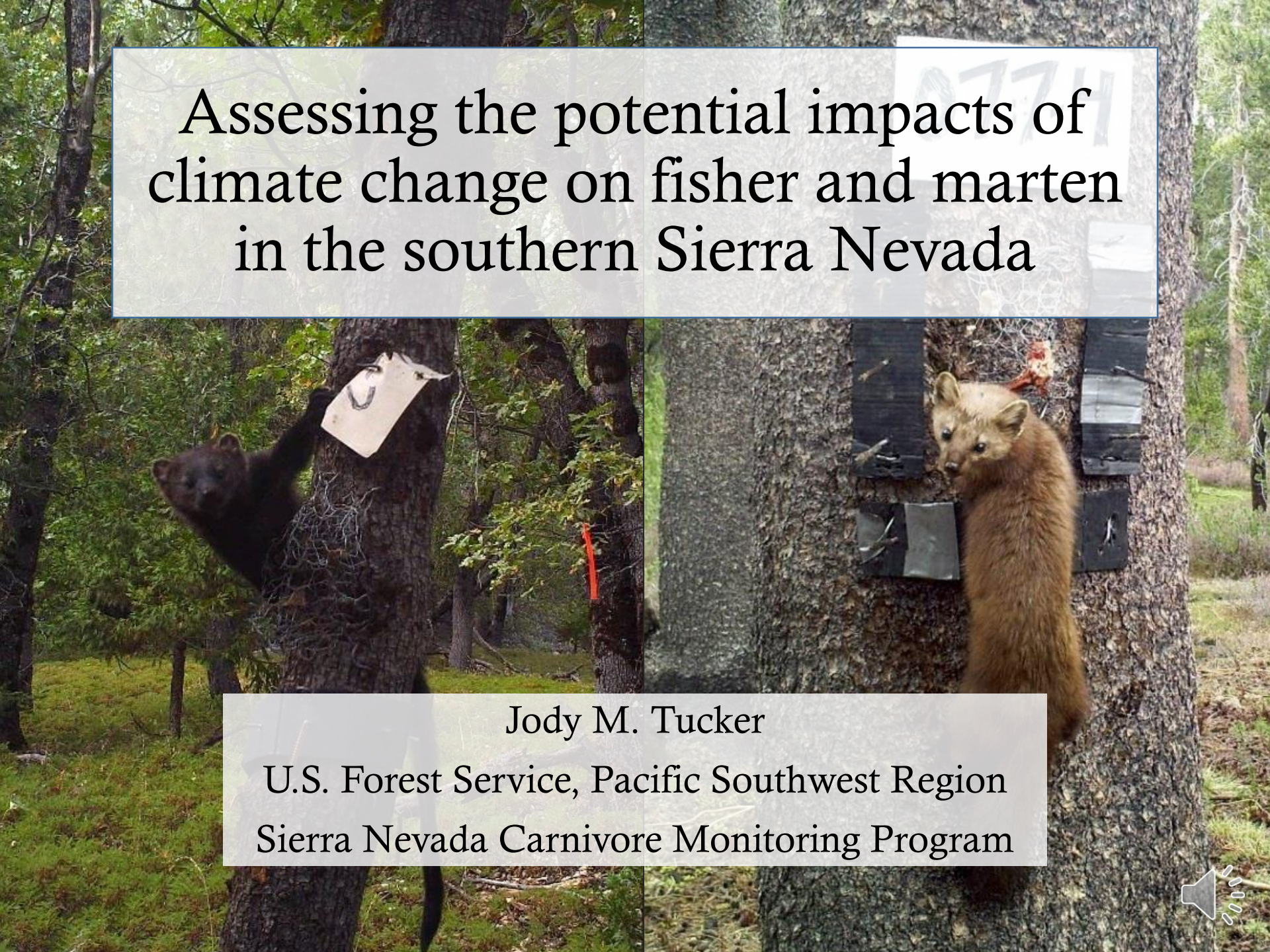
Assessing the potential impacts of climate change on fisher and marten in the southern Sierra Nevada



Jody M. Tucker

U.S. Forest Service, Pacific Southwest Region

Sierra Nevada Carnivore Monitoring Program

Fisher and marten niche

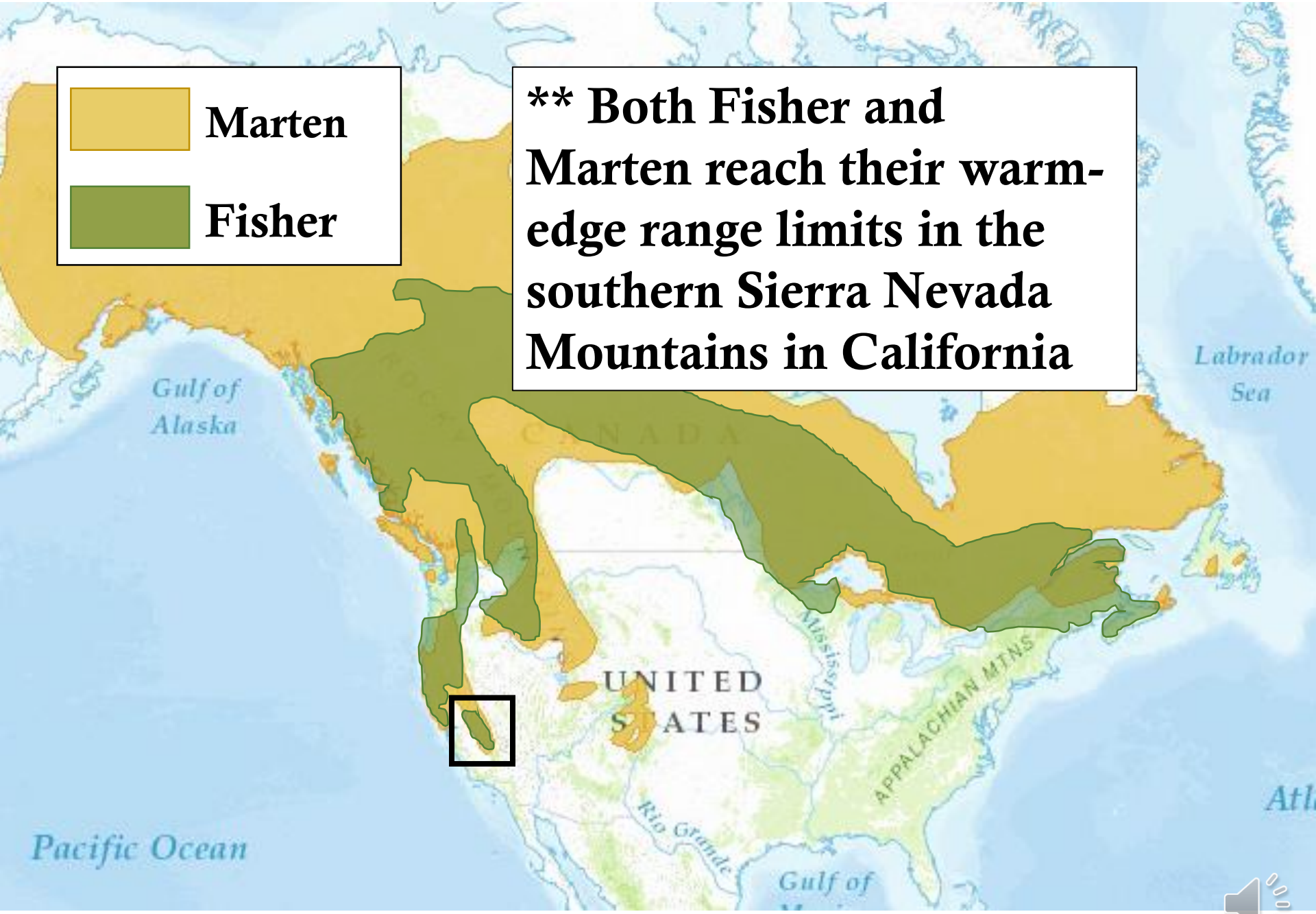
- Prefer similar forest structure but different climactic conditions

Marten

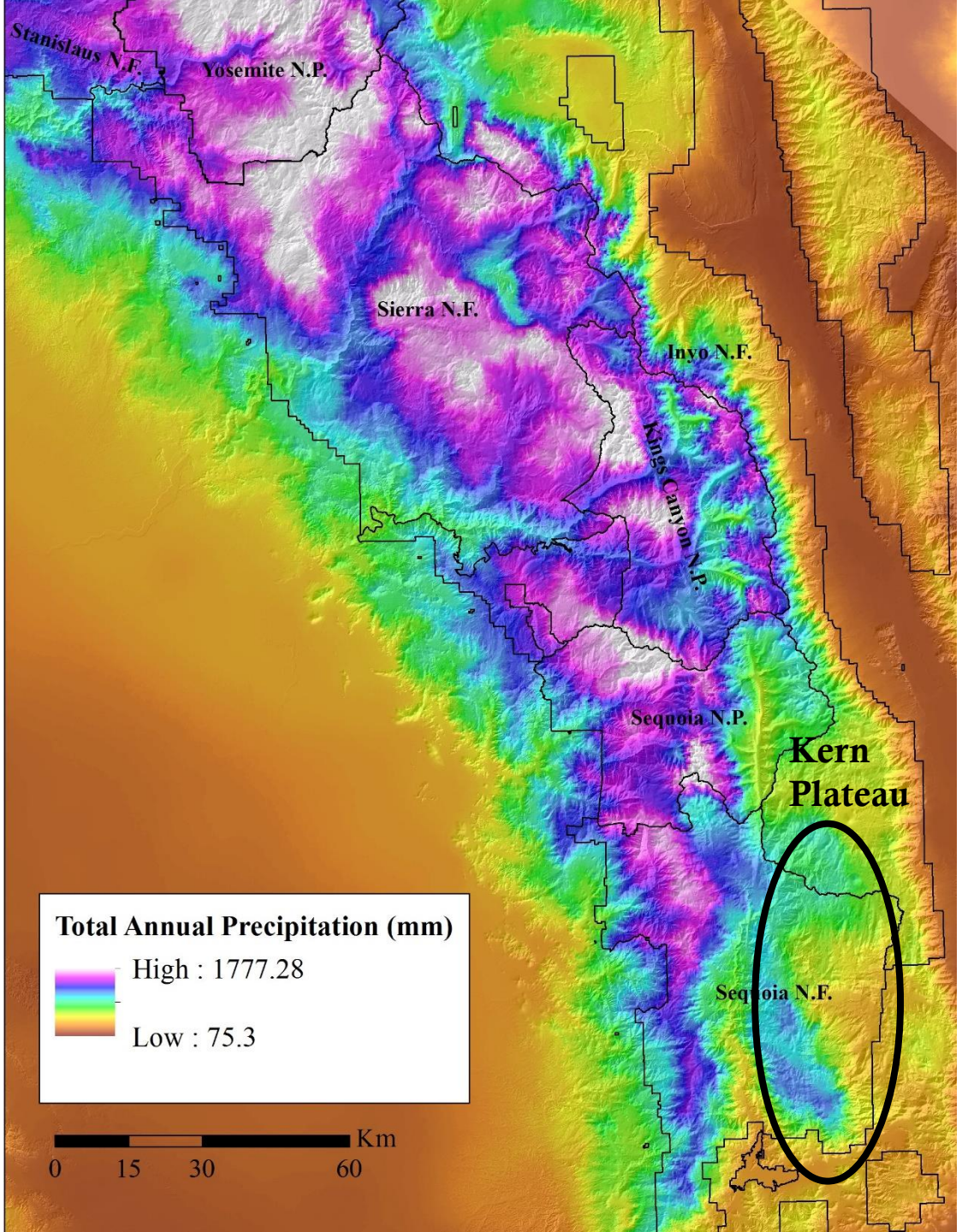
- high elevation
- fir and alpine forest
- deep snow

Fisher

- mid-elevation
- mixed conifer/hardwood
- less snow


Marten
Fisher
** Both Fisher and Marten reach their warm-edge range limits in the southern Sierra Nevada Mountains in California
Gulf of Alaska
Labrador Sea
UNITED STATES
Mississippi
APPALACHIAN MTNS
Rio Grande
Gulf of
Pacific Ocean

Southern Sierra Nevada



N

Wetter
Colder

Drier
Warmer

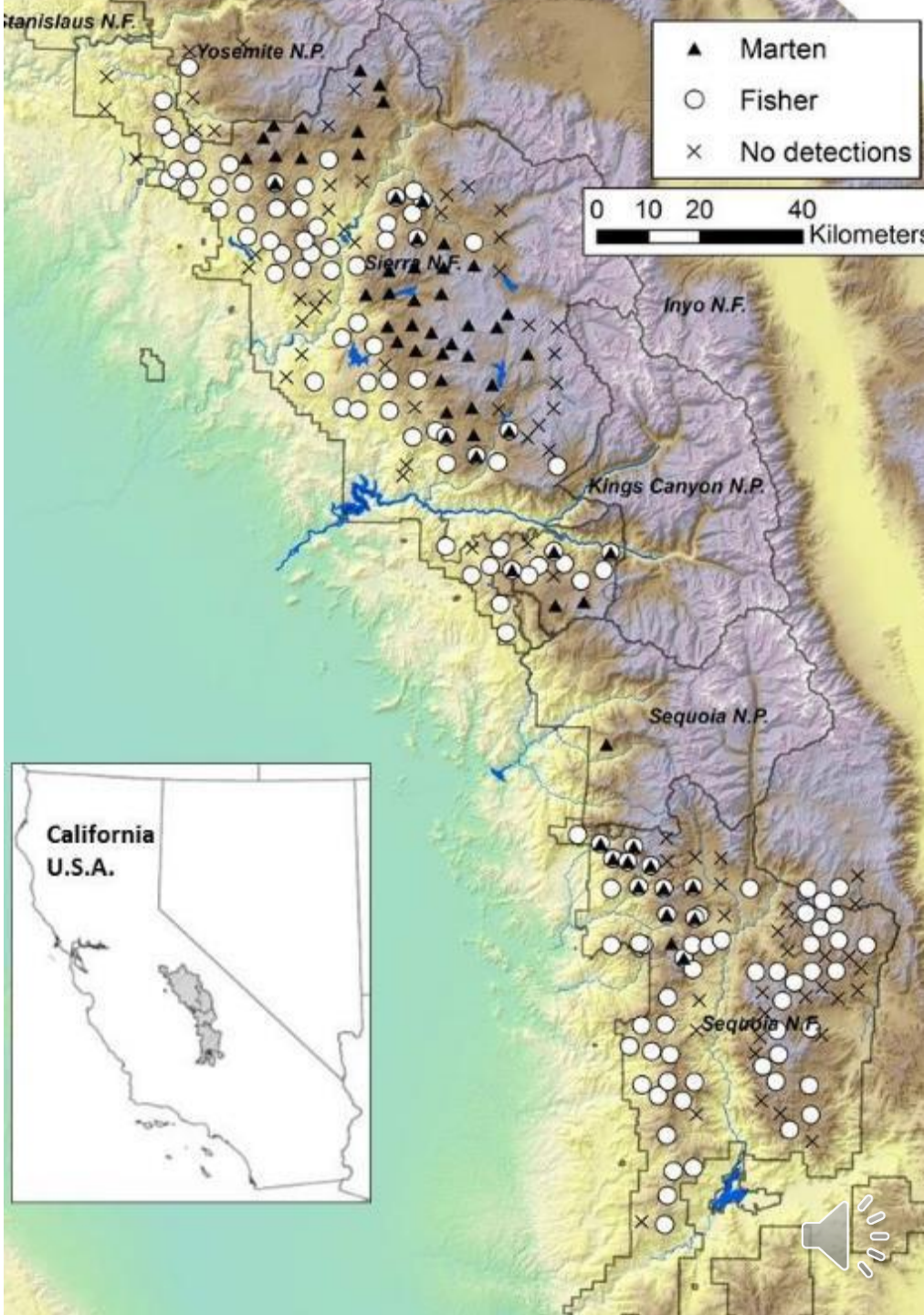
S

Landscape Scale Surveys
USFS Regional Monitoring Program (2002-present)

202 Sample Units

- Track plate boxes
- Camera traps
- Hair snares

- 1467 Stations
- 39,407 Station Visits
- ~160,744 survey nights!



Climactic thresholds

Zielinski, Tucker & Rennie 2017

Fisher not detected
* April 1 snowpack is high >650 mm

Marten not detected
* low annual precipitation <911 mm
* warmer minimum temperatures > 4ºC

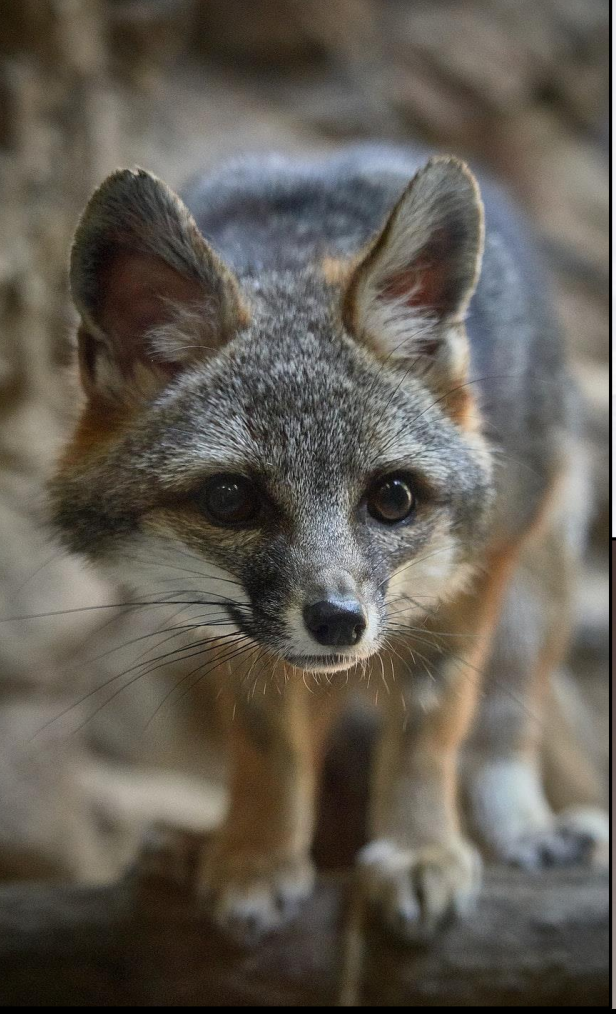
Take homes

Zielinski, Tucker & Rennie 2017

1) Each species appeared to have a threshold relationship with at least one climatic variable

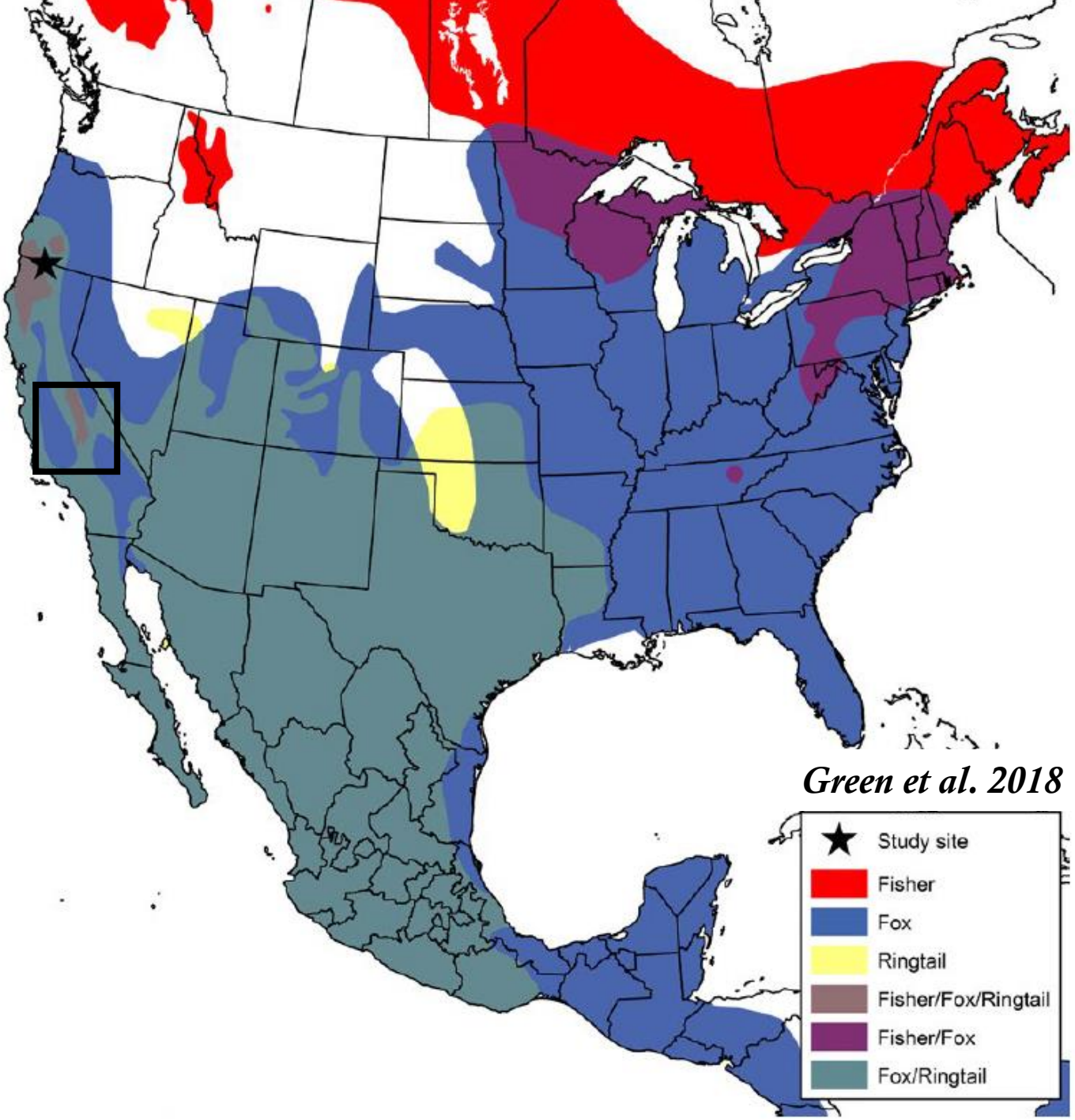
2) At low precipitation fisher can expand to higher elevations, colder temperatures, and atypical habitats.

3) Climate models predict changes that appear to favor fishers. Sympatric zone in which both species can occur shift north in the future.



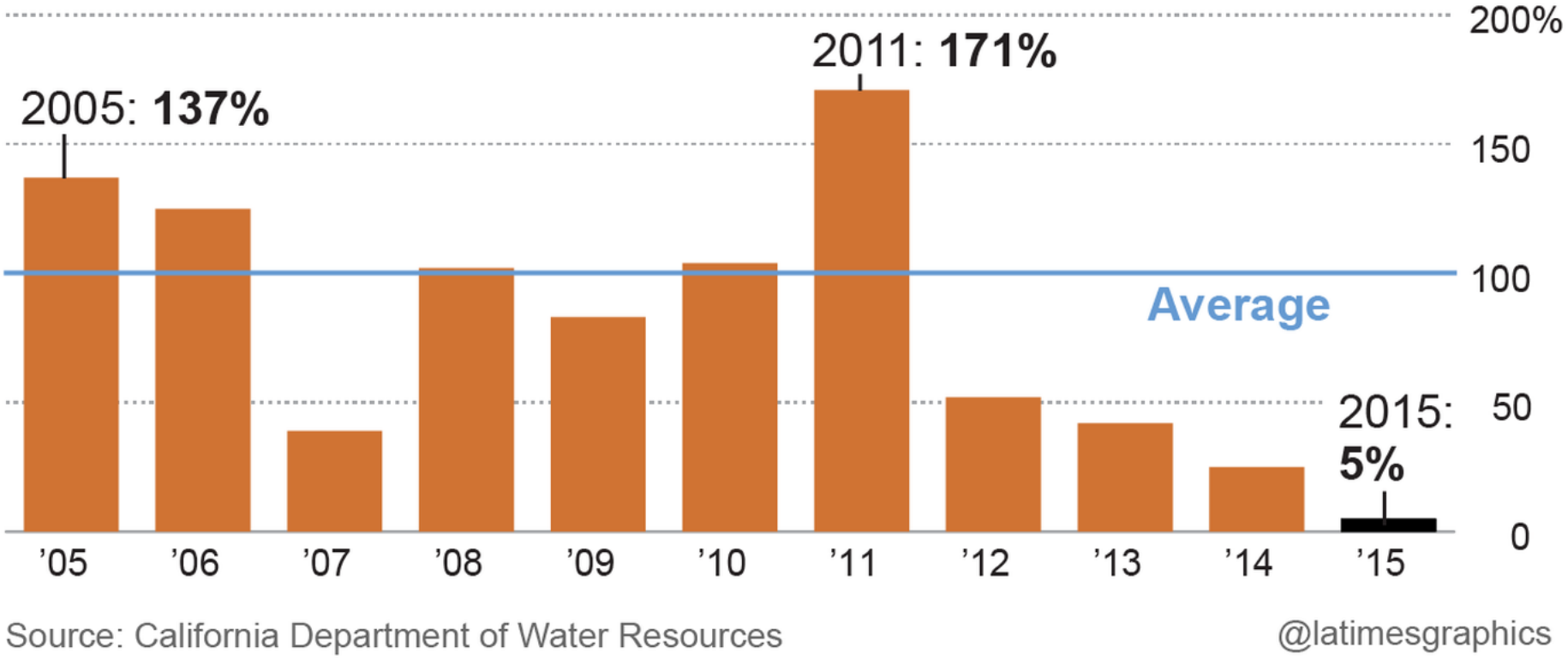

Assessing Mesocarnivore Response to Severe Drought through Long-Term Population Monitoring

Jody Tucker, U.S. Forest Service, Pacific Southwest Region
David Green & Sean Matthews, Oregon State University



Green et al. 2018

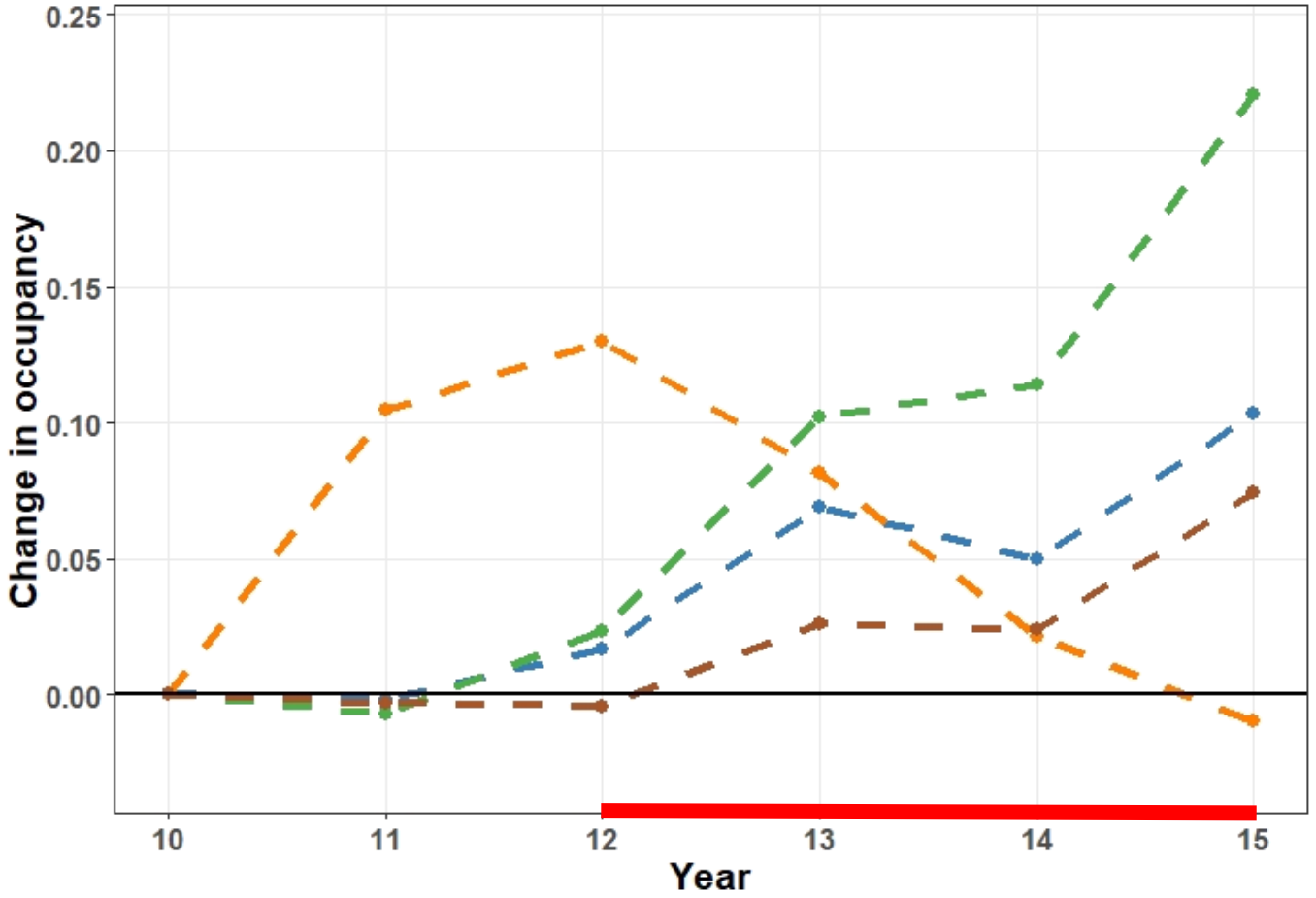
Water content of April 1 Snow Pack in California



Source: California Department of Water Resources

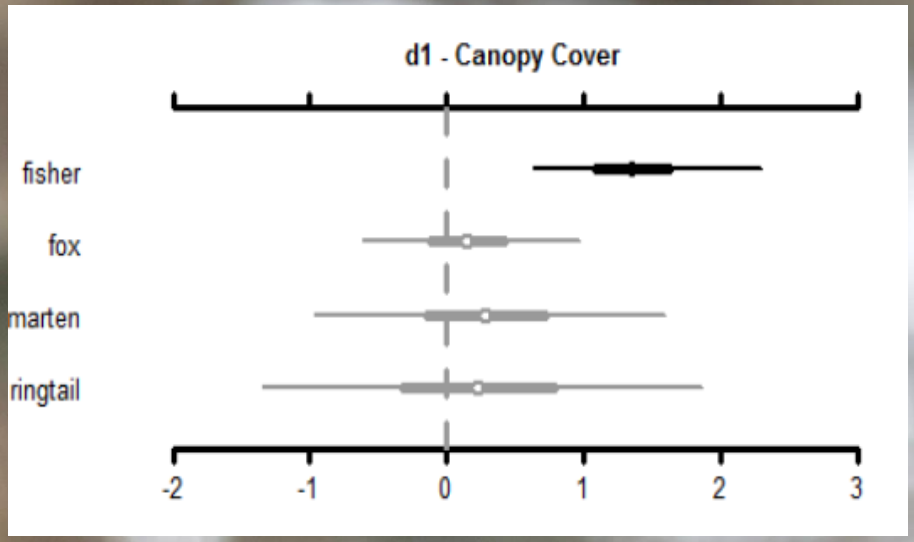
@latimesgraphics

Change in occupancy at high elevations during drought



Canopy Cover significant factor for Fisher:

Occupancy
Colonization
Persistence




Future work will focus on effects of widespread tree mortality

Contact info:
Jody Tucker
Email: jody.tucker@usda.gov, Phone: 559-359-5888

Related Publications:

Zielinski et al. 2017. Niche overlap of competing carnivores across climatic gradients and the conservation implications of climate change at geographic range margins. Biological Conservation 209: 533-545.

Spencer et al. 2015. Simulating effects of climate and vegetation change on distributions of martens and fishers in the Sierra Nevada, California, using Maxent and MC1. In: Bachelet, D. & Turner, D. (Eds.), Global Vegetation Dynamics: Concepts and Applications in the MC1 Model. Wiley, Hoboken, pp. 135–149.

Lawler, J.J. et al. 2012. Martens and fishers in a changing climate. In: Aubry, K.B al. (Eds.), Biology and Conservation of Martens, Sables, and Fishers: a New Synthesis. Cornell, New York, pp. 371–397.