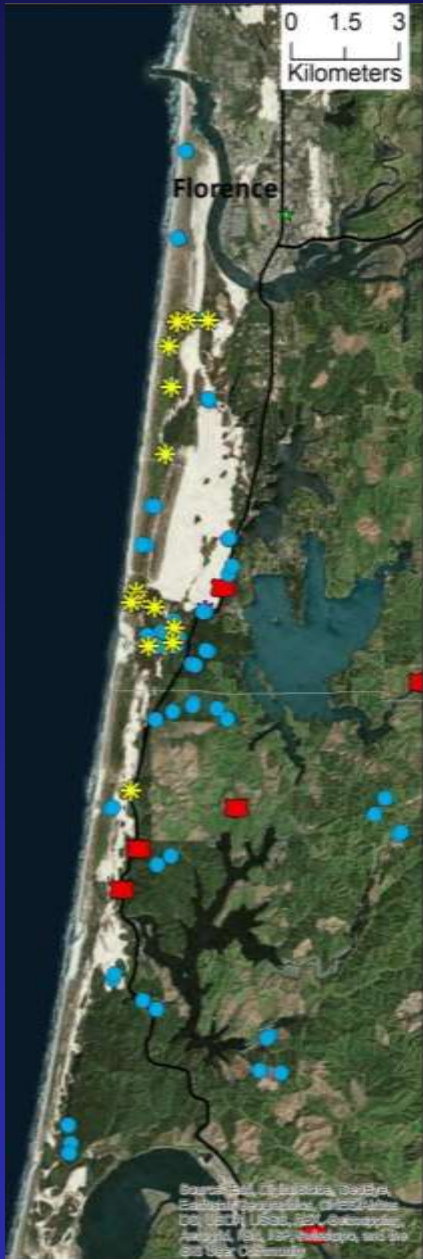


# Coastal marten persist – but in low numbers...

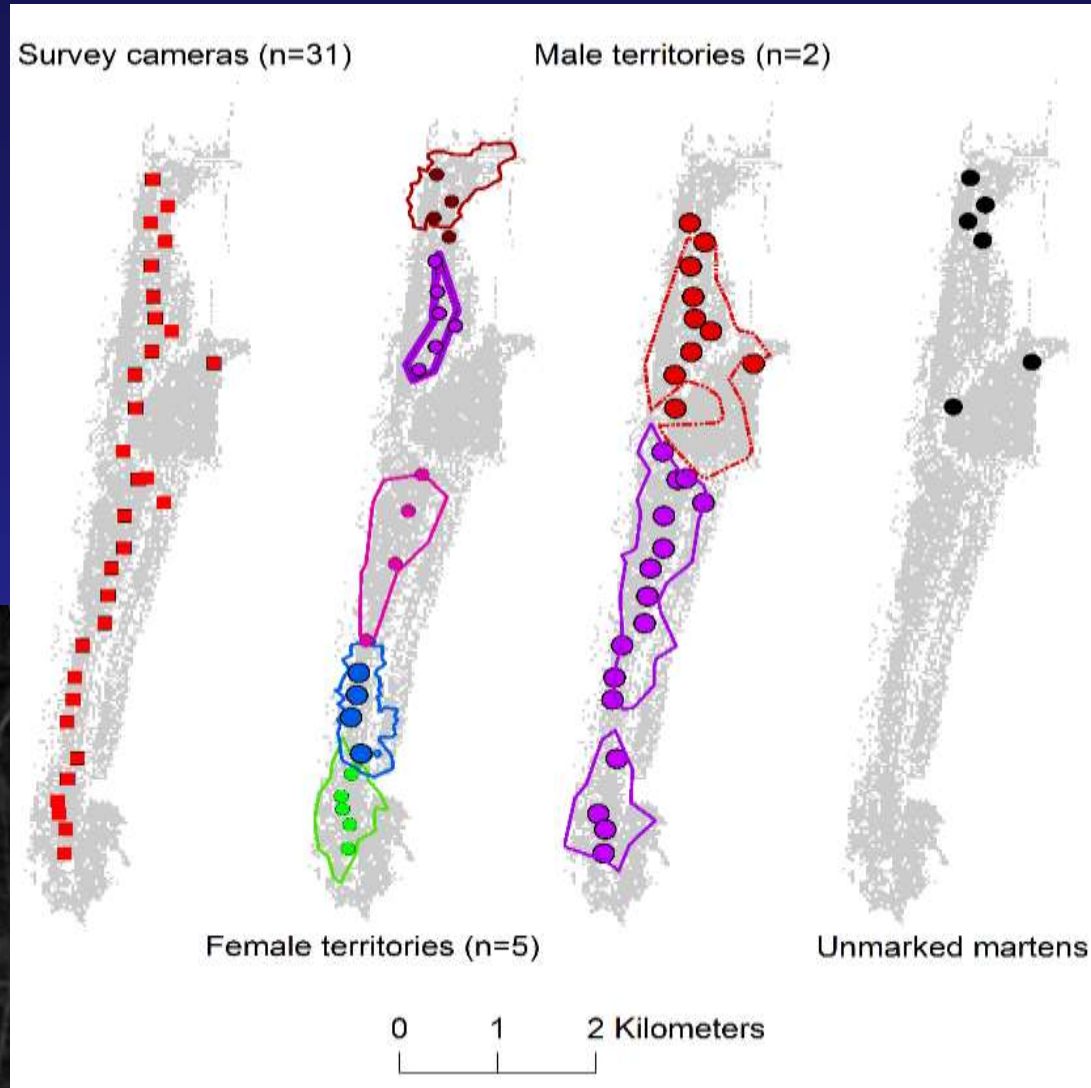
>100 detections, >200 locations; ~200 scats  
- ~400,000 photos



# “Boreal” marten and the Central Coast?!?



# GPS + Spatial Capture Recapture



# Population estimates

North: 37

(34-42)

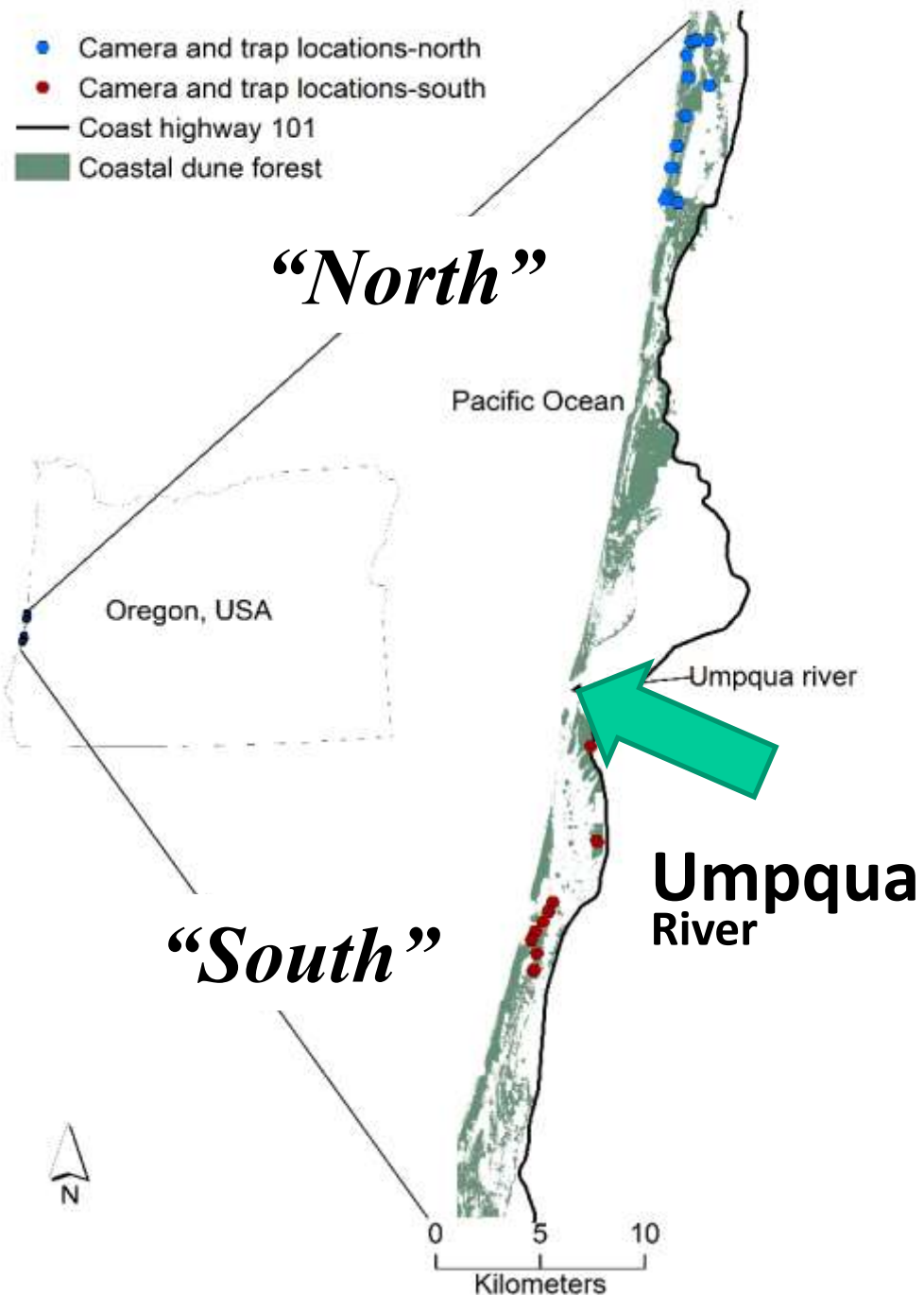
South: 26

(24-30)

**58-72 adult  
martens**

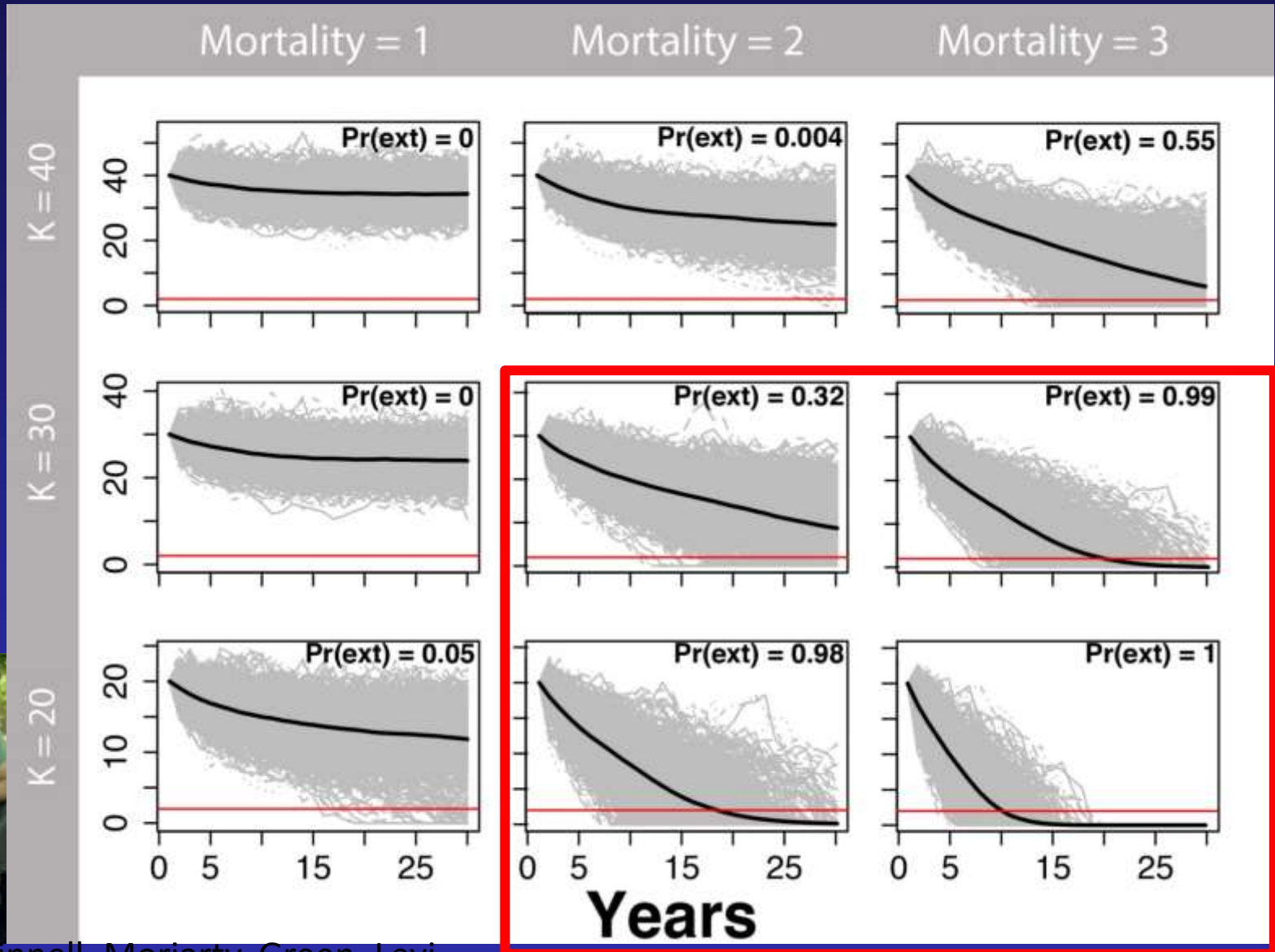


Linnell, Moriarty, Green, Levi  
(in Review) + poster here





# Probability of extinction high with <30 individuals



Linnell, Moriarty, Green, Levi  
(in Review)

# Road kill >2 mortalities annually 2015-present



# Reproduction also documented



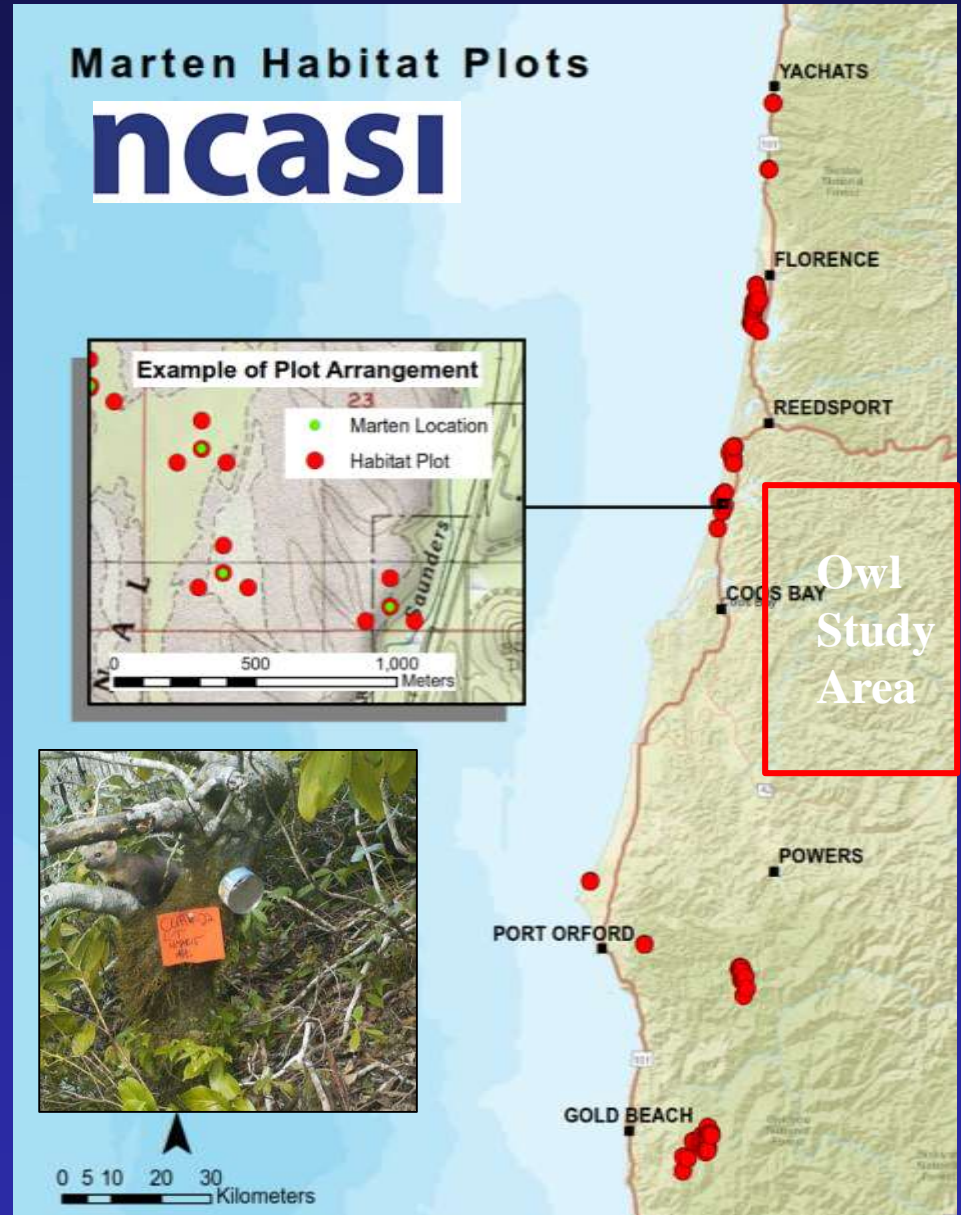
# Resting locations from telemetry



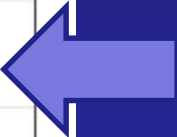
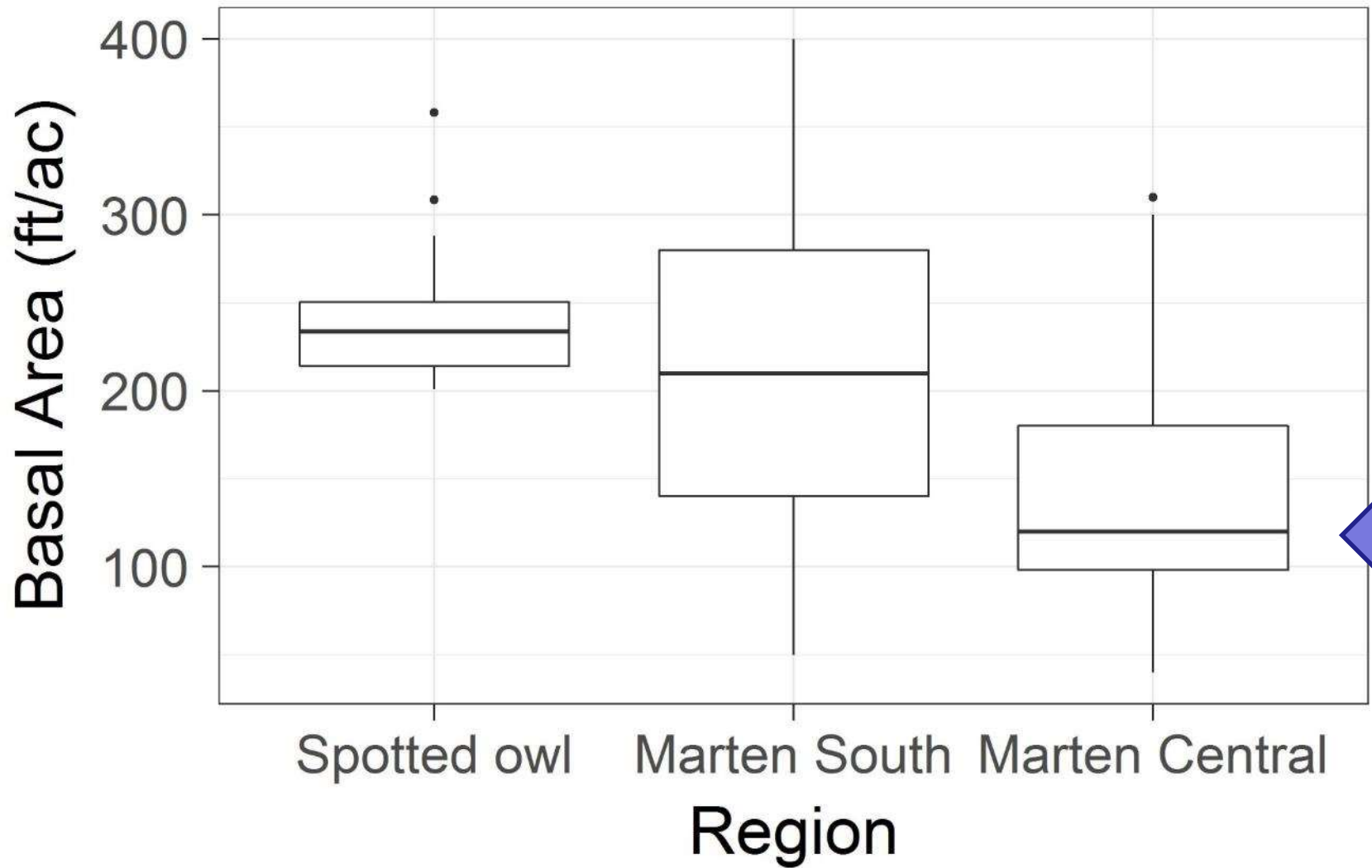
# Fine-scale vegetation

1/5 acre plot

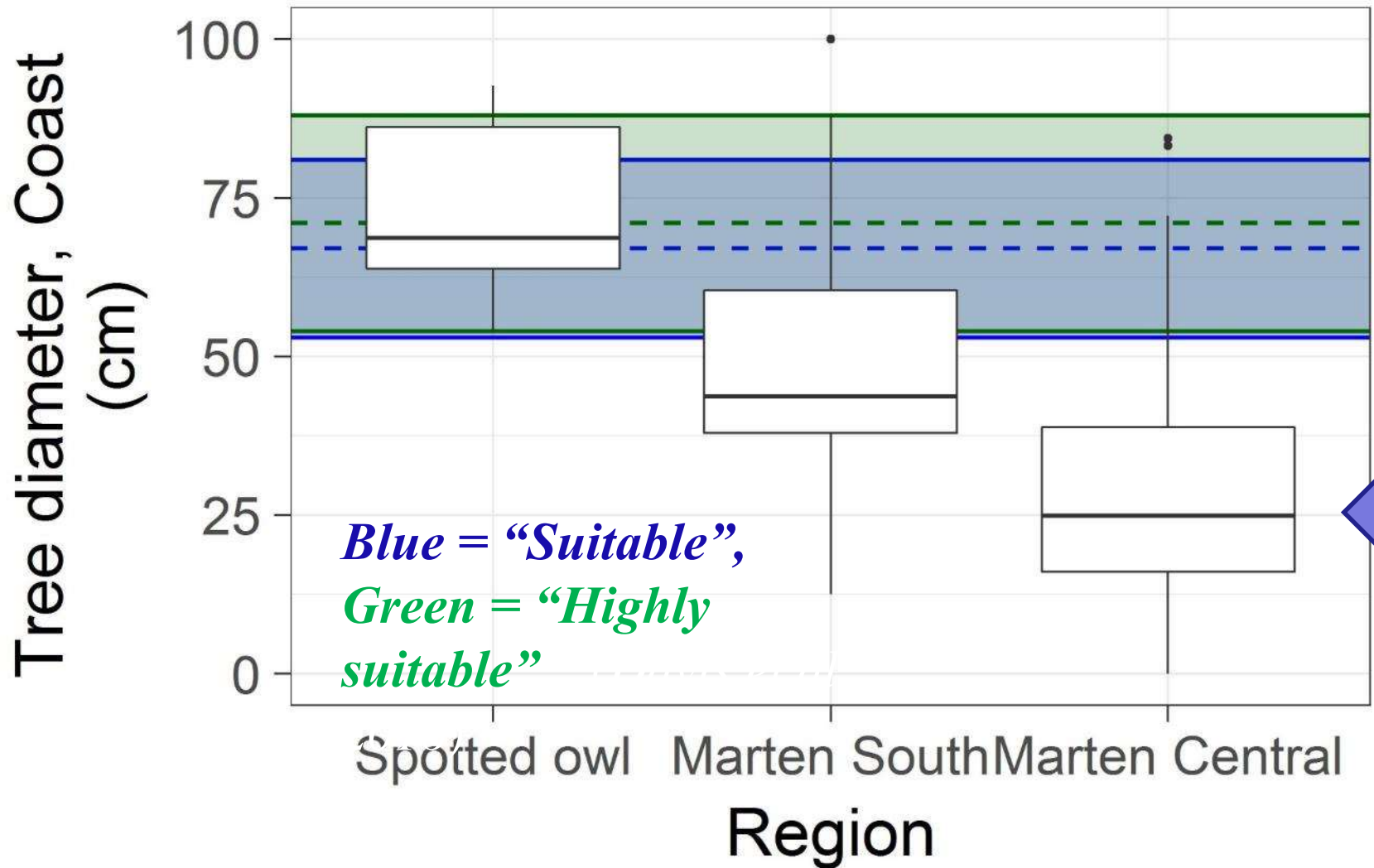
- 395 marten, 3013 owl



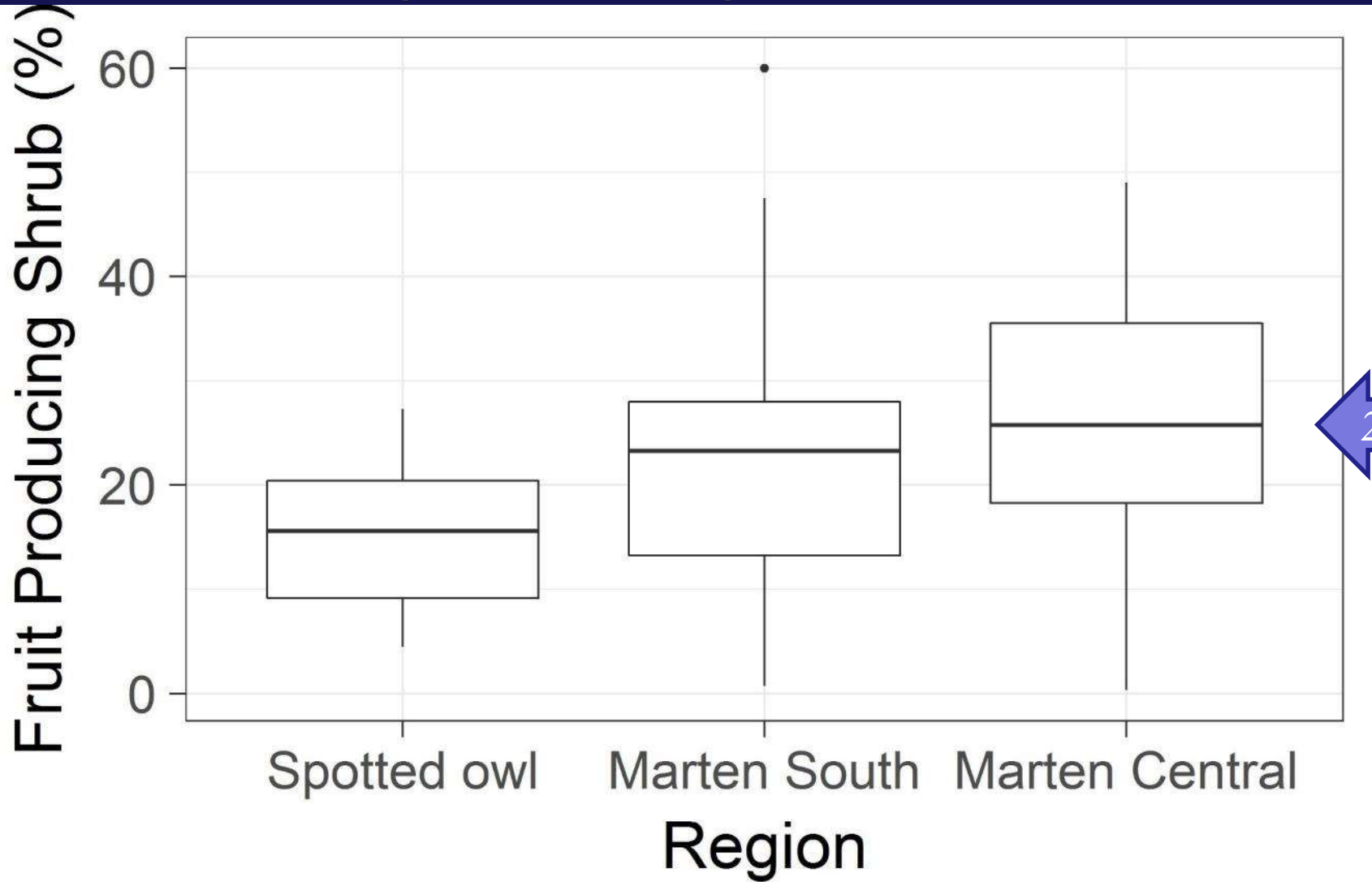
# Basal area – dense forests



# Tree diameter – central coast lower



# Fruit producing shrubs highest in central coast

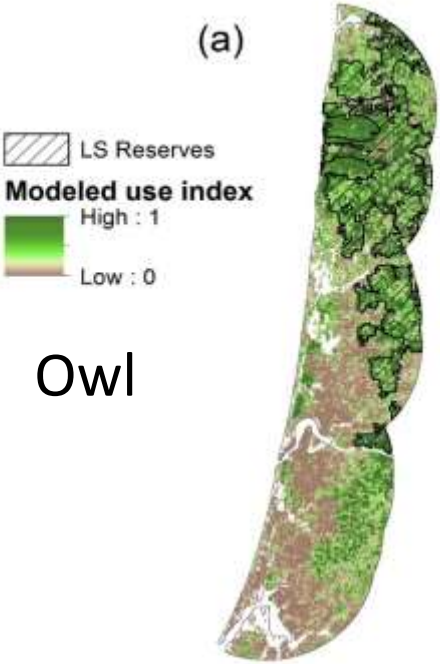


26%



# Predicted owl areas not always marten areas

Central coast



Owl



Marten

South coast



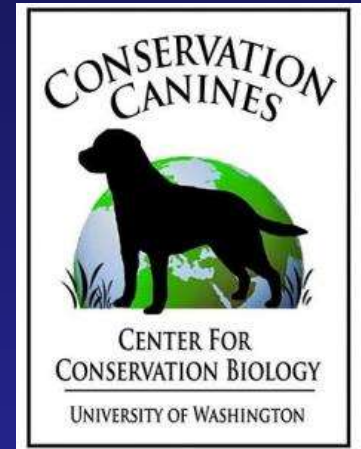
# How (and why) are martens here: prey?



USDA FS Pacific Northwest Research Station  
USDA FS Siuslaw National Forest  
USDA FS Central Coast Ranger District

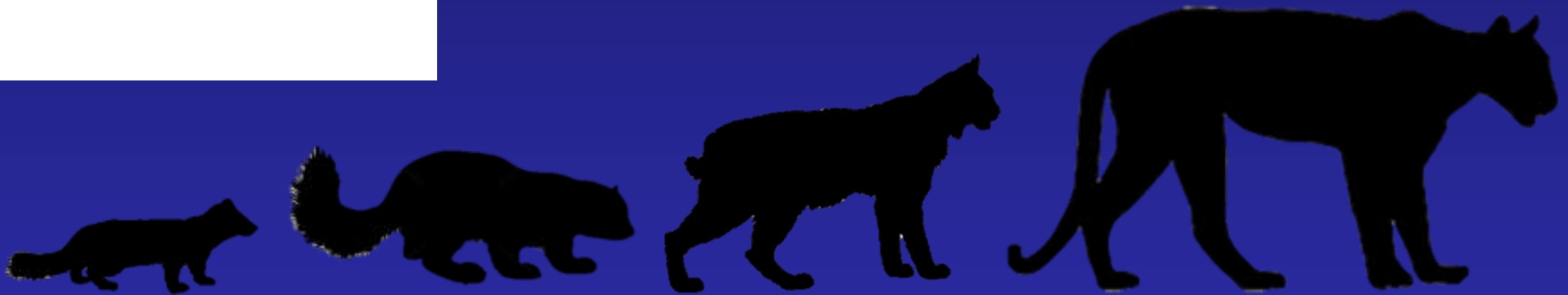
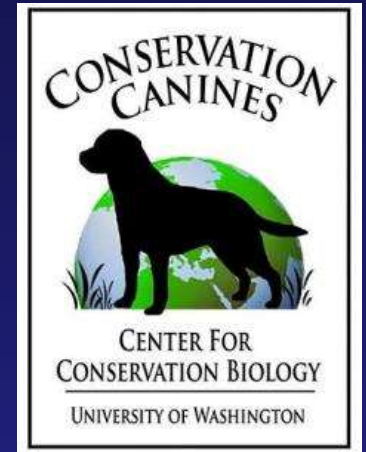
Index of small mammal  
abundance and diversity

**674 camera locations**  
**> 1 million photos**



Charlotte Eriksson, Visiting Scholar, Sweden

# How (and why) are martens here: predators?



# Progress & collaborations

- > 2000 camera stations
- > 200 detection dog units
- > 4 million photos

Oregon State UNIVERSITY College of Forestry

Weyerhaeuser

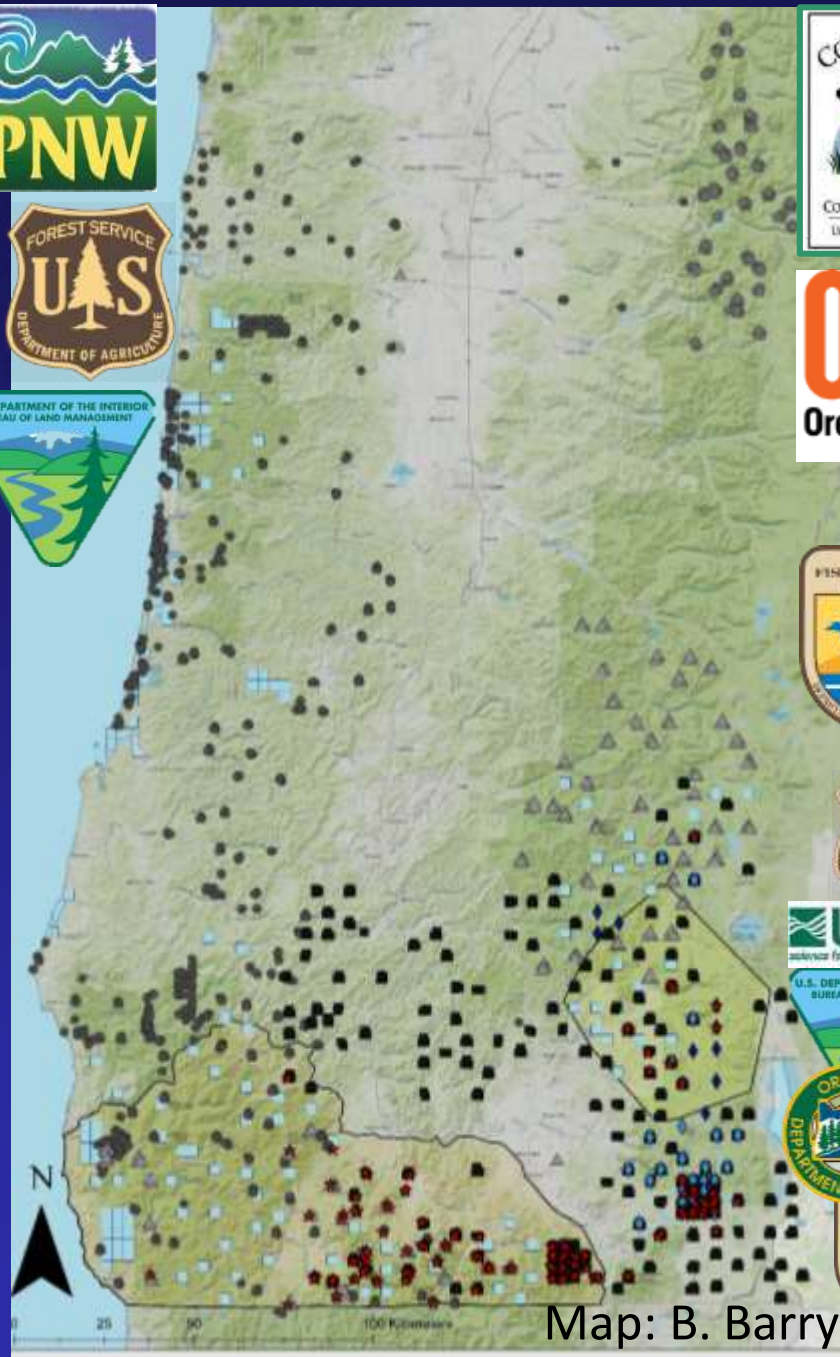
Hancock Timber Resource Group

OFIC

ncasi

PORT BLAKELY TREE FARMS LP

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



Map: B. Barry

# Quantify risks - landscape change



Where are animals?

When and why do populations expand?

Foundation and tools available, but...

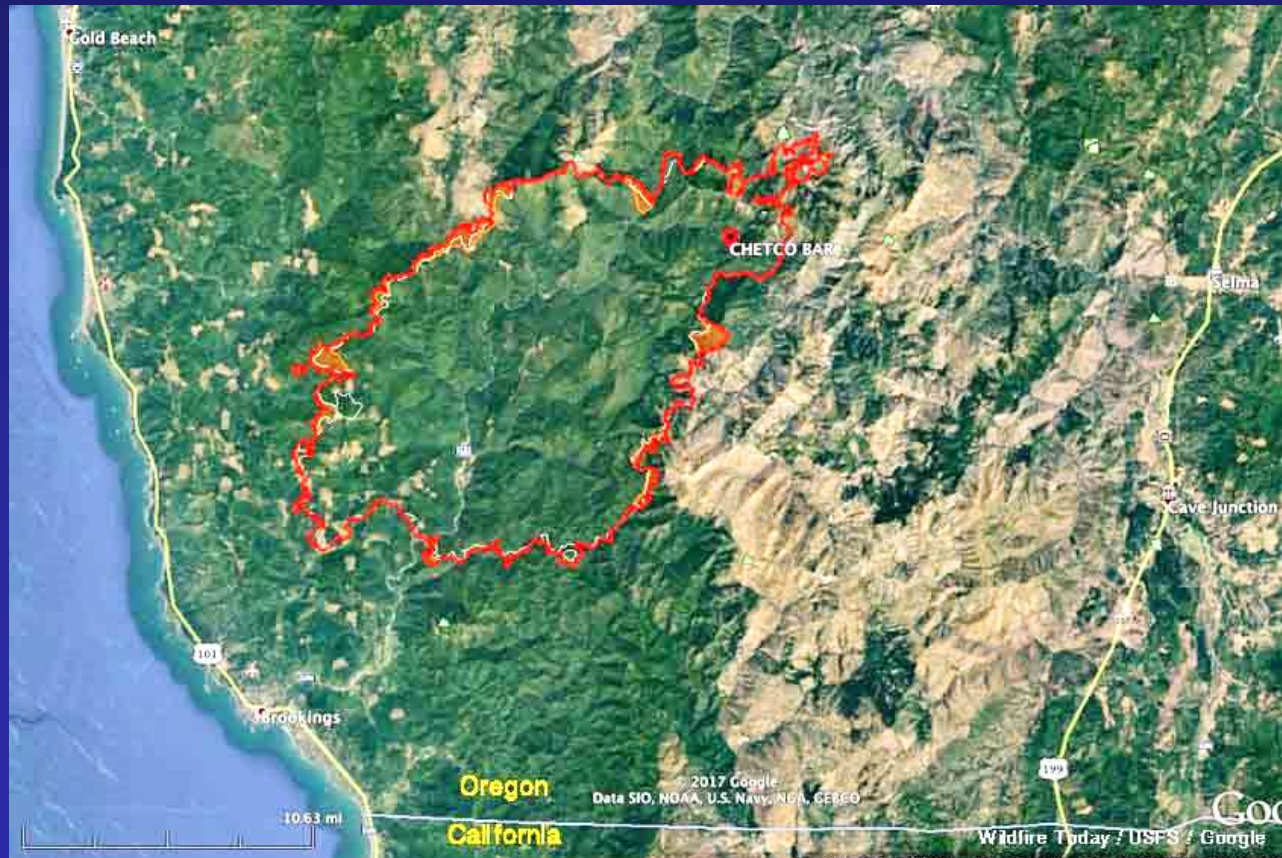
# Coastal marten - Vulnerability

Habitat loss

Population stressors: disease and rodenticides (Dr. Matthews)

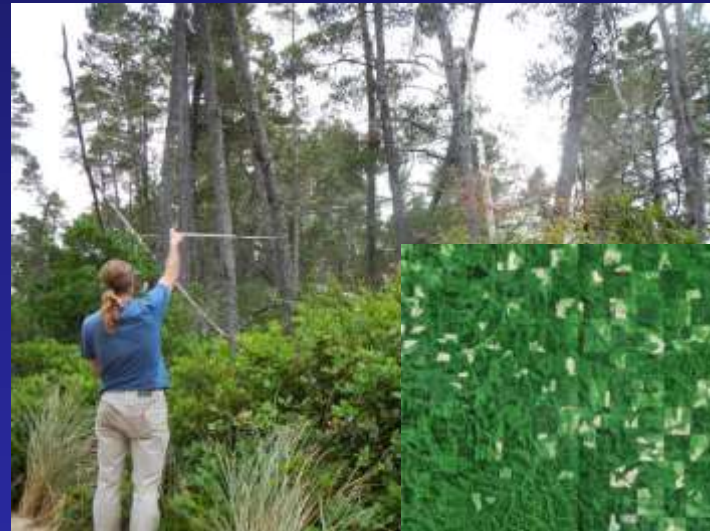
- If issue occurs, lacking strategy for contingency

Continued monitoring?



# Coastal marten - Collaborations

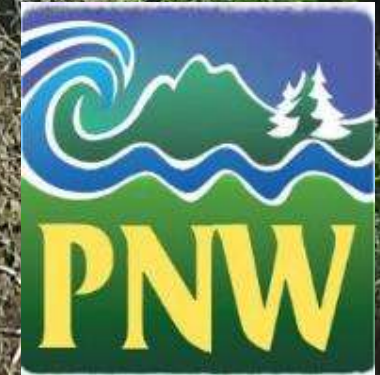
- Reporting/records
  - Road kill
- Structure/restoration
  - Shrubs
- Connectivity





Questions?

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LANEM011-T 50°F 10°C

11-12-2015 16:45:45