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Improving Strategies to Assess Competitive Effects of Barred Owls on Northern Spotted Owls in the Pacific Northwest

A male barred owl (Strix varia) hears the call of another owl during the night. If the call is from another barred owl, he might respond with a series of rapid hoots to inform the intruder of his presence. If the call is from a northern spotted owl (Strix occidentalis caurina)[1], however, he may fly swiftly and silently towards the sound to get a closer look. When the spotted owl call is broadcast by researchers performing a routine survey of spotted owls, and the barred owl sees that there are no owls present, he may remain silent and watch. Barred owls typically are shy around people, and a quiet owl is less likely to be seen by researchers in the dark forest. As a result, it is often difficult to document the occurrence of barred owls during surveys in which researchers use spotted owl calls.

Barred Owl
Photograph by A.J. Hand

A scientific study has determined that survey methods designed for spotted owls do not always detect barred owls that are actually present in spotted owl habitat. The researchers suggest that strategies to address potential interactions between spotted owls and barred owls will require carefully designed surveys that account for response behaviors and imperfect detection of both species. Species-specific sampling methods, which are proposed, can be used by forest managers to determine the occurrence and distribution of barred owls with high confidence. This fact sheet provides highlights of the research (Wiens and others, 2011).

Background

Under the Endangered Species Act, resource managers are charged with developing research and management strategies that aid in the recovery of the northern spotted owl. Current strategies rely on the preservation of structurally complex forest habitat, but declines in spotted owl populations also may be a consequence of increased competition for space, habitat, and food with invading barred owls.

Evidence of barred owls expanding their range into western forests is based on incidental detections of barred owls documented during surveys of spotted owls. In response to a growing concern among land managers about the effects of invading barred owls on spotted owls, eight Federal and State agencies jointly funded a comprehensive 4-year study that specifically examined the competitive interactions between both owl species. At the onset of that study, researchers needed to be confident that they were using survey methods that worked equally well for both species. Survey protocols for spotted owls are well documented and tested, and regularly conducted associated with population monitoring objectives. Survey protocols for barred owls, however, are recently developed and have not been fully tested in the field. As a consequence, the first objectives of the larger study of competitive interactions were to investigate the effectiveness of the two survey protocols in detecting barred owls and to determine the occurrence of barred owls independently of spotted owl monitoring efforts.

[1]There are three subspecies of spotted owl: northern (*S. o. caurina*), California (*S. o. occidentalis*), and Mexican (*S. o. lucida*). This overview relates primarily to the northern spotted owl, hereafter referred to as spotted owl. This subspecies is listed as "Threatened" under the Endangered Species Act.

Forest photograph by Tom Spies

Highlights of Results

Survey methods used to monitor spotted owl populations may significantly underestimate detections of barred owls and lead to weak or inaccurate inferences regarding the effects of barred owls on spotted owls. Barred owls may respond differently to spotted owl calls versus barred owl calls, as shown by a higher prevalence of rapid, silent approaches within the first 2 minutes of the survey period when spotted owl calls are used. Moreover, because barred owls exhibit various response behaviors during surveys, the amount of time that observers spend at each call point matters. A typical survey for spotted owls lasts 10 minutes, and observers may miss many barred owls that respond late in the survey period. The results also show that detection rates of barred owls during a single survey were consistently low regardless of what type of calls were used to elicit responses, which indicates that multiple surveys of a given area are required to maximize the chances of identifying barred owls that are present during the survey period. In this study, three nighttime surveys using barred owl calls resulted in a 95-percent probability of detecting barred owls that were present.

The study also found that the distribution of barred owls was strongly influenced by landownership conditions, with occupancy being highest in the mature and old forests that were most abundant on public lands. The increased presence of barred owls in forest conditions that also are preferred by the spotted owl may exacerbate competitive interactions between the two species and further complicate spotted owl recovery efforts.

Implications for Future Surveys

The survey techniques developed in this study can be used by forest managers to determine the occurrence and distribution of barred owls with high confidence. This is an important component of future strategies to address the potentially negative effects of barred owls on spotted owl populations. The overall likelihood of locating barred owls that are present can be increased by (1) conducting multiple (2–3) nighttime surveys of a given area using barred owl calls to elicit responses, (2) extending the survey period for each call station to a minimum of 15 minutes, (3) alternating broadcast and listening periods while visually searching the surrounding trees for barred owls that may have flown in silently, and (4) training owl observers to recognize the range of more than 10 different barred owl response vocalizations. If both barred owl and spotted owl surveys are required at the same location, it is important that species-specific surveys are separated sufficiently in time to avoid creating potentially negative interactions between the two species.

Northern Spotted Owl
Photograph by Patrick Kolar

Reference Cited

Wiens, J.D., Anthony, R.G., and Forsman, E.D., 2011, Barred owl occupancy surveys within the range of the northern spotted owl: Journal of Wildlife Management, v. 75, no. 3, p. 531-538, doi:10.1002/jwm.82, accessed July 8, 2011, at http://www.bioone.org/doi/abs/10.1002/jwmg.82.

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