Chapter 4: Northern Spotted Owl Habitat and Populations—Status and Threats

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Northern Spotted Owls

- Decades of Science and Conservation
  - 1990 ESA Listing – Threatened
  - 1994 Northwest Forest Plan
Northern Spotted Owls

- Territorial
- Non-migratory
- K-selected species
- Lifespan of 20+ years
- Low fecundity

- Old forest obligate
Long-term Demography

- NWFP Effectiveness Monitoring
- Anthony et al. 2006
  - 1985-2003
- Forsman et al. 2011
  - 1985-2008
- Dugger et al. 2016
  - 1985-2013
Mark-Resight Data

- Apparent survival
- Reproduction
- Territory occupancy
- Population change ($\lambda$)
Range Wide Population Trends

Population Growth

Stable population ($\lambda = 1$)

- 1993: Anthony et al. 2006
- 2011: Forsman et al. 2011
- 2016: Dugger et al. 2016

- 1993: Anthony et al. 2006
- 2011: Forsman et al. 2011
- 2016: Dugger et al. 2016

- Stable population ($\lambda = 1$) in 1993:
  - Range: 0.955 to 0.971
  - Percentage: 59-77%

- Stable population ($\lambda = 1$) in 2011:
  - Range: 0.955 to 0.971
  - Percentage: 31-64%

- Stable population ($\lambda = 1$) in 2016:
  - Range: 0.955 to 0.971
  - Percentage: 32-55%
Habitat

- Resources and environmental conditions to support occupancy, reproduction, and survival
Habitat Mapping

Nesting and Roosting Forest

ESA Critical Habitat

Suitable

unsuitable
Habitat: Patterns of Change

- **↓3.4% net decrease**

- **Non-federal**
  - Timber harvest

- **Federal**
  - Wildfire

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**Net change**

**Losses**
- Percent change:
  - >5% loss
  - 2.5 to 5% loss
  - 1 to 2.5% loss
  - <1% change
  - 1 to 2.5% gain
  - 2.5 to 5% gain
  - >5% gain

**Gains**
Effects of Habitat Loss

Core Area Scale

Territory Scale

High Fitness

Low Fitness

Dugger et al. 2005

Franklin et al. 2000
Protection of Suitable Forest

- LSR Network
- Nest sites in matrix
- National Parks, Wilderness Areas
Prey

Spotted Owl

- 95% Mammal
- 3% Bird
- 1% Amphibian
- Reptile
- Crayfish
- Fish
- Insect
- Mollusk

Barred Owl

- 66% Mammal
- 13% Bird
- 8% Amphibian
- 3% Reptile
- Fish
- Insect
- Mollusk

Photo by Patrick Kolar
Barred Owl Effect on Spotted Owls

- Occupancy
- Survival
- Reproduction
- Population size
- Detection rates

Graphs showing occupancy trends for different regions:
- Olympic Peninsula
- Cle Elum
- Coast Range
- HJ Andrews
- Tyee
- South Cascades
- Klamath
- NW California
Proportion of Territory Burned at Mod or High severity

Rockweit et al. 2017
Forest Restoration – Driest Forest

• Thinning
• Fire resiliency
Forest Restoration – Moist Forest

- Thinning
- Vegetation diversity
- Structural complexity
Climate Change

- Wet winters
- Hot dry summers
- Spotted owls
- Old-growth more resistant to climate change
Information Needs

- Climate Change
  - Forest Management
    - Barred Owls
    - Disease
    - Prey Populations
    - Wildfire
    - Stress
    - Old forest connectivity
Conclusions

- Northwest Forest Plan and Spotted Owl Conservation
  - NECESSARY
    - Populations would have declined more rapidly without the plan
  - But alone is NOT SUFFICIENT

![Graph showing Spotted Owls with and without Barred Owls (USFWS 2011)]