

# NORTHERN SPOTTED OWL FIVE-YEAR STATUS REVIEW

Assessment of the Potential Threat of the  
Barred Owl to Northern Spotted Owl



At 1990 listing, Barred Owl already perceived as a potential threat to Northern Spotted Owl:

**Comments** from listing document (Fed.Reg.55:26173[1990]):

- “...not shown that presence of BO detrimental to NSO...”
- “..BO competes with NSO for habitat but [this is] conjecture..”
- “..real threat to NSO is presence of BO and expansion of range..”
- “..BO much better competitor,..will replace NSO even where management efforts implemented to protect habitat...”
- “..recent work seems to indicate that BO displaces NSO..”

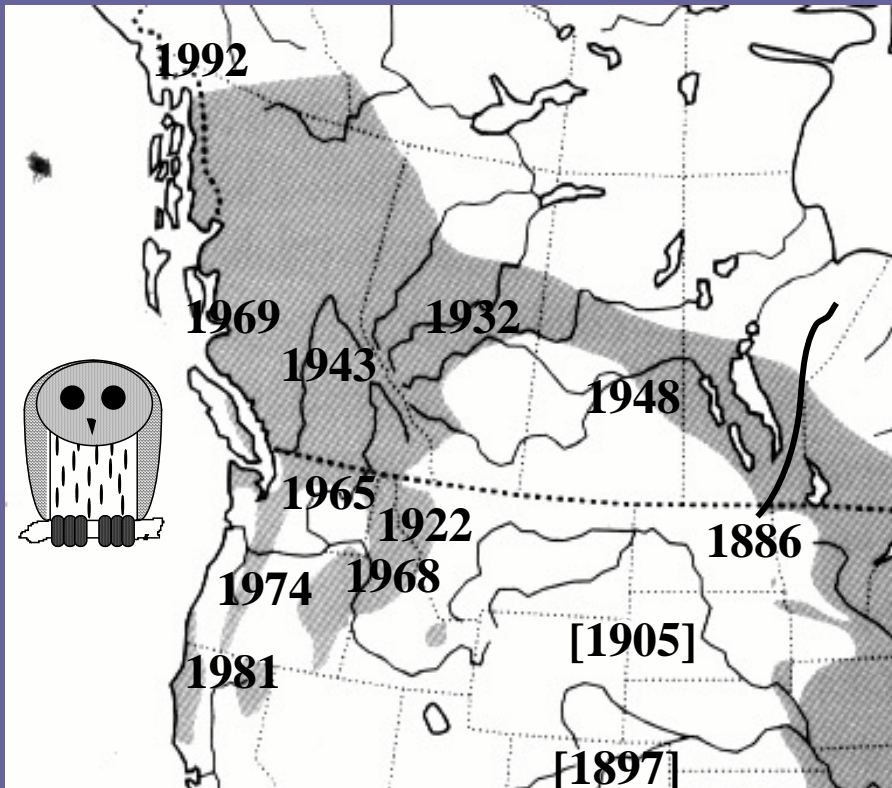
**Service Response:**

- “1989 Status Review Suppl...did not reach a conclusion regarding impact of BO on distribution, reproductive success, abundance or survival of NSO...long term impact unknown but of concern.”

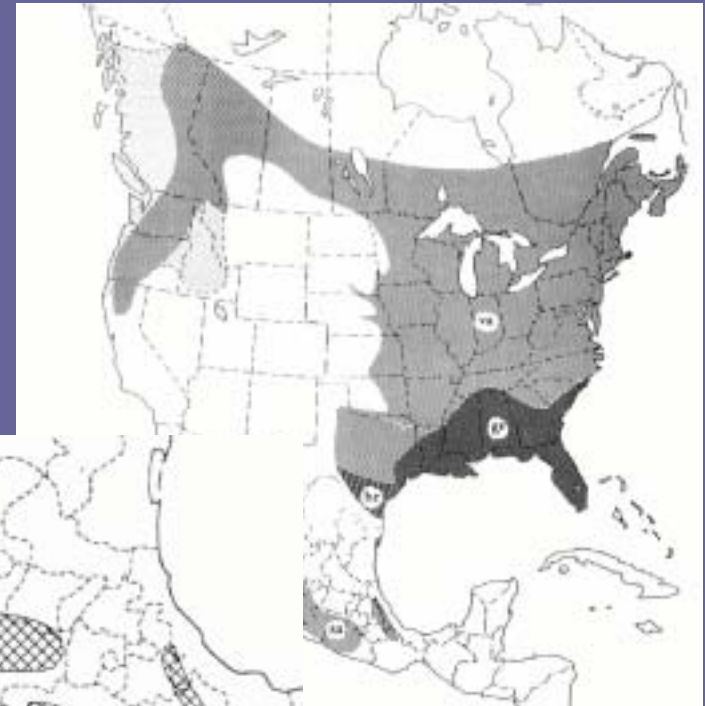
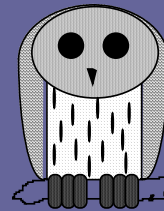
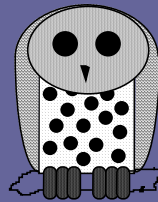
Barred Owls have expanded their breeding range in historic times, east into the PNW and south into Northern California

Result:

- there is now  $\pm$ complete sympatry between BO and NSO;
- there is extensive syntopy (use of same habitats), and
- there is high overlap in prey use by syntopic BO, NSO

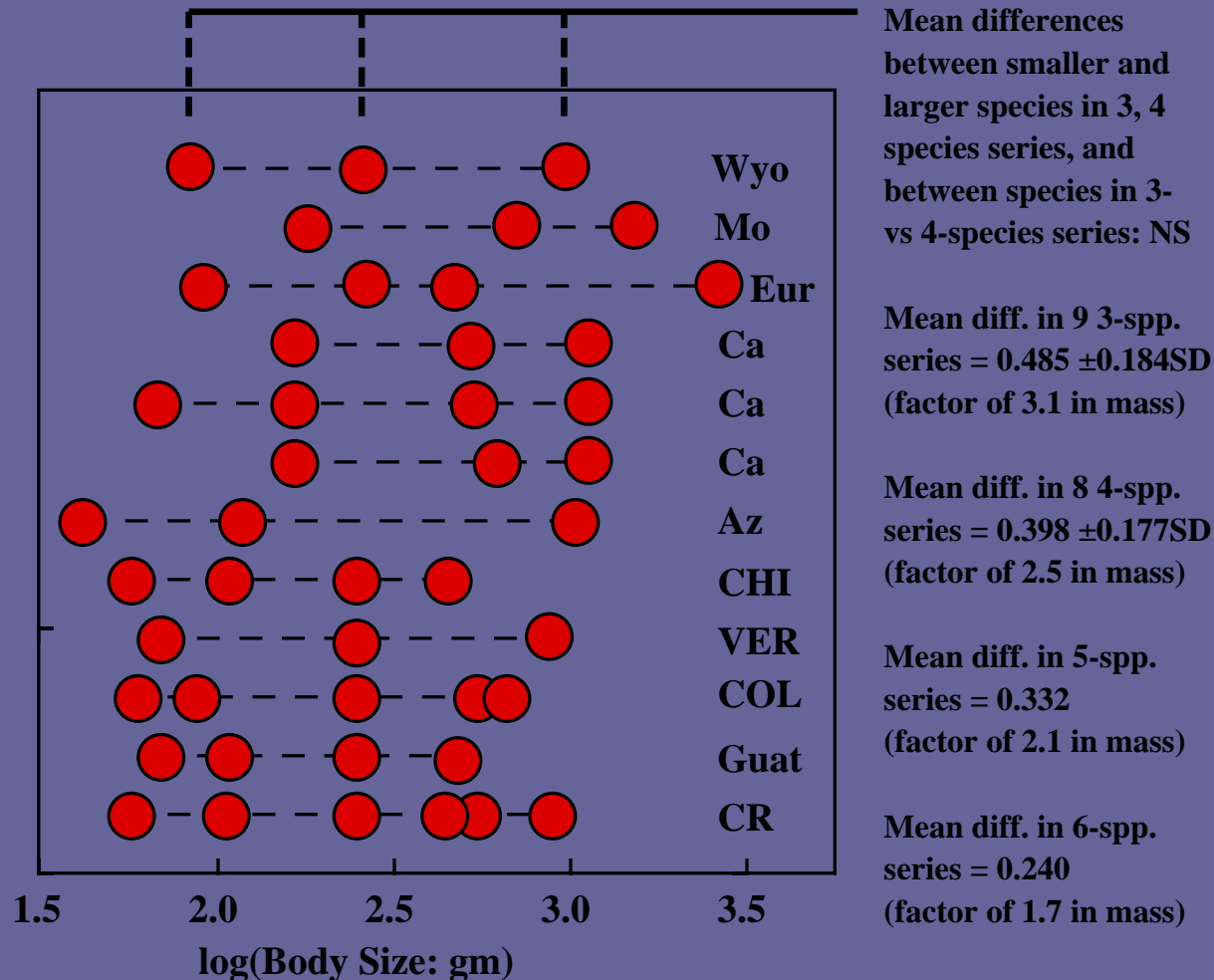


# Continent-wide ranges of Barred and Spotted Owls

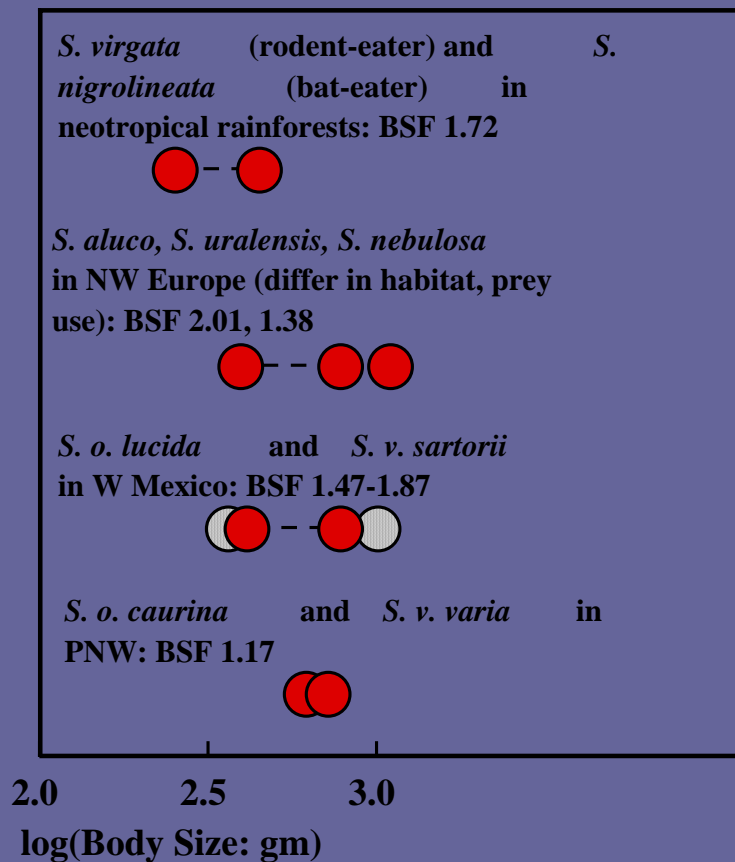


There are now two regions where Barred and Spotted Owls co-occur:  
PNW and W Mexico

# The broader perspective on owl coexistence: strongly related to differences in body size



# Coexisting congeneric owls also segregate by body size differences

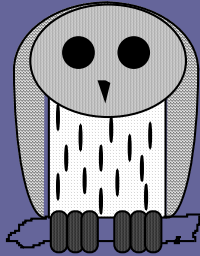


- Coexisting species sets sometimes contain congeneric species, which also differ by size
- Syntopic *Strix* species generally differ by size and prey preferences
- BO and NSO differ substantially by size in W MEX, not in PNW

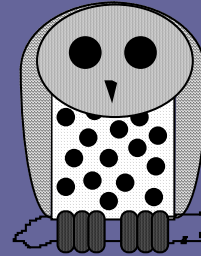
However, there **are** differences in the ecologies of the two species

- In overall **habitat preferences** (more or less mesic, mixed vs. uniform, older vs. younger forest types)
- In **reproduction** variables (smaller vs. larger territories and clutch sizes; possibly in variability and productivity of young)
- In **prey range and taxa** (generalist vs. specialist strategies)

# There are some differences between species in habitat use

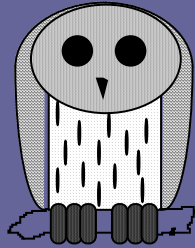


- BO uses a wider range of habitat types overall: deciduous, mixed, to coniferous forest, riparian to boreal and montane
- Some tendency for more use of younger, more mesic, flatter sites at lower elevations

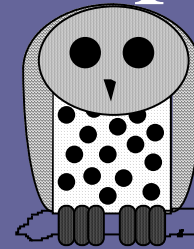


- NSO more constrained to mixed and especially coniferous forest, old growth and large saw timber
- Some tendency for greater use of older forest, of drier sites, of upslope rather than riparian habitat

# Reproductive strategies differ somewhat between the species

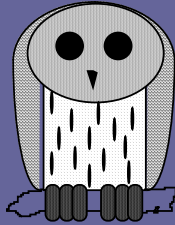


- Territory size much smaller in BO, likely reflecting more productive habitat and wider prey base
- Clutch size ranges higher (1-5) in BO

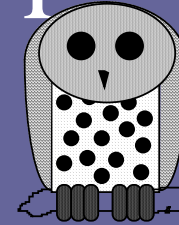


- Territory size in NSO much larger (3.5-7.4x larger in N cascades shared habitat)
- CS range smaller (1-3), breeding usually in alternate years, LTA production of young 0.74/y/female over yrs

# Differences exist in the prey base utilized by the two species



- BO has a much wider prey base, including larger mammals, more birds; also fish, lizards, amphibians, and invertebrates
- Tendency to take more diurnally active prey
- Nb. 76% overlap at one site



- NSO much more a dietary specialist on mid-sized mammals, main components vary regionally from voles and flying squirrels to woodrats
- Takes more prey from arboreal locations

# Interactions between Barred and Northern Spotted Owls

- Vary from direct agonistic to indirect behavioral interactions; BO prominent aggressor
- Actual or inferred displacement of NSO by BO; reduced site occupancy by NSO following increased BO presence in area
- Potential for competition via resource depletion of shared prey base
- Potential for a predation factor; BO known to kill birds of NSO-size

# Correlational evidence of NSO displacement by Barred Owls

## **Declines in NSO #s followed BO increases in**

- Olympic Peninsula 1991-99: 5x incr. in BO; 2003 BO counts 55% higher than previous yrs
- Mt. Ranier 1991-98: BO outnumbered NSO by ratio 38:27 in 107 original NSO territories
- BC 1992-2001: BO 4x NSO numbers in late 1980's; 49% decline in NSO
- Redwood NP, SP 1997-2002: 5x increase in BO occupancy of 37 erstwhile NSO sites, just 17% still had NSO pairs present

# Analyses of NSO site occupancy reveal direct effects of BO presence

On Olympic Peninsula, in Cle Elum, Roseburg, Oregon Coast Range forests

-NSO site occupancy declined significantly where BO located  $<0.8$  km from territory center, not so where BO was  $>0.8, <2.4$  km

-46% of NSO moved  $>0.8$  km away following BO presence nearby, 39% not relocated after  $\geq 2$  years

# A more detailed analysis of BO/NSO interaction requires

- Detailed information on BO numbers, densities, trends etc collected under standardized protocols
- Experimental, controlled investigations of BO/NSO interactions over site occupancy to elucidate direct, causal relationships
- Synchronous analysis of other potential factors (prey densities, weather, site history, past and present habitat availability, etc)

# Hypothetical outcomes of the BO/NSO interaction in PNW

- Clearly plausible:
  - 1A BO will replace NSO throughout range or
  - 1B in only more northerly and mesic areas or
  - 1C outcome favors BO with NSO persistent at low density
- Plausible:
  - 2A NSO remains competitively superior in some habitats that favor its preferred prey and foraging tactics
  - 2B or does so only with management intervention

Range shifts & competitive exclusion relatively common at high latitudes revegetated post-glacially  
 Sequence is allopatric ( $\gamma$ -counterparts) to allotopic (different habitats,  $\beta$ -counterparts) to syntopic ( $\alpha$ -counterparts) with decreasing latitude

- Exx. of this scenario are *Sylvia* warblers in Europe, wrens in N America
- House wren replaced Bewick Wren over much of E, MidW >1960's (BW listed 12 states);
- The 2 species coexist as  $\beta$ -replacements in CA (neg. correl. between years, and within shared habitats);
- coexist in same open oak-pine habitat in W MEX, without interactions; differ in foraging sites and foraging heights.

