



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

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Northern spotted owl



Barred owl

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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***

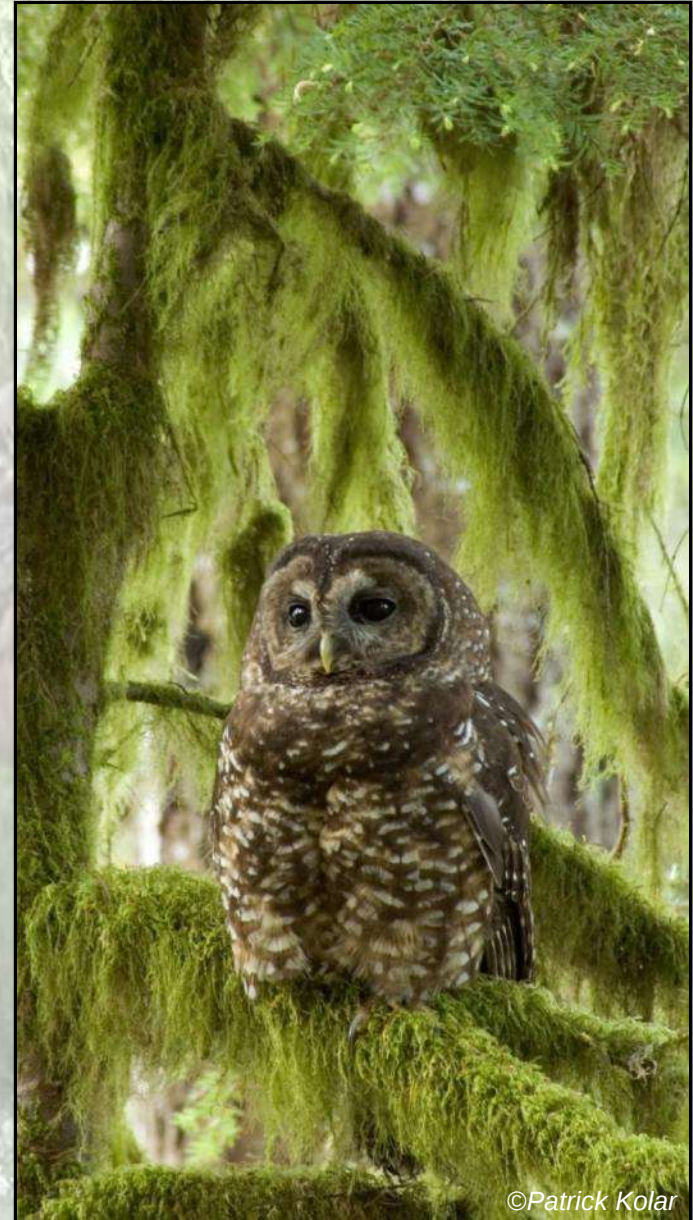
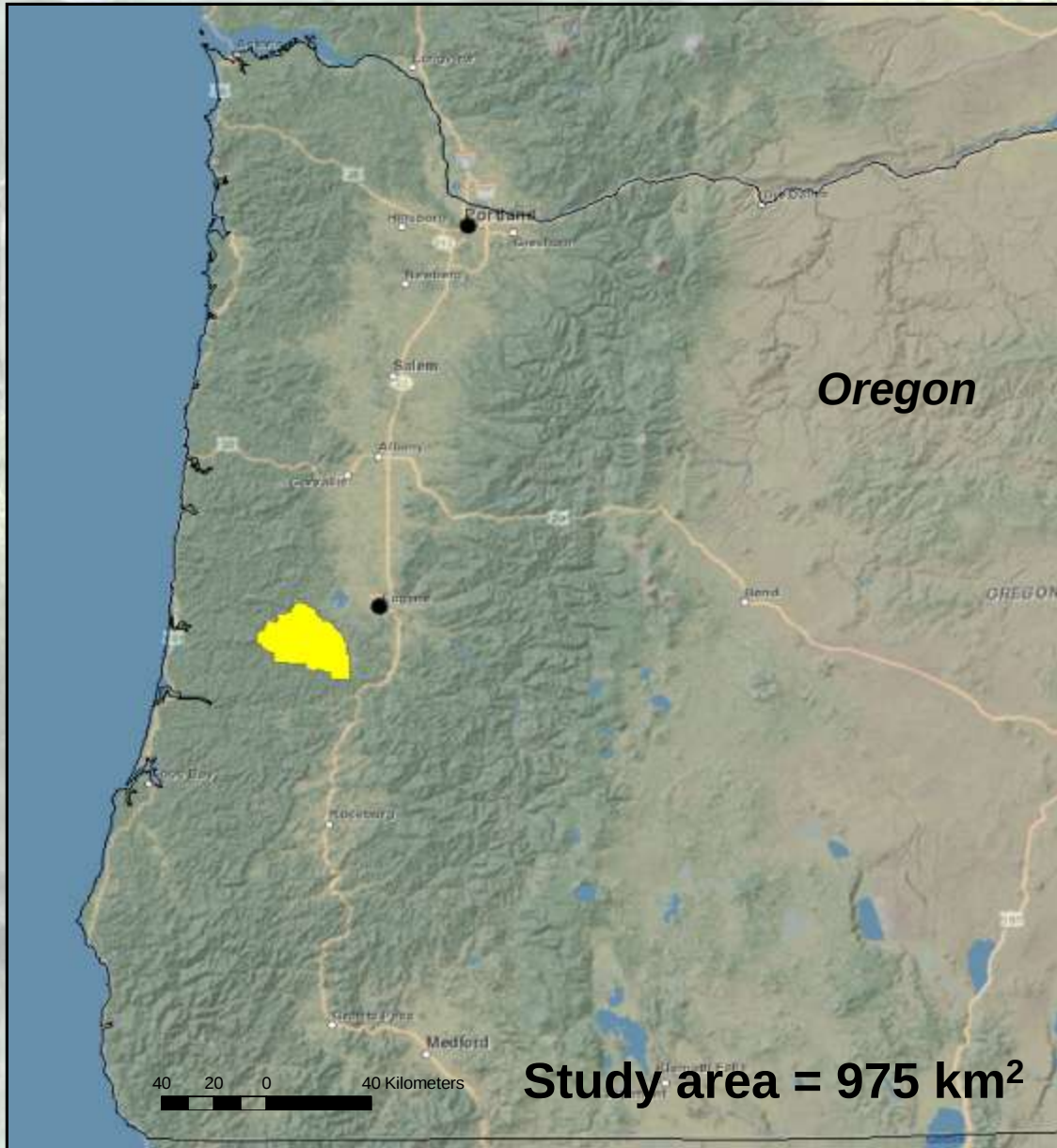
***Habitat
selection***

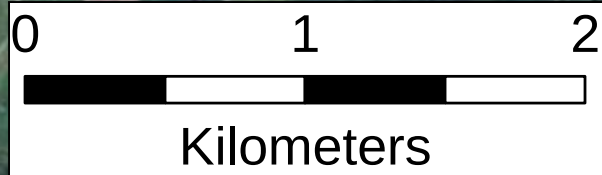
***Diets
and foraging***

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)



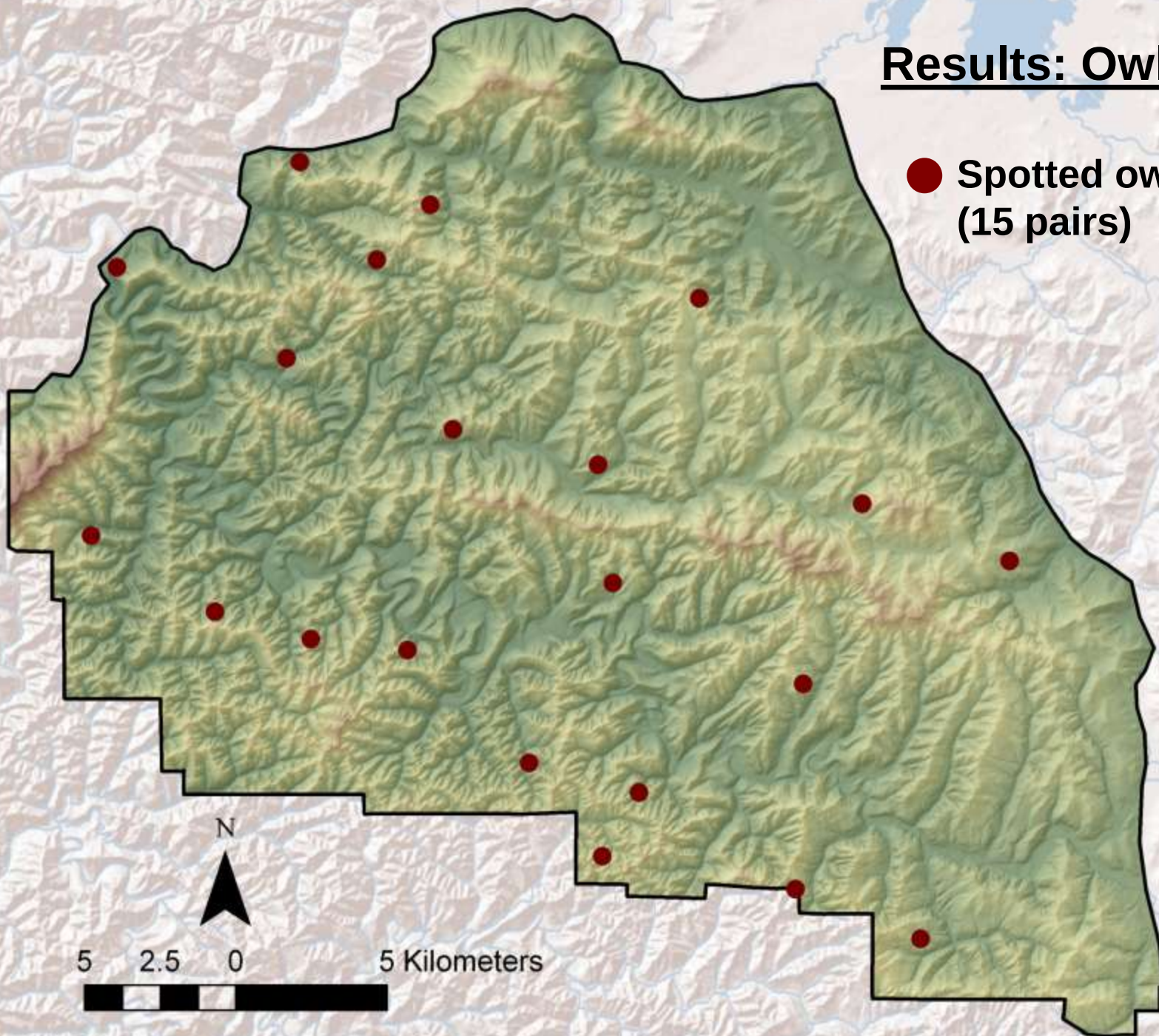
Methods: Owl Diets

- 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)



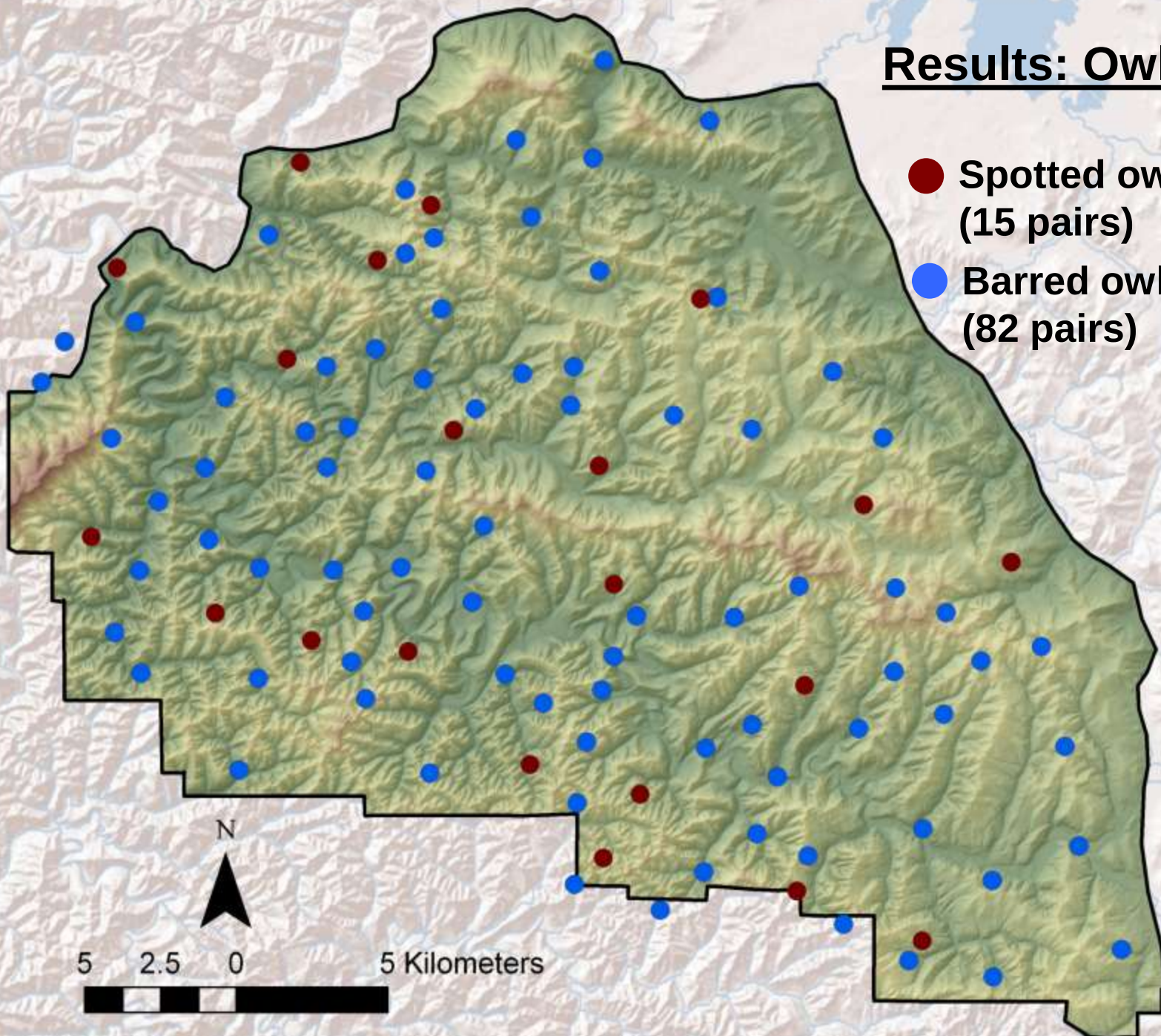
Results: Owl Surveys

● Spotted owl territory
(15 pairs)

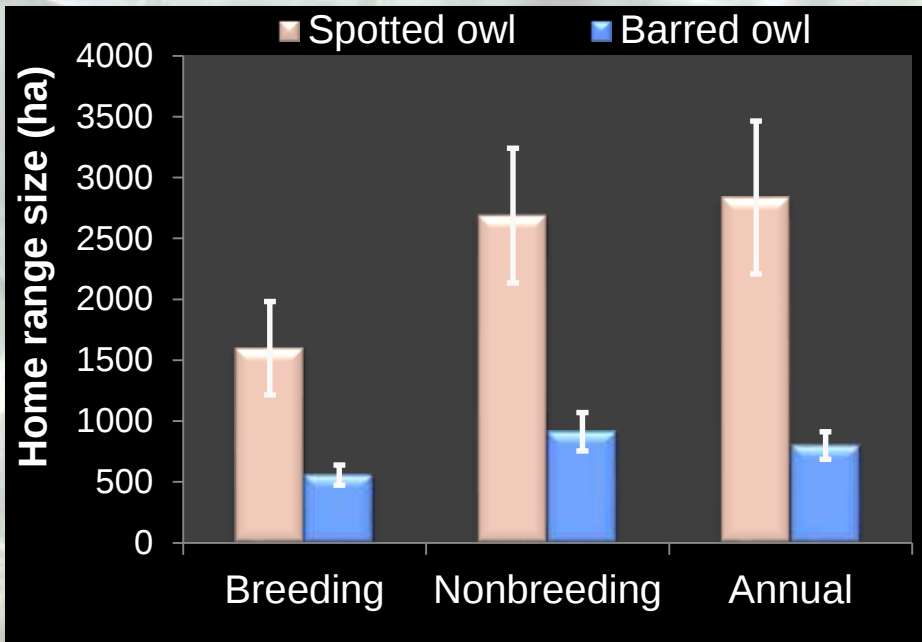


Results: Owl Surveys

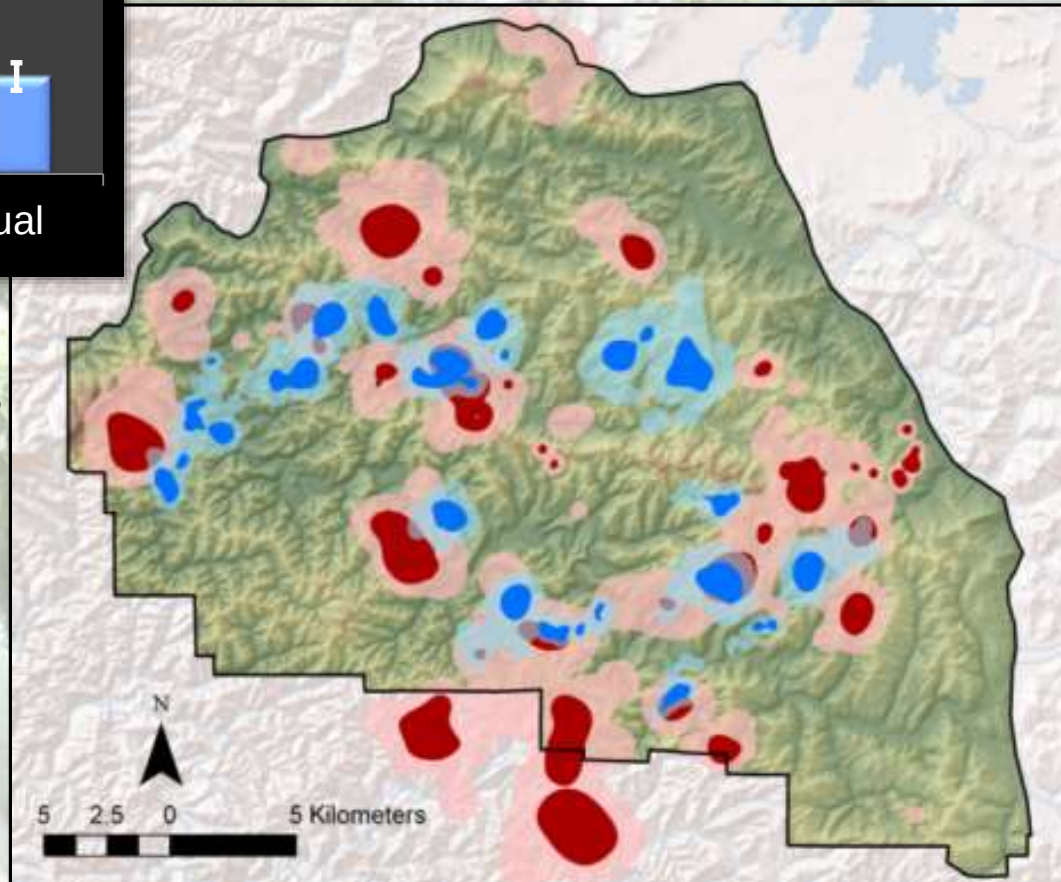
- Spotted owl territory (15 pairs)
- Barred owl territory (82 pairs)



Spatial Relationships



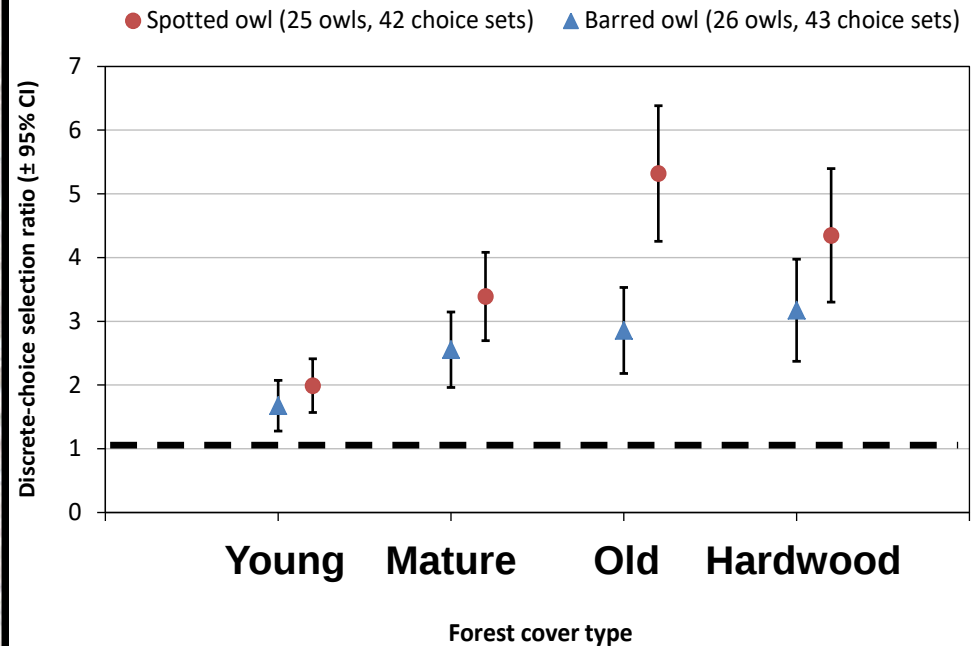
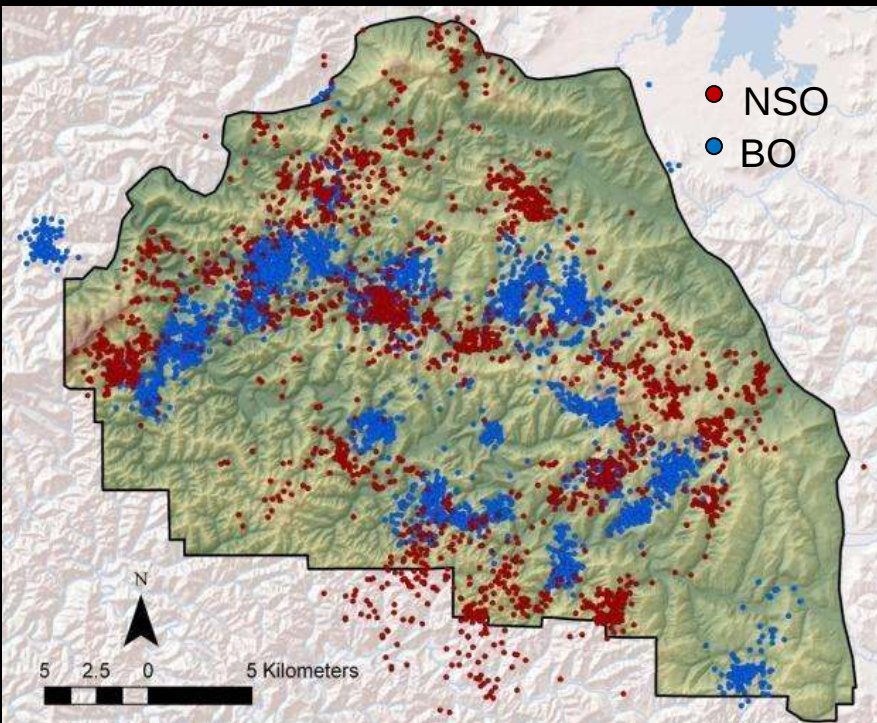
- Home ranges of spotted owls were 2 – 5 times larger than those used by barred owls



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

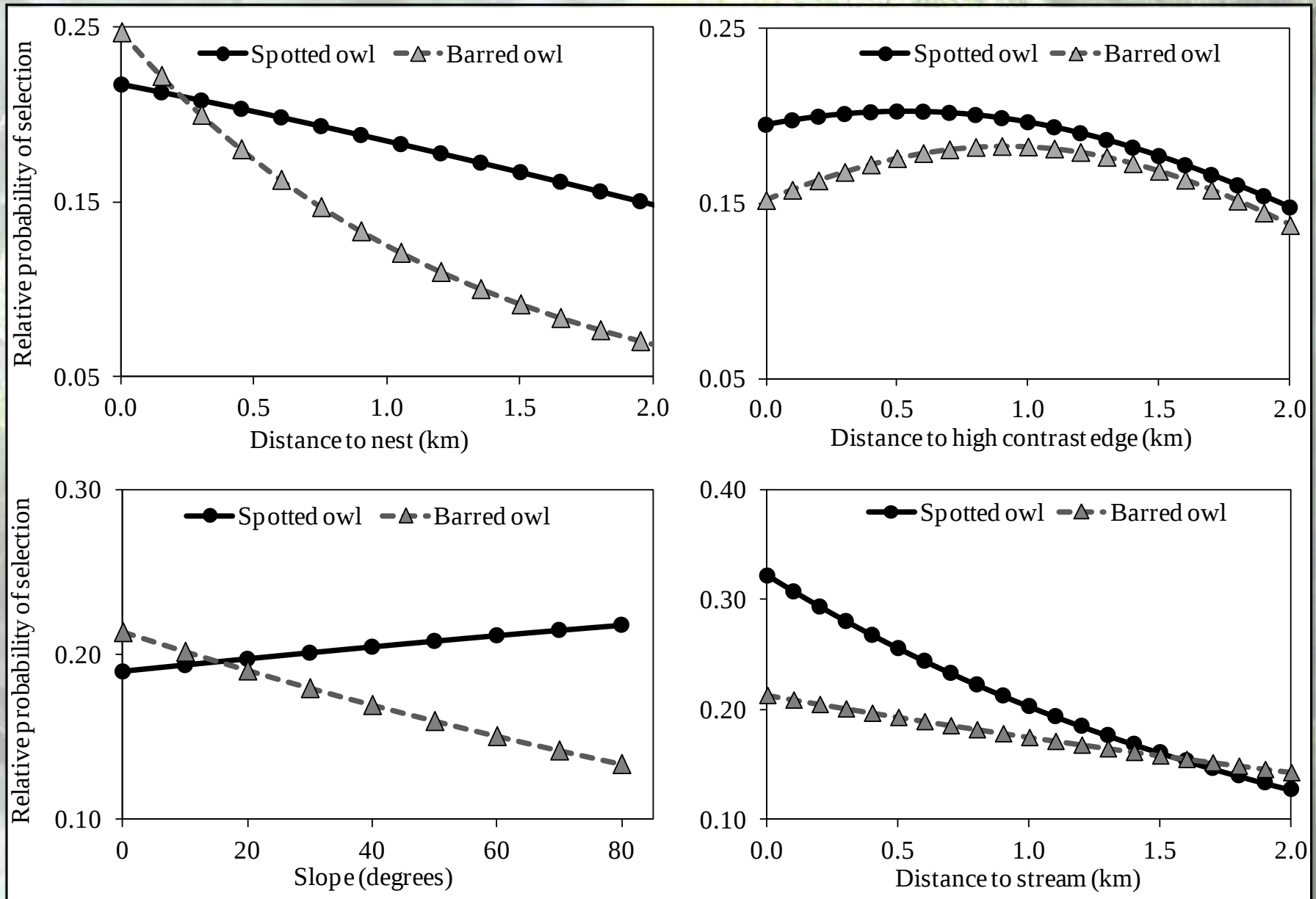
Nighttime Habitat Selection

- 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



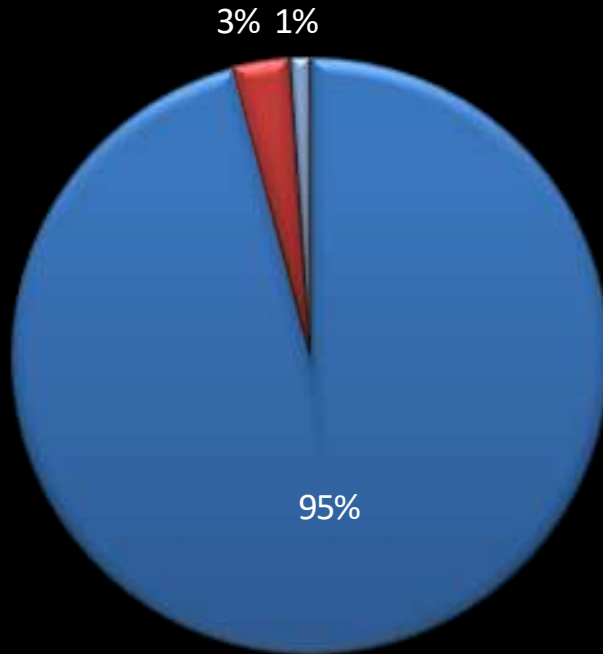
Diets and Foraging Behavior



Dietary Composition (% of prey numbers)

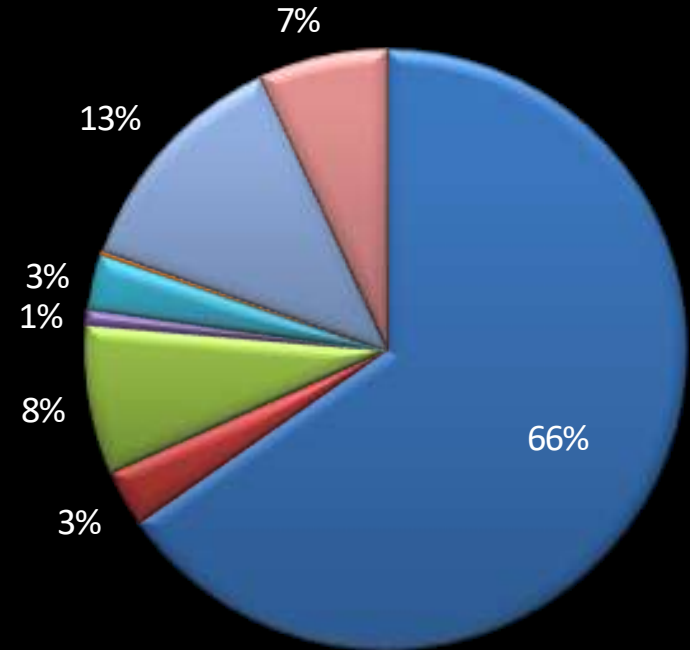
■ Mammal ■ Bird ■ Amphibian ■ Reptile ■ Crayfish ■ Fish ■ Insect ■ Mollusk

Spotted Owl



1,246 prey items
51 species

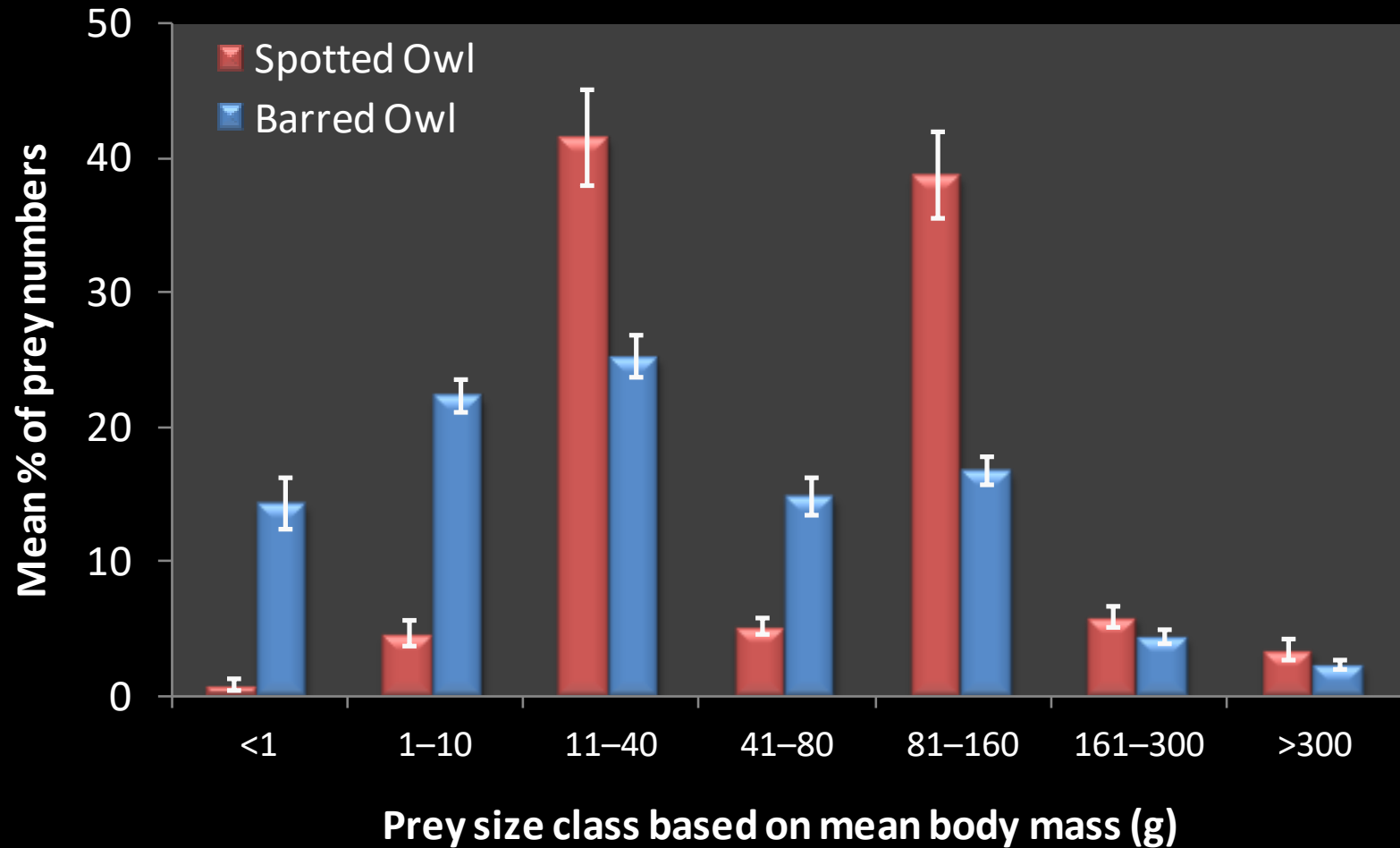
Barred Owl



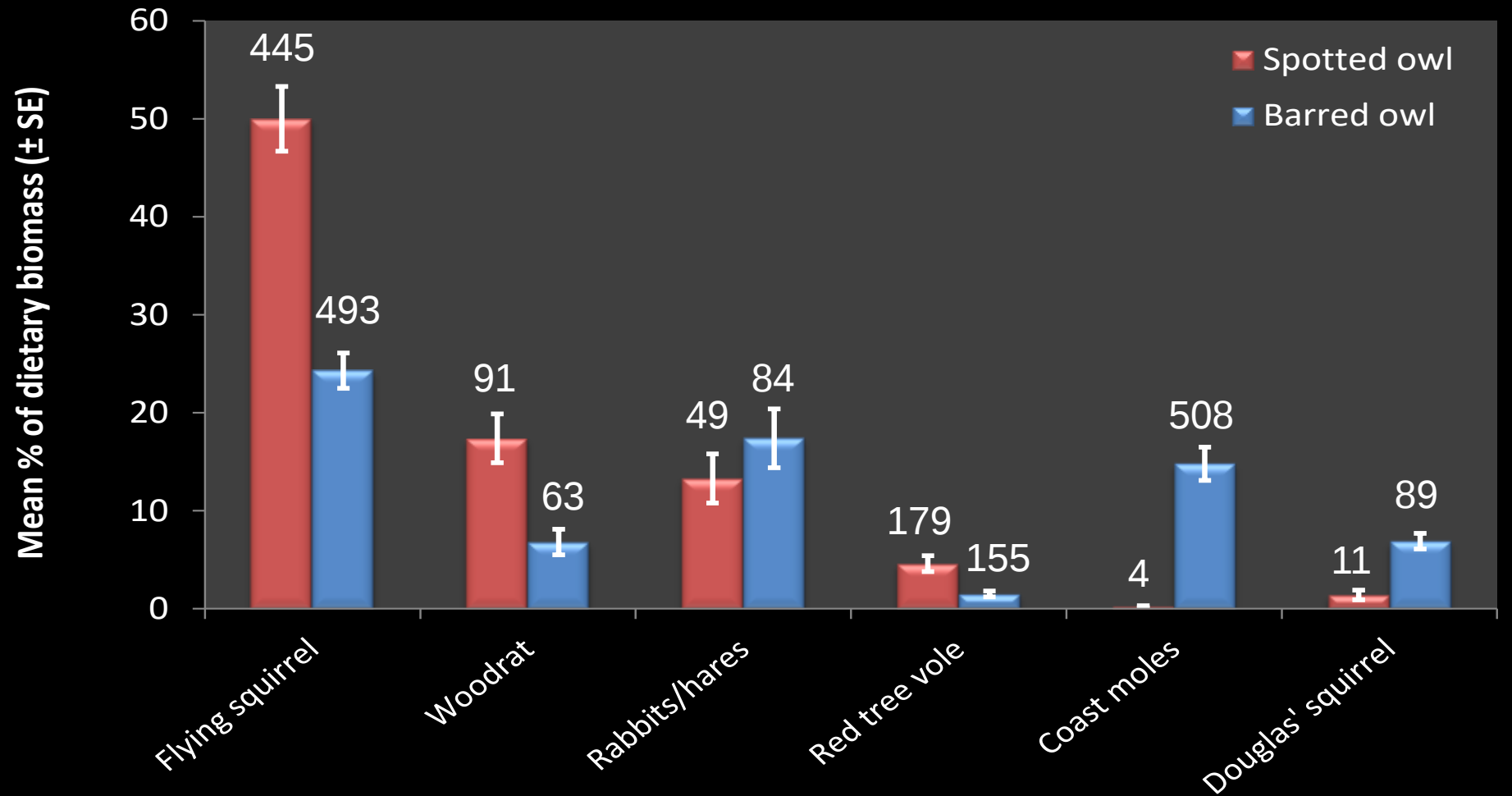
4,306 prey items
95 species

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

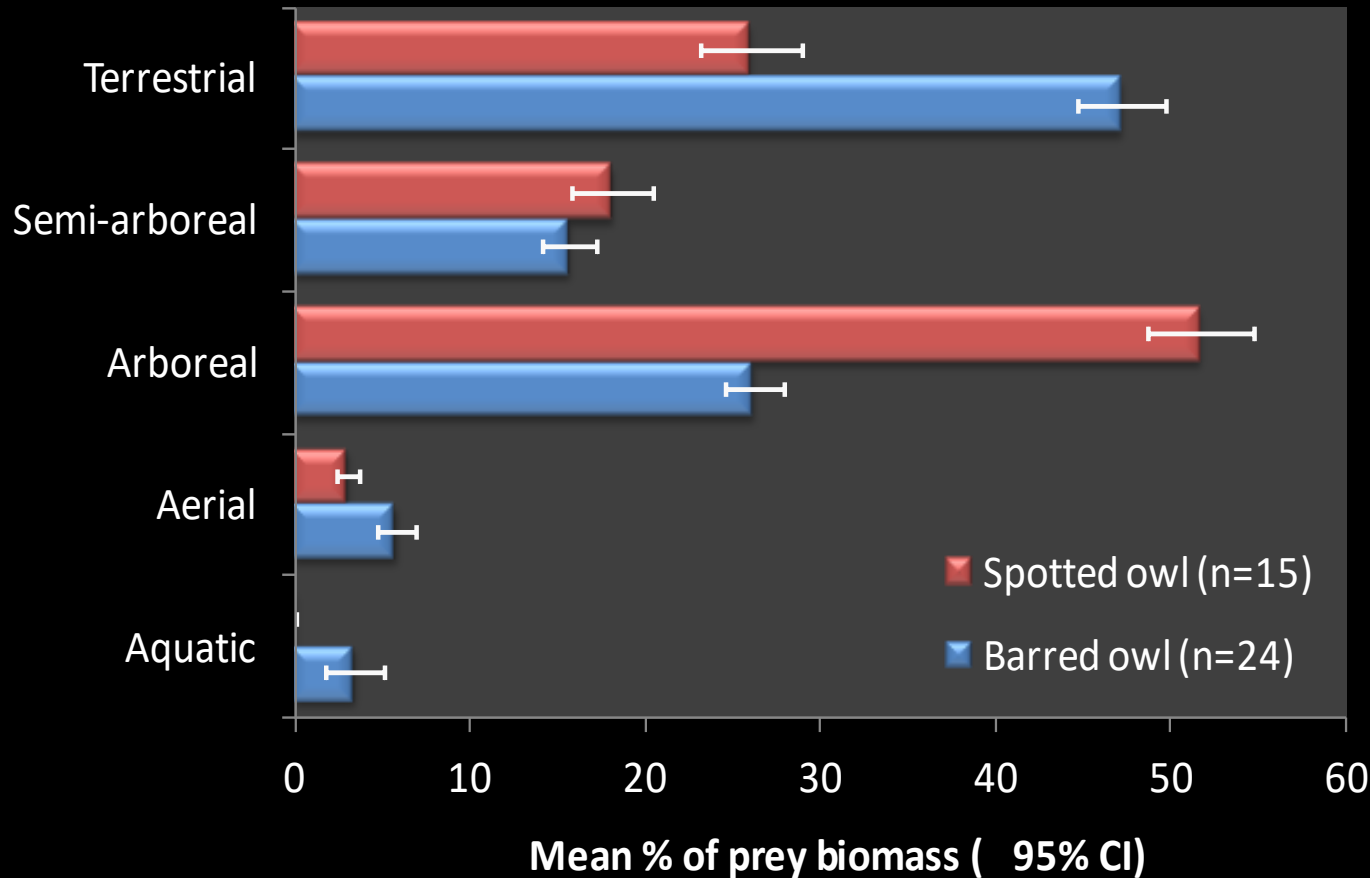
Dietary Overlap by Prey Size Class



Primary Contributors to Dietary Biomass



Diet Composition by Prey Activity Zone





©Will Stuart



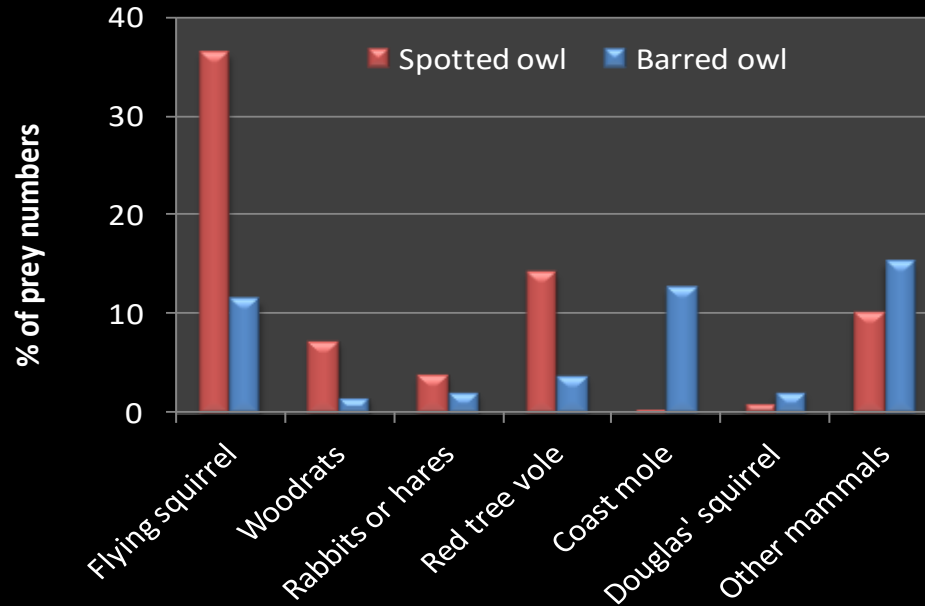
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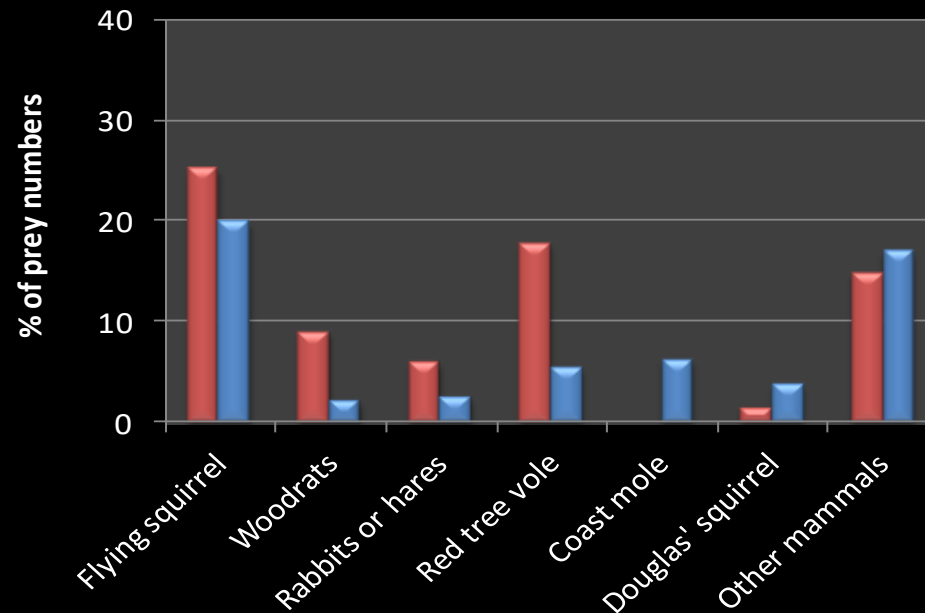
Seasonal Changes in Diets, 2007 – 2009

**Breeding
(Mar – Aug)**



Dietary overlap = **45%**

**Nonbreeding
(Sep – Feb)**



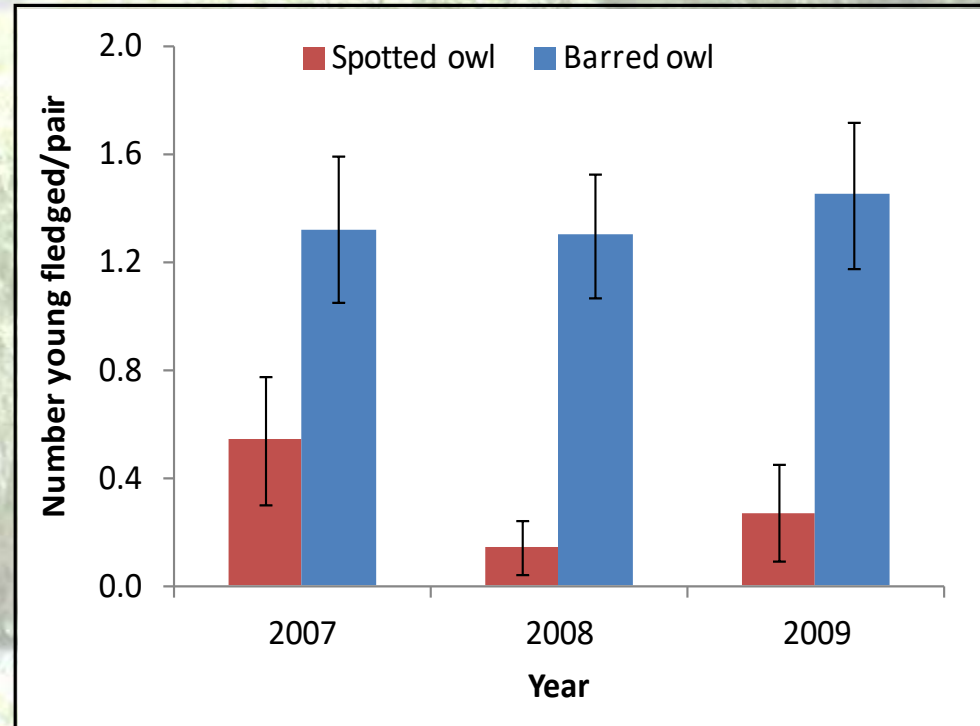
Dietary overlap = **68%**

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

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Weyerhaeuser Company

Swanson Superior

National Council for Air &
Stream Improvement

Biological Information Specialists



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