

Dietary Overlap between Northern Spotted Owls and Barred Owls in Western Oregon

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Northern spotted owl



Barred owl

Management Uncertainties Associated with Barred Owls

- Role in NSO population declines?
- Mechanisms and magnitude of competition?
- Implications to spotted owl recovery efforts and potential need to control barred owl populations?



Primary Research Questions

- 1) What is the degree of resource partitioning between spotted owls and barred owls where they now co-occur?
- 2) Does the presence of barred owls influence resource selection, survival, and reproduction of spotted owls?



Components of Research

***Spatial
relationships***

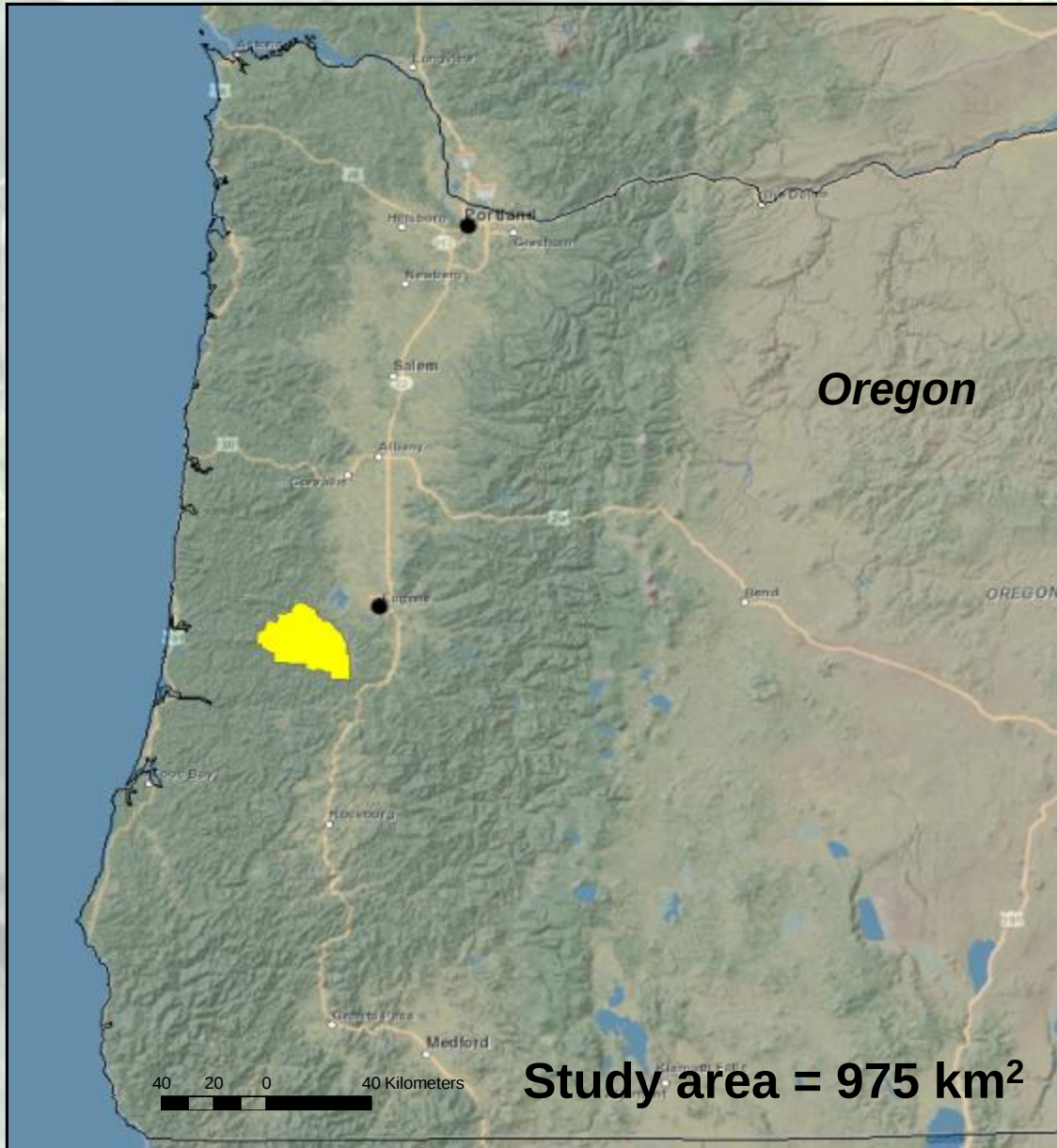
***Habitat
selection***

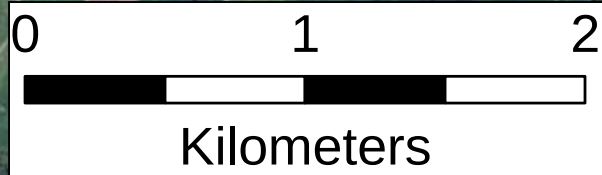
***Diets
and foraging***

Overlap in resource use

***Influence on movements,
resource selection, and fitness characteristics?***

Owl Interaction Study Area, 2007–2009





Methods: Owl Surveys and Radio-telemetry

- Conducted annual surveys of both species, 2007 – 2009
- Captured and radio-marked 29 spotted owls, 28 barred owls
- Tracked owls using standardized radio-telemetry methods
- Directly monitored space-use, habitat selection, and diets
- Individual owls monitored for an average of 593 days (~20 months)



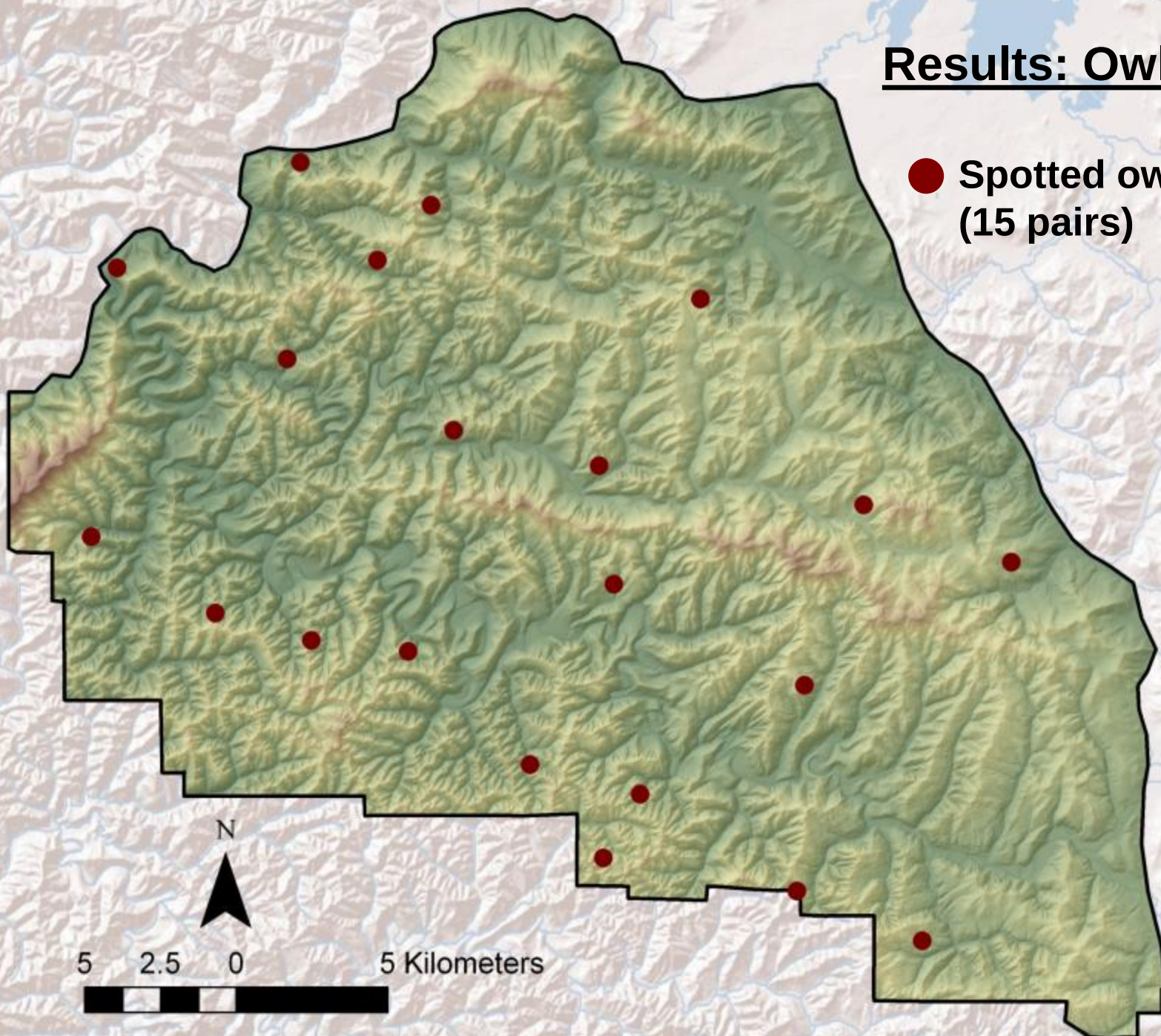
Methods: Owl Diets

- Collected owl pellets from roosts and nesting areas used by radio-marked owls
- Identified prey remains in pellets using dichotomous keys and local reference collection
- Estimated dietary composition by territory ($n = 15$ spotted owl, 24 barred owl)



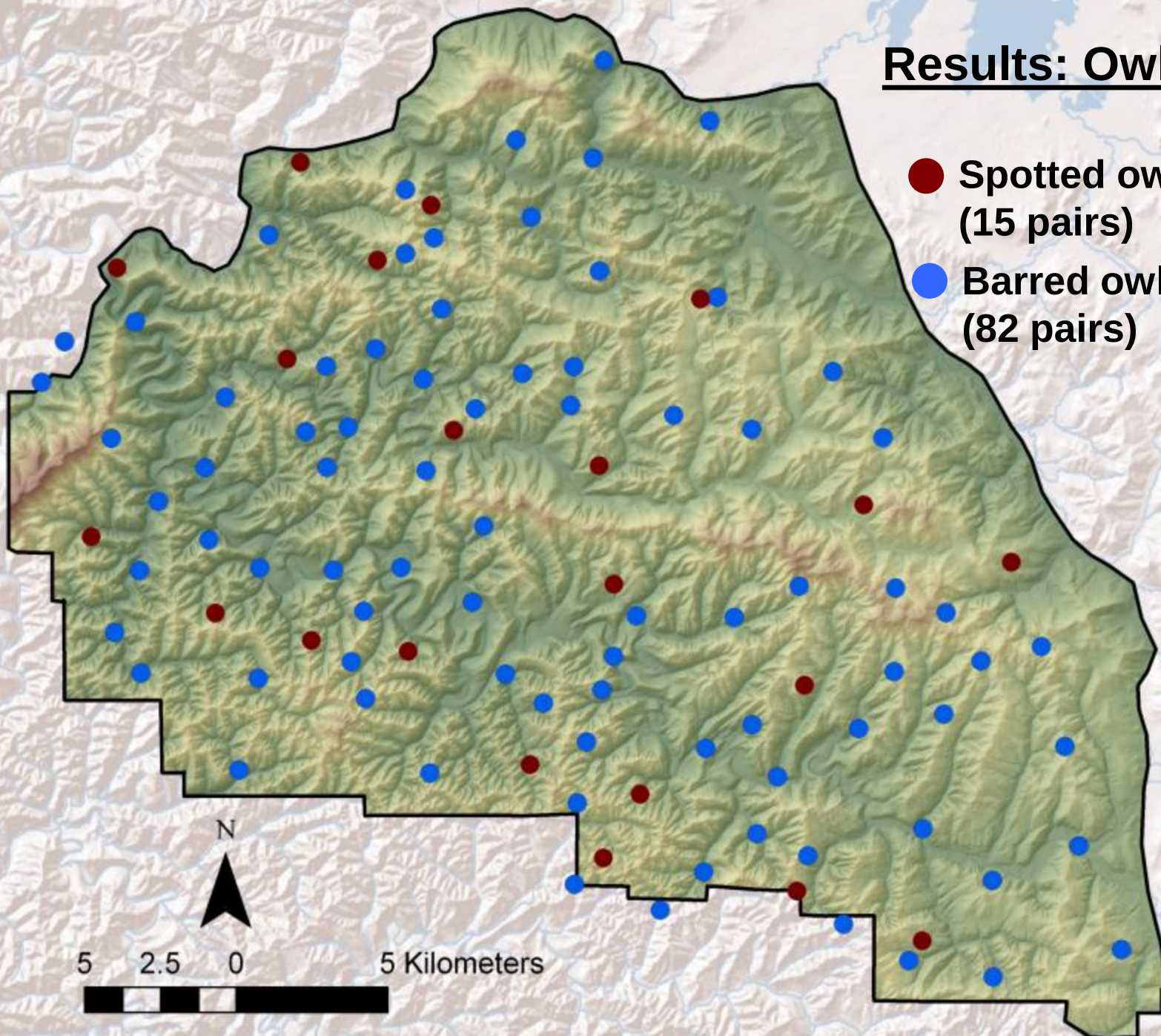
Results: Owl Surveys

● Spotted owl territory
(15 pairs)



Results: Owl Surveys

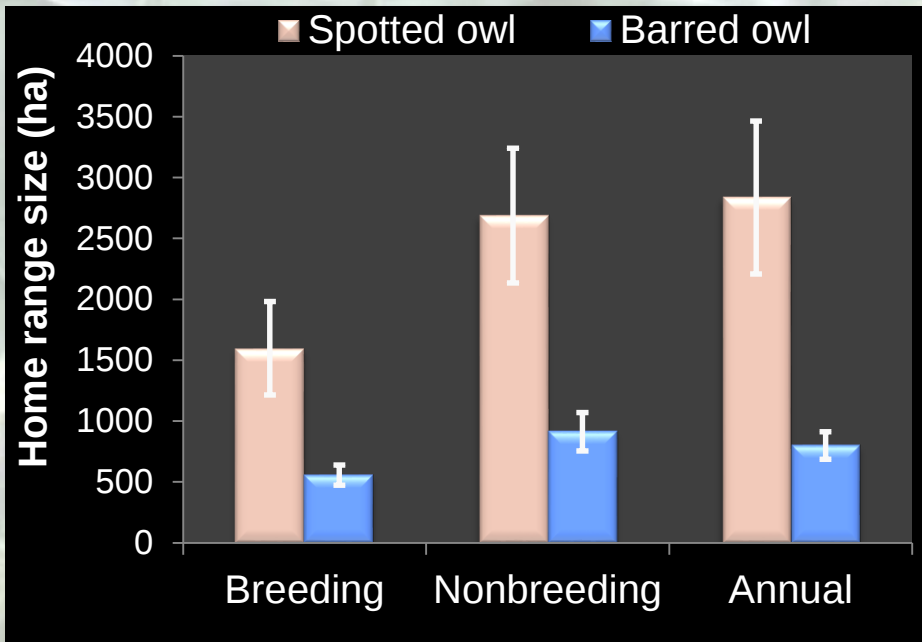
- Spotted owl territory (15 pairs)
- Barred owl territory (82 pairs)



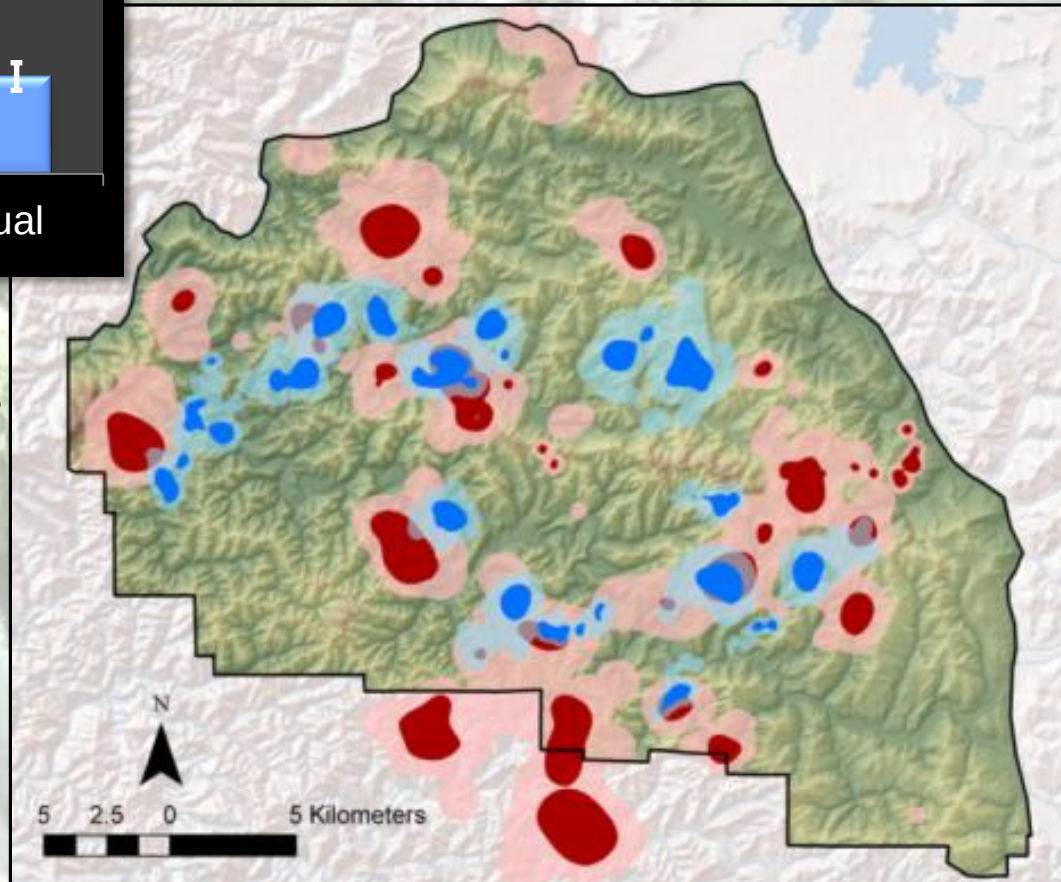
N

5 2.5 0 5 Kilometers

Spatial Relationships



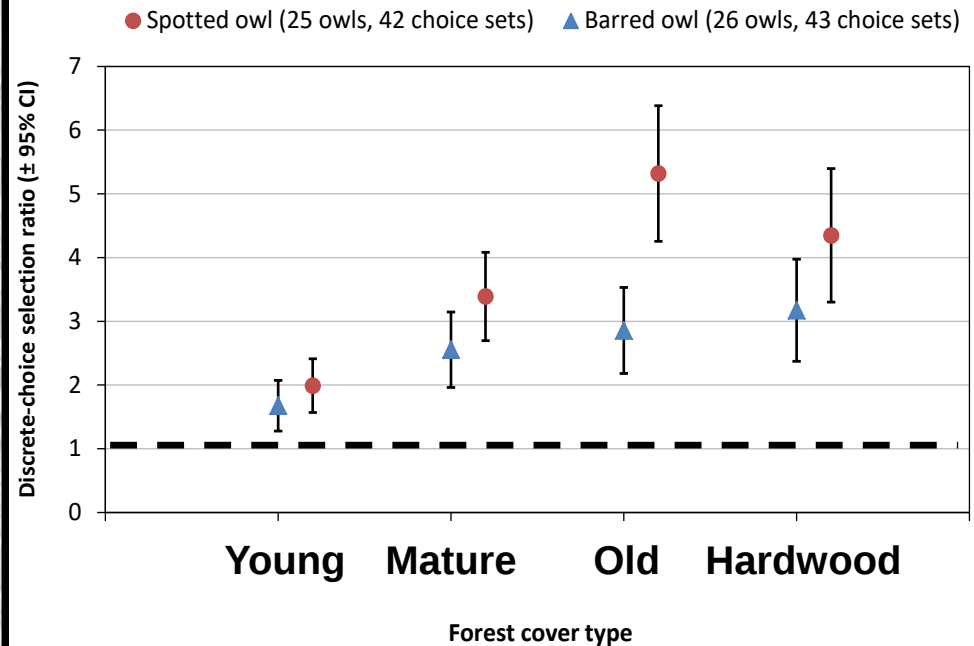
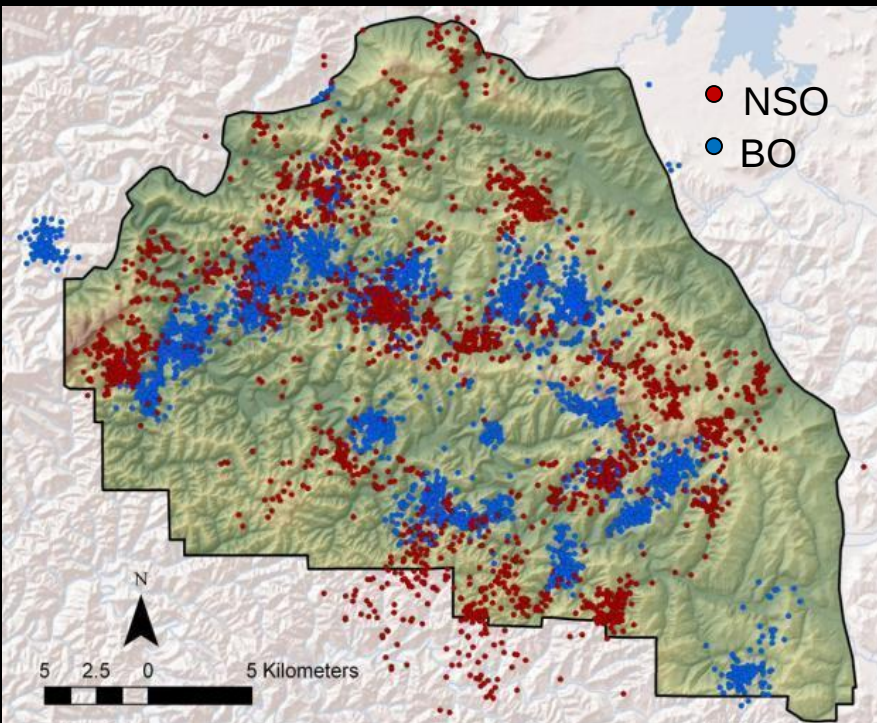
- Home ranges of spotted owls were 2 – 5 times larger than those used by barred owls



- Broadly overlapping home ranges with minimal overlap among core-use areas containing nests

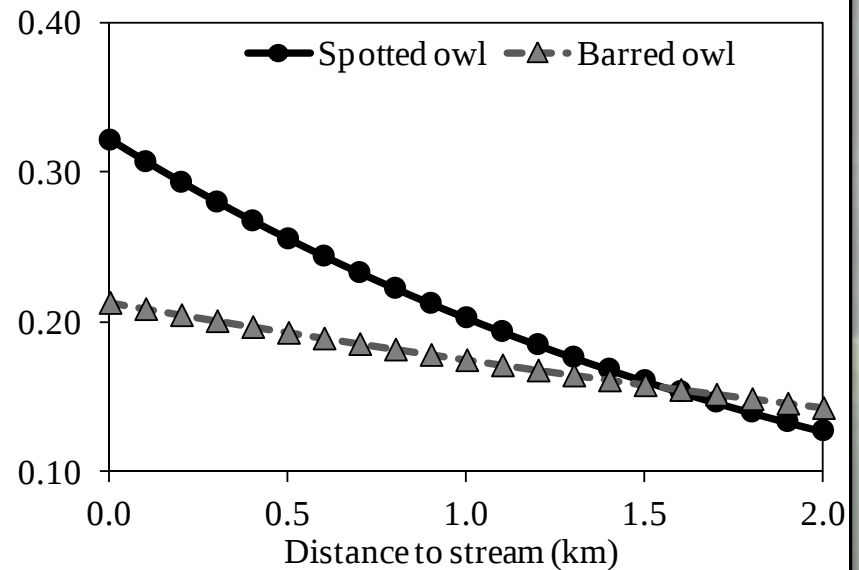
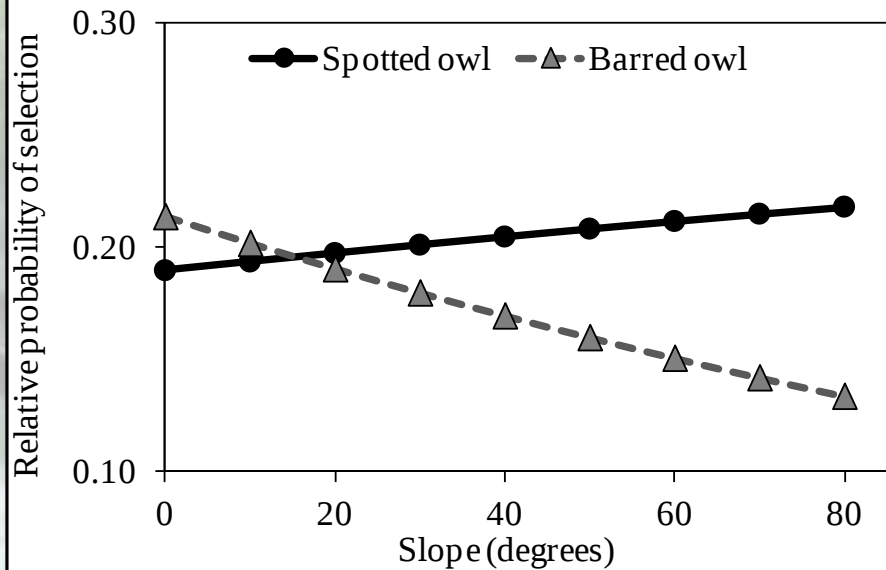
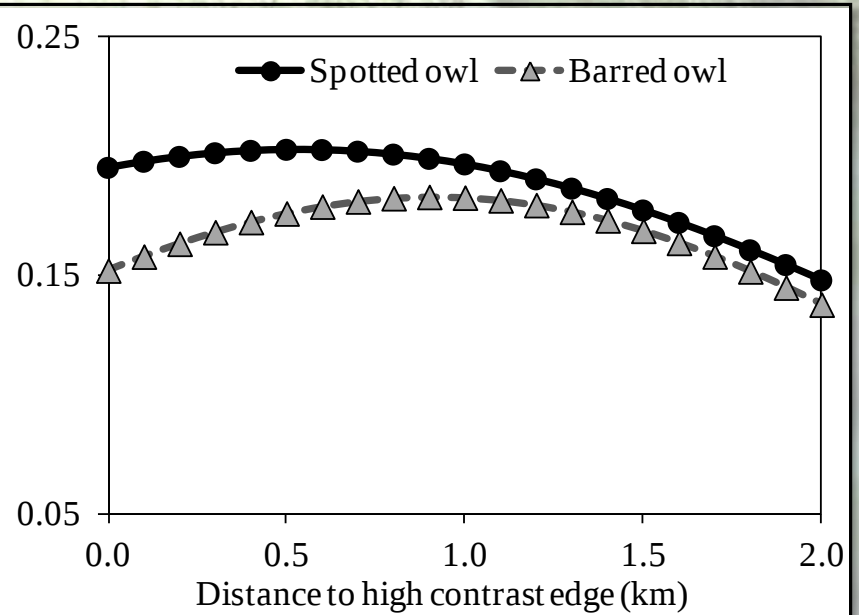
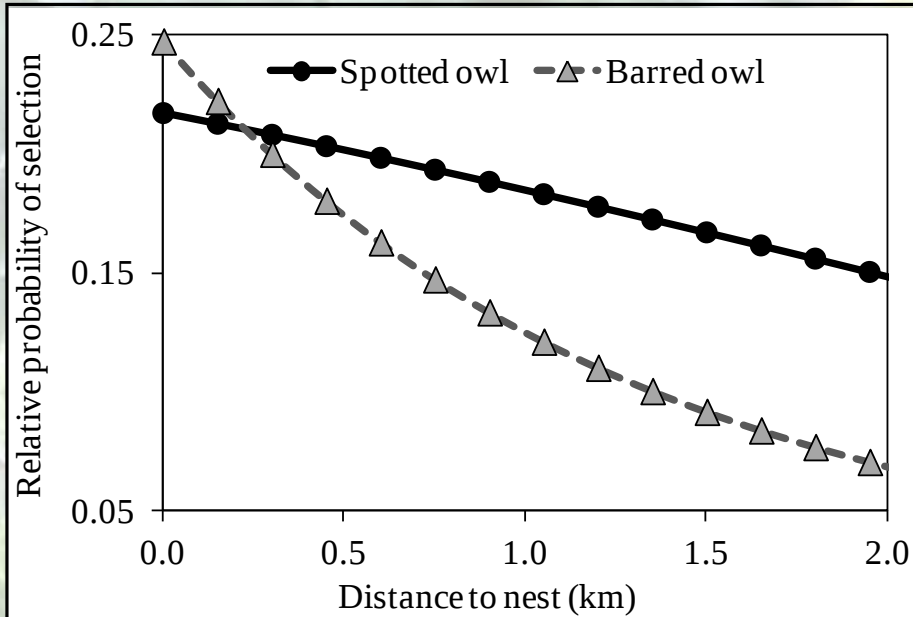
Nighttime Habitat Selection

- Both species most often foraged in patches of old (>120 yrs old) conifer forest or riparian areas containing large hardwood trees
- Barred owls used available forest types more evenly than spotted owls
- Overlap in use of primary forest types = **81% (range = 30 – 99%)**



5,809 nighttime foraging locations

Nighttime Habitat Selection



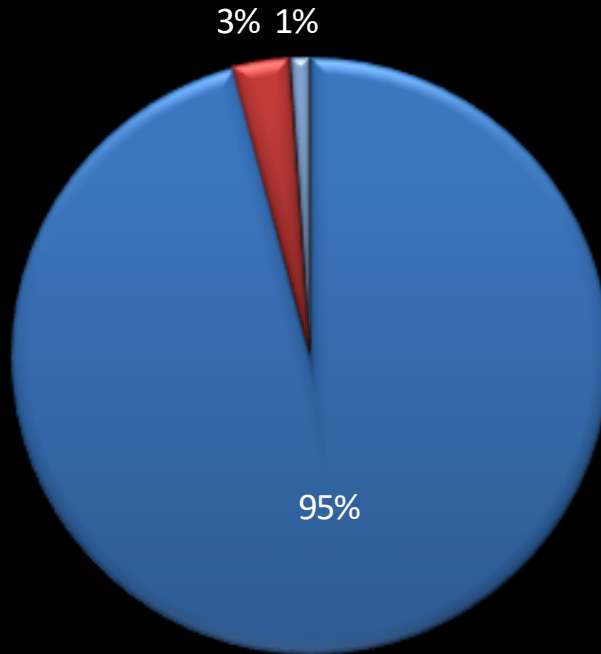
Diets and Foraging Behavior



Dietary Composition (% of prey numbers)

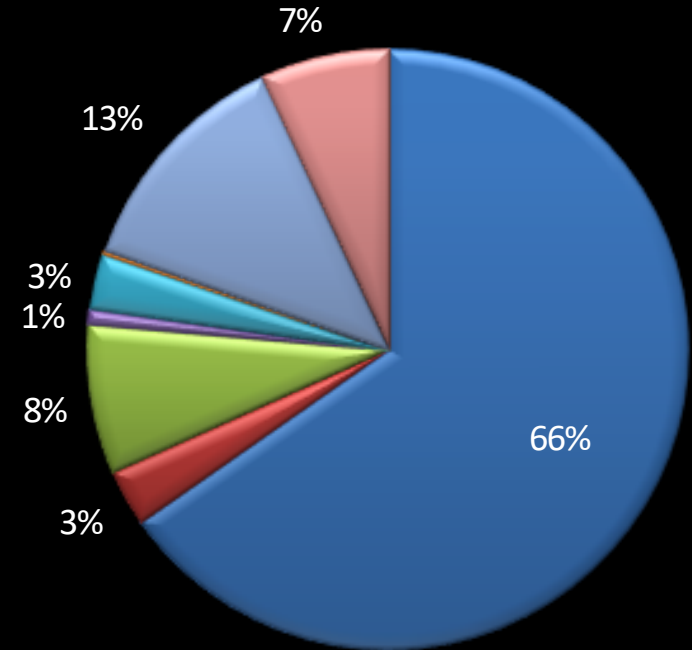
■ Mammal ■ Bird ■ Amphibian ■ Reptile ■ Crayfish ■ Fish ■ Insect ■ Mollusk

Spotted Owl



1,246 prey items
51 species

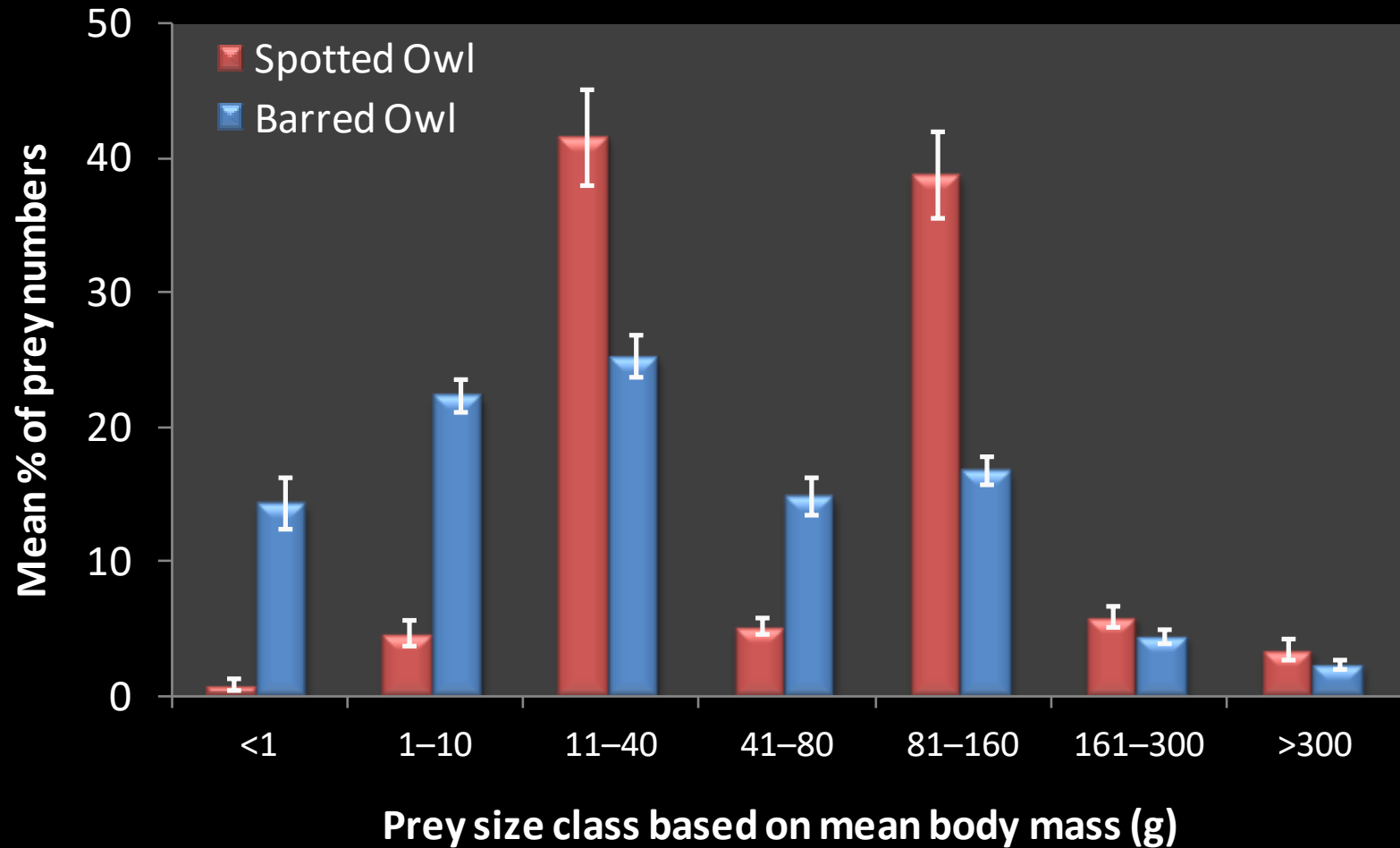
Barred Owl



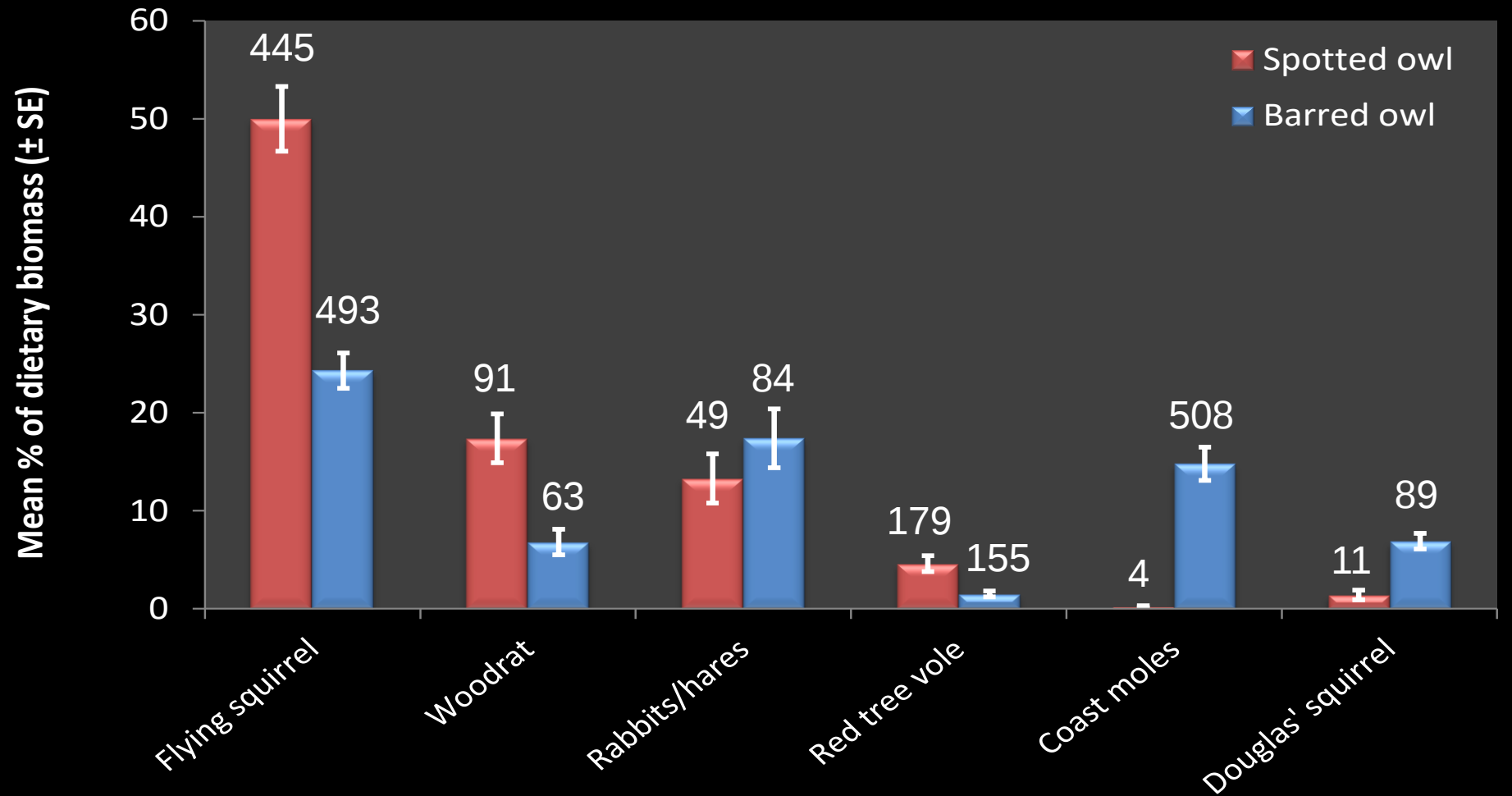
4,306 prey items
95 species

Mean dietary overlap = 42% (range = 28 – 70%)

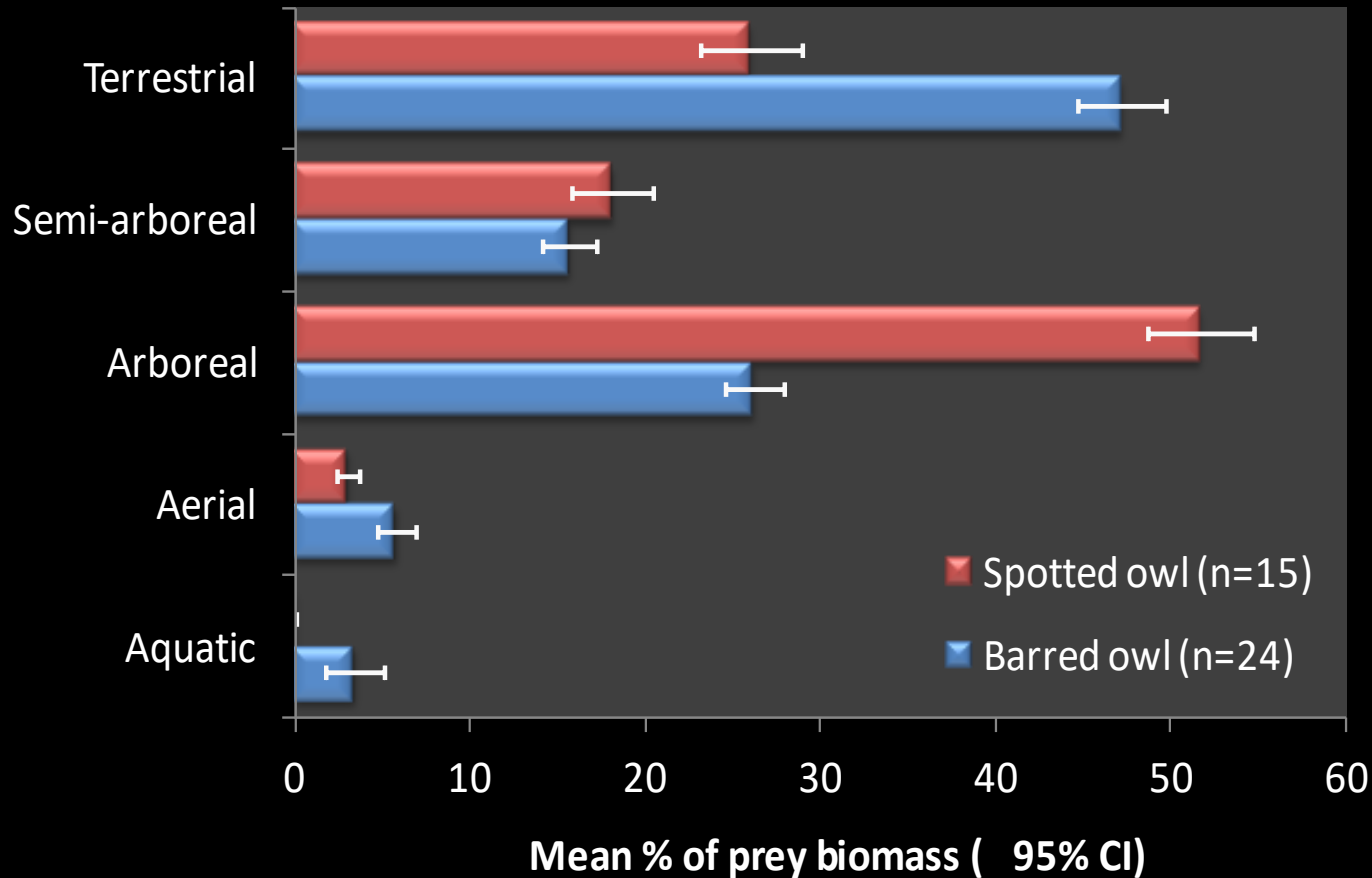
Dietary Overlap by Prey Size Class



Primary Contributors to Dietary Biomass



Diet Composition by Prey Activity Zone





©Will Stuart



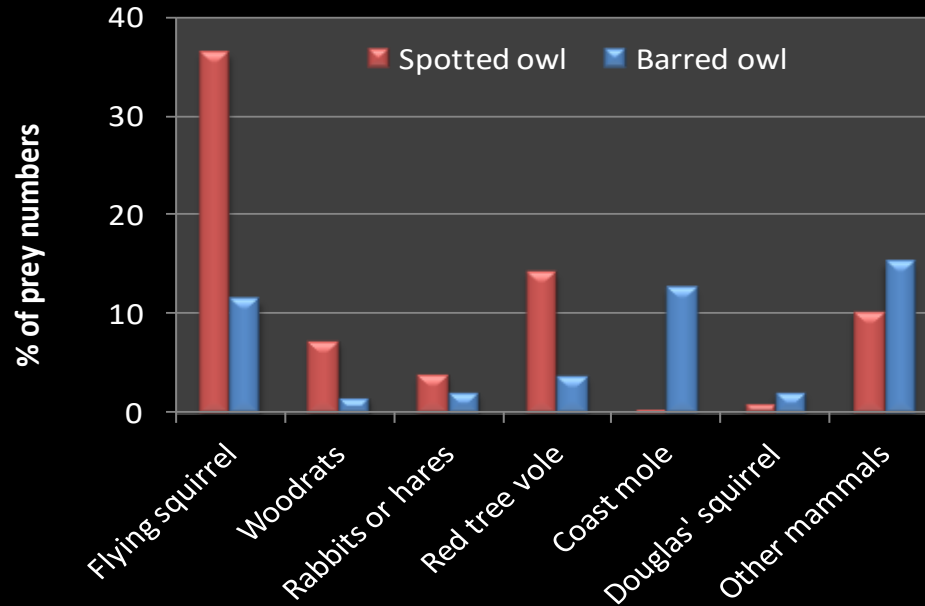
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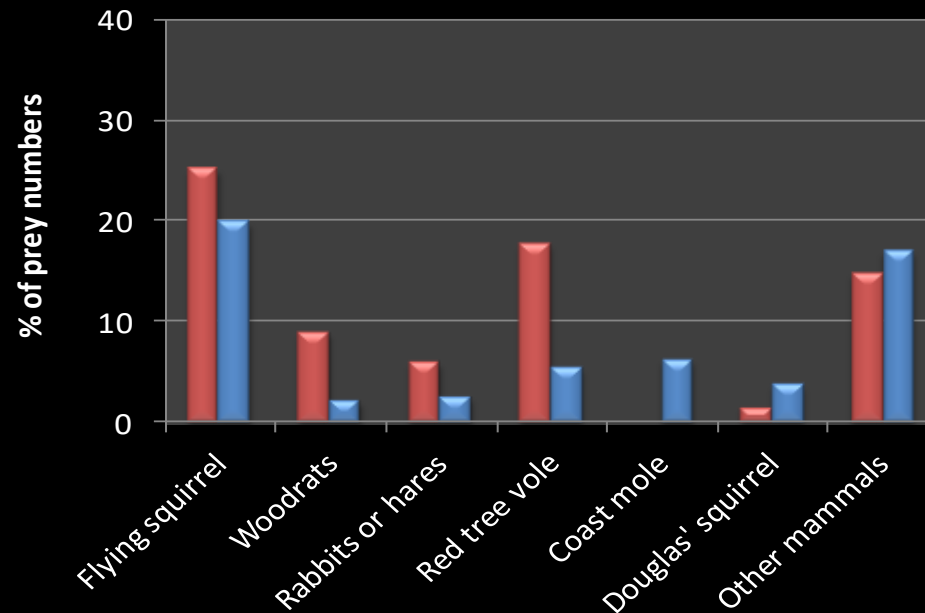
Seasonal Changes in Diets, 2007 – 2009

**Breeding
(Mar – Aug)**



Dietary overlap = **45%**

**Nonbreeding
(Sep – Feb)**



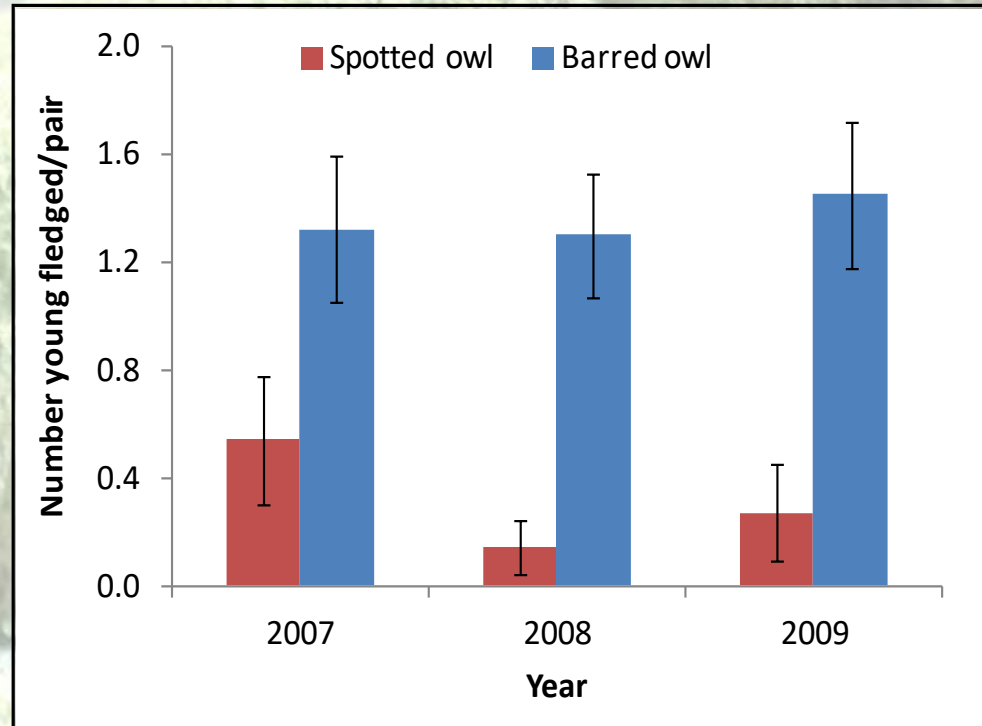
Dietary overlap = **68%**

Reproductive Output

Number of Young Fledged per Pair

Spotted owl **0.31** (SE = 0.11, $n = 14$)

Barred owl **1.36** (SE = 0.14, $n = 20$)



- Barred owls produced 6 – 9 times as many young as spotted owls annually
- All spotted owls that attempted to nest within 1.5 km of a barred owl's nest failed to produce young

Summary of Key Findings

- Barred owls outnumbered spotted owls by >4:1
- Both predators had broadly overlapping home ranges and displayed similar patterns of habitat selection within shared foraging areas
- Spotted owls specialized on arboreal mammals whereas barred owls foraged opportunistically across a broad range of prey sizes and types
- Both predators relied on a similar set of high-biomass prey species (e.g., *flying squirrels*, *woodrats*, *lagomorphs*, *tree voles*, *deer mice*)
- Habitat overlap (81%) was greater than dietary overlap (42%)
- Dietary overlap increased during fall and winter months
- Evidence of differential foraging strategies and fine-scale habitat partitioning (terrestrial vs. arboreal prey species)

Conservation Implications

- Results emphasize the importance of old conifer forest and moist streamside habitats to resource partitioning
- Additional loss of older forest can further constrain both species to a common set of limiting resources, thereby increasing competitive pressure
- Potentially cascading effects of barred owls on other native wildlife?



Funding Agencies and Cooperators



Research Cooperators

Oregon State University

Boise State University

Westside Ecological

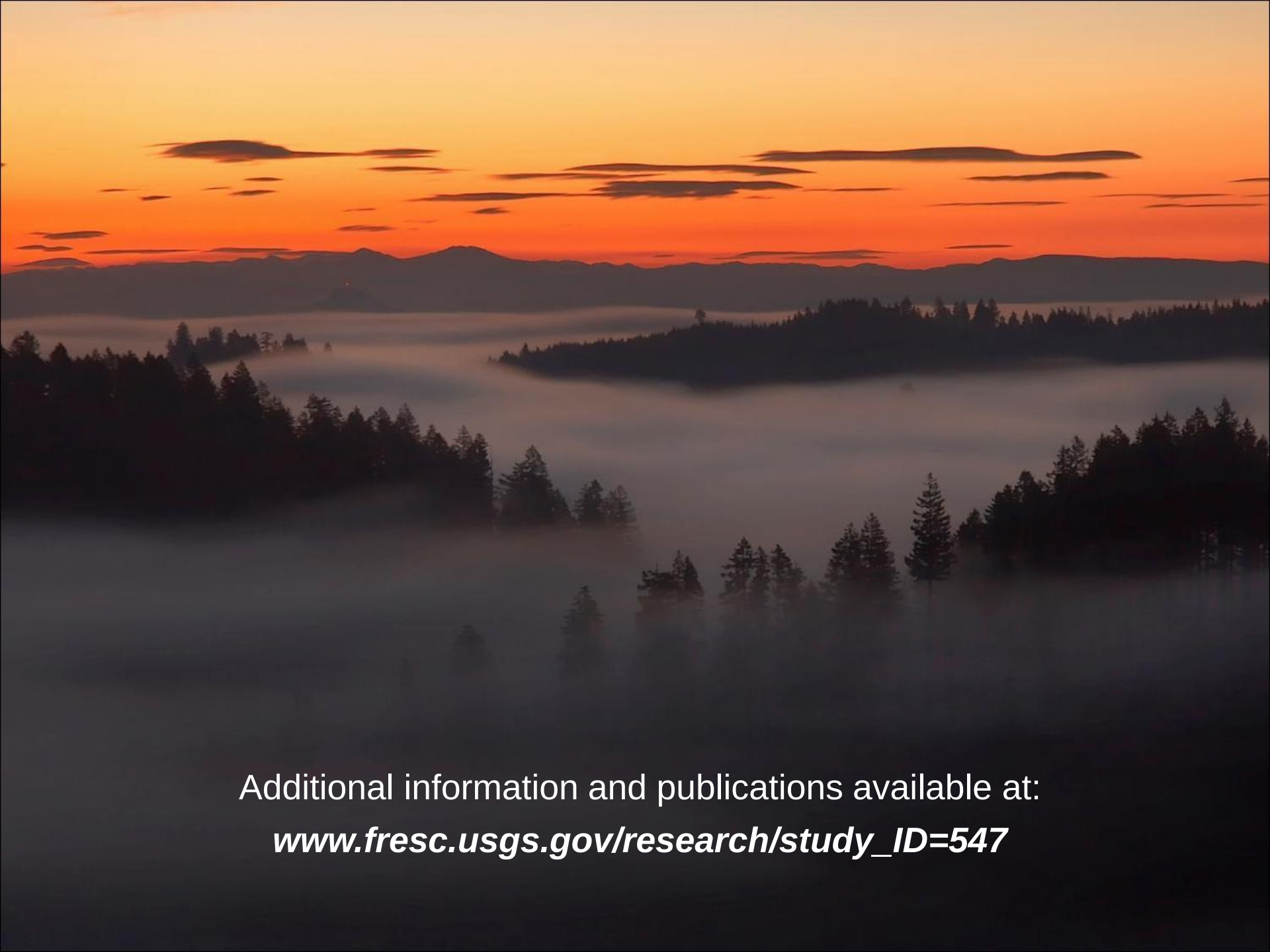
Roseburg Forest Products

Weyerhaeuser Company

Swanson Superior

National Council for Air &
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Biological Information Specialists



Additional information and publications available at:
www.fresc.usgs.gov/research/study_ID=547