U.S. Fish and Wildlife Service

Timeline: Evolution of the Barred Owl Threat to the Northern Spotted Owl

Full literature citations are listed alphabetically by author at the end of this fact sheet.

1959: *Barred owls, native to eastern North America, are first documented in the northern parts of the northern spotted owl's range in British Columbia. They appear to have moved westward from the Northeastern U.S. into British Columbia and then south into Washington.*

1970s: *Barred owls are first documented within the range of the spotted owl in Oregon (in 1972), Washington (in 1973), and California (in 1976).*

1988: *A thesis on barred owl and spotted owl ranges shows barred owls are "generalists" compared to spotted owls because they use a variety of habitats and forage on a broader range of prey.* ***[Hamer, Thomas, "Barred Owl and Spotted Owl Home Ranges and Habitat Use in Washington"]***

1989: *A status review for the spotted owl indicates that the long-term impact of barred owl expansion into the range of the spotted owl is unknown but of considerable concern.* ***[USFWS, "The Northern Spotted Owl Status Review Supplement"]***

1990: *U.S. Fish and Wildlife Service (FWS) lists the northern spotted owl under the Endangered Species Act as a threatened species in Washington, Oregon, and California. Habitat loss is identified as the primary threat to spotted owls. The listing documents reflect concerns raised in the previous year's status review about barred owl expansion.*

1994: *Northwest Forest Plan is finalized, in part to guide federal agencies' contribution to spotted owl conservation throughout the owl's range. The plan amends federal resource management plans within 19 National Forests (19.4 million acres) and seven BLM districts (2.7 million acres). Six National Parks (totaling 2 million acres) also are covered under the plan.*

Late 90s/early 00s: *Researchers' observations increasingly indicate that barred owl populations are expanding and may be causing harm to spotted owls. Though these incidental observations occur in the course of other field research, they eventually point to the need for specific studies on the barred owl's encroachment into the spotted owl's range.*

2003: *First evaluation of barred owl/spotted owl interactions in the Pacific Northwest shows that barred owls are increasing rapidly in Oregon, hybridization reports are rare, and spotted owl occupancy declines significantly after barred owls are detected nearby. (Later research, such as Olson et al. in 2005, showed that what appeared to be occupancy declines could have been the spotted owl's reluctance to respond to audio surveys when barred owls are present.)* ***[Kelly et al., "Are Barred Owls Displacing Spotted Owls?"]***

2004: *During a 5-year status review, researchers find that the barred owl is a significantly greater threat to the spotted owl than originally estimated at the time of listing. The report provides a comprehensive overview of the barred owl situation and presents hypotheses on the potential outcome of barred owl/spotted owl interactions. It is the first scientific document to discuss the concept of experimental removal of barred owls as a potential part of spotted owl recovery.* ***[Courtney et al.,"Scientific Evaluation on the Status of the Northern Spotted Owl"]***

2005: *Researchers find that the barred owl's presence suppresses spotted owl detection during audio surveys, an important tool for locating spotted owls. Their research also indicates that barred owls are displacing spotted owls.* ***[Olson et al., "Modeling of Site Occupancy Dynamics for Northern Spotted Owls, with Emphasis on the Effects of Barred Owls"]***

2006: *Researchers document the barred owl's influence on the spotted owl's survival, reproduction, and population growth rate. Their research also shows in some areas barred owls are likely to negatively affect spotted owl populations.* ***[Anthony et al., "Status and Trends in Demography of Northern Spotted Owls"]***

2006: *California Academy of Sciences obtains permits to collect 20 barred owl specimens in northern California. Barred owls are collected from three sites formerly occupied by spotted owls on Green Diamond Resource Company's lands. Spotted owls return to all three sites after barred owls are removed. While only a small pilot effort, this indicates that spotted owls will re-occupy sites from which barred owls are removed, at least under some circumstances.*

2007: *British Columbia natural resources agency begins an effort to capture and translocate barred owls from about 10 sites historically occupied by spotted owls. Since spotted owls within the Canadian portion of the species' range are on the brink of extinction, the removal effort is part of a broader recovery program which also involves protecting about a dozen known birds remaining in the wild and bringing a small number of birds into captivity for a breeding program.*

2007: *Researchers suggest various approaches to address potential competitive interactions between barred owls and spotted owls. They posit that removal experiments would be the strongest scientific approach to evaluate the barred owl's effect on spotted owl*

population dynamics. They also suggest that landscapes with existing spotted owl monitoring data would likely provide more immediate understanding of potential competitive effects because the outcome of removal experiments could be related to existing information. ***[Buchanan et al., "A Synopsis of Suggested Approaches to Address Potential Competitive Interactions Between Barred Owls and Spotted Owls," and Gutierrez et al., "The Invasion of Barred Owls and Its Potential Effect on the Spotted Owl: A Conservation Conundrum"]***

2008: *FWS releases spotted owl recovery plan, identifying habitat loss and competition from barred owls as the two main threats to the spotted owl. Roughly a third of recovery actions address the barred owl threat, including consideration of measures relating to a barred owl removal experiment.*

2008: *Barred Owl Work Group is established, including representatives of federal and state agencies, tribes, non-governmental organizations, and the timber industry. The group's role is to 1) assess the nature and scope of information needed related to barred owl/spotted owl interaction, 2) design a barred owl-specific survey protocol for locating barred owls (later tested by researchers, see 2010), 3) revise the spotted owl survey protocol used to help guide forest management activities, and 4) design a scientific barred owl removal experiment.*

2009: *Because the British Columbia natural resource agency's efforts to capture and translocate barred owls prove challenging, the agency begins to include lethal methods of barred owl removal as part of its spotted owl recovery program.*

2009: *In response to public concerns after barred owl management was recommended in the spotted owl recovery plan, a Barred Owl Stakeholder Group is formed. It includes representatives of broad-interest environmental groups, bird conservation groups, animal welfare groups, the timber industry, tribes, and federal, state, and local government agencies. Because of the need to consider barred owl removal as part of spotted owl recovery, FWS hires an environmental ethicist to facilitate constructive group dialogue. The environmental ethicist helps guide the group's exploration of varying perspectives on the ethical aspects of barred owl management options.*

2009: *Building on considerations of both the Barred Owl Work Group and Stakeholder Group, FWS issues a public scoping notice on developing an Environmental Impact Statement. The EIS would outline options for experimental removal of barred owls from select areas throughout the spotted owl's range to determine if such removal benefits spotted owls.*

2010: *FWS receives 54 comments from 29 different organizations in response to the public scoping notice (including environmental, animal welfare, and industry groups; tribes; professional societies; government agencies; zoological parks; and individuals). The agency also receives input from the Barred Owl Work Group and Barred Owl Stakeholder Group.*

2010: *Researchers identify some differences in habitat types used by barred owls and spotted owls. They also identify some habitat areas where spotted owls are likely to persist and barred owls are less likely to displace them.* ***[Singleton et al., "Barred Owl Space Use and Habitat Selection in the Eastern Cascades, Washington"]***

2011: *British Columbia natural resource agency finds that seven spotted owls that were not known to exist have returned to historically occupied sites where barred owls were removed, some as soon as one year after barred owl removal. Successful breeding was also observed following barred owl removal.*

2011: *FWS revises spotted owl survey protocol to improve efforts to locate spotted owls in areas of proposed forest management activities. The revised survey protocol was needed because of barred owls suppressing spotted owl detection during audio surveys, an important tool for locating spotted owls.*

2011: *FWS finalizes a revised recovery plan for the spotted owl. The plan retains previous recovery actions from the original 2008 recovery plan relating to the barred owl with updated information to reflect recent research.*

2011: *Research shows that when barred owls are present, spotted owls are more likely to abandon a territory and less likely to reoccupy an area. However, these effects were not as prominent in older forest habitat, pointing to the importance of retaining large amounts of continuous old forest.* ***[Dugger et al., "Transient Dynamics of Invasive Competition: Barred Owls, Spotted Owls, and the Demons of Competition Present"]***

2011: *Research includes testing the new barred owl-specific survey protocol developed by the Barred Owl Work Group to verify the barred owl's presence. The barred owl survey protocol will be an important instrument for future research on competitive interaction between barred owls and spotted owls, including those described in a forthcoming EIS on experimental removal of barred owls. This initial research provides the most reliable estimate of barred owl abundance to date in coniferous forests of the Pacific Northwest.* ***[Wiens et al., "Barred Owl Occupancy Surveys Within the Range of the Northern Spotted Owl"]***

2011: *A comprehensive data analysis shows barred owls are even more of a stressor on spotted owls than previously thought. Researchers recommend limited experimental removal of barred owls as part of spotted owl recovery.* ***[Forsman et al., "Status and Trends in Demography of Northern Spotted Owls"]***

On the Horizon

- *A draft Environmental Impact Statement on experimental removal of barred owls in select areas throughout the spotted owl's range will be released early in 2012. This will outline options for lethal and non-lethal methods of removal (and combinations of the two) to see if it would have a positive effect on spotted owls.*

Commonly cited scientific research related to barred owls referenced above:

Anthony, R.G., E.D. Forsman, A.B. Franklin, D.R. Anderson, K.P. Burnham, G.C. White, C.J. Schwarz, J. Nichols, J.E. Hines, G.S. Olson, S.H. Ackers, S. Andrews, B.L. Biswell, P.C. Carlson, L.V. Diller, K.M. Dugger, K.E. Fehring, T.L. Fleming, R.P. Gerhardt, S.A. Gremel, R.J. Gutiérrez, P.J. Happe, D.R. Herter, J.M. Higley, R.B. Horn, L.L. Irwin, P.J. Loschl, J.A. Reid, and S.G. Sovern. 2006. **Status and trends in demography of northern spotted owls, 1985–2003**. Wildlife Monograph No. 163.

Buchanan, J.B., R.J. Gutierrez, R.G. Anthony, T. Cullinan, L.V. Diller, E.D. Forsman, and A.B, Franklin. 2007. **A synopsis of suggested approaches to address potential competitive interactions between barred owls and spotted owls**. Biol. Invasions 9:679-691

Courtney, S.P., J. A. Blakesley, R.E. Bigley, M. L. Cody, J. P. Dunbacher, R.C. Fleischer, A. B. Franklin, J. F. Franklin, R.J. Gutiérrez, L. M. Marzluff, and L. Sztukowoski. 2004. **Scientific evaluation of the status of the northern spotted owl.** Sustainable Ecosystems Institute, Portland, OR, U.S.A.

Dugger, K.M., R.G. Anthony, and L.S. Andrews. 2011. **Transient dynamics of invasive competition: barred owls, spotted owls, and the demons of competition present.** Ecological Applications.

Forsman, E.D., R.G. Anthony, K.M. Dugger, E.M. Glenn, A.B. Franklin, G.C. White, C.J. Schwarz, K.P. Burnham, D.R. Anderson, J.D. Nichols, J.E. Hines, J.B. Lint, R.J. Davis, S.H. Ackers, L.S. Andrews, B.L. Biswell, P.C. Carlson, L.V. Diller, S.A. Gremel, D.R. Herter, J.M. Higley, R.B. Horn, J.A. Reid, J. Rockweit, J. Schaberl, T.J. Snetsinger, and S.G. Sovern. 2011. **Population demography of northern spotted owls: 1985–2008.** Studies in Avian Biology 40. Cooper Ornithological Society.

Gutiérrez, R.J., M. Cody, S. Courtney and A.B. Franklin. 2007. **The invasion of barred owls and its potential effect on the spotted owl: a conservation conundrum**. Biological Invasions 9:181–196.

Hamer, T.E. 1988. **Home range size of the northern barred owl and northern spotted owl in western Washington.** M.S. thesis, Western Washington University, Bellingham, WA.

Note: the citation for the published version of the above is:

Hamer, T. E., E. D. Forsman, and E. M. Glenn. 2007. **Home range attributes and habitat selection of barred owls and spotted owls in an area of sympatry.** Condor 109:750–768.

Kelly, E.G., E.D. Forsman, and R.G. Anthony. 2003. **Are barred owls displacing spotted owls?** Condor 105:45–53.

Olson, G.S., R.G. Anthony, E.D. Forsman, S.H. Ackers, P.J. Loschl, J.A. Reid, K.M Dugger, E.M. Glenn, and W.J. Ripple. 2005. **Modeling of site occupancy dynamics for northern spotted owls, with emphasis on the effects of barred owls.** Journal of Wildlife Management 69:918–932.

Singleton, P.H., J.F. Lehmkuhl, W.L. Gaines, and S.A. Graham. 2010. **Barred owl space use and habitat selection in the eastern Cascades, Washington.** Journal of Wildlife Management 74:285–294.

USFWS. 1989. **Status review supplement for the northern spotted owl**.

Wiens, J.D., R.G. Anthony, and E.D. Forsman. 2011. **Barred owl occupancy surveys within the range of the northern spotted owl.** Journal of Wildlife Management 75(3): 531-583.

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