



To Shoot or Not to Shoot

THE ETHICAL DILEMMA OF KILLING ONE RAPTOR TO SAVE ANOTHER

By Lowell V. Diller



Credit: Janice Diller

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On September 10, 2013, the U.S. Fish and Wildlife Service (FWS) announced its [Record of Decision](#) authorizing the experimental lethal and non-lethal removal of barred owls (*Strix varia*) from four study areas in the Pacific Northwest as a means to benefit threatened northern spotted owls (*Strix occidentalis caurina*) (FWS 2013). As I write this article, I've just returned from helping to conduct the first such removals authorized by the federal action, done in the Hoopa Valley Reservation of northern California.

Such announcements can sound sterile, even routine. But as one who has been involved in planning and research on barred owl removal since its inception, I know how much thought, science, and emotional angst go into reaching these decisions. For me personally, the issue of lethal removal of one raptor to save another raises ethical questions that all of us in the wildlife profession, and in society at large, need to explore.

On One End of the Gun

I'll never forget the day in February 2009 when I stood in a forest looking down the barrel of my shotgun. My heart was pounding and my hands were shaking. I took a few deep breaths to calm myself and steady my gun, but I still hesitated. I wasn't facing a monster buck or spectacular tom turkey—I was trying to draw a steady bead on a barred owl, the first of more than 80 I would shoot as part of a pilot removal experiment I was conducting in northern California on approximately 400,000 acres of timberlands owned by the Green Diamond Resource Company.

The owl in my sights was a large, beautiful female who was hooting in indignation at an intruder into her territory. Although I had been hunting wildlife for six decades, I was amazed at my emotional reaction to the prospect of killing this bird—an act superficially no different than shooting a grouse or turkey. But I had always rationalized that game birds were okay to shoot because they would be eaten by my family and me, and because their demographics allowed for a harvestable surplus. In

contrast, I saw owls and other raptors as something to be strictly protected. In fact, I've spent most of my professional career working to conserve spotted owls, raptors that look remarkably similar to the owl I was about to shoot.

Shooting that barred owl and the others that followed was part of an effort to understand the impact of barred owls on spotted owls and to learn whether the latter could recover following lethal removal of barred owls. After nearly five years of research—done in collaboration with the California Academy of Sciences and FWS—the answer appears to be yes. We found that virtually 100 percent of the sites freed from barred owls have been rapidly re-occupied—within the same breeding season—by spotted owls, and the number of occupied spotted owl sites has increased in the removal areas. We also found that the removal was rapid, technically feasible, and cost effective—results we'll soon publish in the *Wildlife Society Bulletin* (Diller et al. in press). This is highly encouraging, given the mounting threat that barred owls pose to one of the nation's most iconic at-risk species.

A Spreading Concern

Native to eastern forests and historically restricted by the treeless Great Plains, the barred owl began moving westward and arrived in British Columbia and Washington around the beginning of the 20th century. European settlement of the plains likely facilitated their spread (FWS 2013). Barred owls in the Northwest remained largely a novelty until the 1980s and '90s, when their numbers began to dramatically increase (FWS 2013). There are no official estimates of the barred owl population today, but based on my own extrapolations, I think it's fair to say there are now tens of thousands within the historical range of northern spotted owls.

In contrast, the northern spotted owl has drastically declined in major portions of its range. In 1990, the FWS listed the species as threatened under the Endangered Species Act, primarily due to habitat loss from timber harvesting (FWS 1990). That list-



ing launched the most controversial and expensive conservation effort in U.S. history. The Northwest Forest Plan set aside 18.5 million acres in various types of preserves that were supposed to be sufficient to allow the spotted owl population to stabilize (USDA and DOI 1994). This prediction might have been realized, but then the barred owl emerged as a threat capable of sweeping through the entire range of the northern spotted owl.

Both species select the same habitat for nesting and roosting, and both are strongly territorial and potentially will attack a perceived intruder (Van Lanen et al. 2011). However, barred owls are 15 to 20 percent larger than spotted owls—the human equivalent of a heavy weight going up against a middle weight—so smaller spotted owls often retreat if attacked. Once losing a fight, spotted owls presumably leave the area or learn to stay silent and avoid further encounters, as suggested by survey detection probabilities, which steadily decline where the two species overlap (Dugger et al. 2009, Olson et al. 2005).

Silence is a problem for survival. As with many owl species, spotted owls rely mainly on vocalizations to establish and maintain territories, find and communicate with mates, and feed their fledged young. Food competition may also be a problem. While spotted owls tend to prey primarily on small mammals and have large home ranges of about 2,000-5,000 acres (Courtney et al. 2004), barred owls have a more diverse diet and can exist at higher densities of three to eight barred owls per spotted owl territory in some cases (Hamer et al. 2007).

Individual spotted owls may be able to go on the lam and survive, but they are not going to be able to reproduce. Furthermore, there is no known habitat that is exclusive to spotted owls (Dugger et al. 2011). This is most depressing, because it means there is no known habitat solution for conserving spotted owls, and the most likely outcome from setting aside more habitat will be to have even more barred owls. With their size and numerical advantage, the inescapable conclusion is that barred owls are capable of taking over and excluding spotted owls from all available nesting habitat.

Watching the Onslaught

Since 1989, I have watched the steady invasion of barred owls from Washington through Oregon and into California. Initially, I was a bit Pollyannaish, thinking the spotted owls in Green Diamond's

managed timberlands would somehow withstand the invasion. After all, 'our' owls were exceptional in being able to persist in high densities in habitat originally thought to be marginal (Diller and Thome 1999). Furthermore, the initial colonization of barred owls in California occurred in the old growth of national and state parks, leaving our managed timberlands largely uninvaded.

Biologists to the north of California who had witnessed the barred owl spread into all available



Credit: Lowell V. Diller

A gun, dog, and owl-calling decoy are tools of barred owl removal, with dogs being valuable to help recover fallen owls, especially at night. A barred owl (below) removed in October from California's Hoopa Valley Reservation is measured and studied to determine sex and age. Swabs and tissue samples of removed owls will provide data about disease and genetics, furthering researchers' understanding of a species that threatens spotted owl recovery.



Credit: Raymond Bosch



Credit: Stan Sovern/USFS

An adult and fledgling northern spotted owl symbolize the renewal that's possible after barred owl removal. As a participant in removal experiments, Lowell Diller knows the pain of killing one raptor to save another. But he sees the value when holding a fledgling spotted owl (below) that he banded at a site where barred owls had been removed. "This owlet would almost certainly not be alive today without active intervention," he says.

much or all of their former range unless barred owls were controlled.

The most recent published meta-analysis indicates that northern spotted owls declined by an average 2.9 percent per year in 11 northwest demographic study areas (nine on U.S. Forest Service and Bureau of Land Management lands and one each on the Hoopa Valley Reservation and the private Green Diamond site). The declines were more precipitous in Washington and Oregon, where barred owl numbers were highest (Forsman et al. 2011). The 2012 annual reports for six demographic study areas in Oregon and Washington indicate that spotted owls in many parts of their range may already be spiraling towards extinction. In the Cle Elum demographic study area in the Washington Cascades, there has been an 83 percent decline in the num-

ber of spotted owl habitat warned me that it would be just a matter of time before the owls also saturated all available habitat in my study area. Beginning around 2000, those predictions came true: the barred owl population began to take off (spreading from two to 12 sites in six years), and it was apparent that our study areas were not going to be spared. This inexorable spread led to a single conclusion in my mind: spotted owls were going to be extirpated from

ber of spotted owls detected since 1992. The next meta-analysis is scheduled for January 2014, and I predict that it will show a drastic increase in the rate of decline throughout the owl's range.

Taking Action

In 2006, FWS formed the Northern Spotted Owl Recovery Team composed of representatives from various agencies, NGOs, and timber industry. Though some spotted owl biologists at that time were beginning to spread the alarm about the barred owl threat, it was still largely viewed as either an untested hypothesis or an inevitability about which nothing could be done. As a member of the team, I was frustrated by the lack of urgency and reluctance to even experimentally test the barred owl impact on spotted owls. Because I often stressed the need to take action to at least confirm the threat, I earned the label of being a trigger-happy guy looking for an excuse to shoot barred owls. Conceptually, I was okay with that mantle because I believed someone needed to take action or spotted owls would enter an extinction spiral while we debated what should be done.

The FWS had to go through a protracted environmental impact statement to propose barred owl removal experiments on federal lands (FWS 2013). But because I was already working on a spotted owl demographic study on Green Diamond's private timberlands and collaborating with evolutionary ecologist Jack Dumbacher of the California Academy of Sciences, we were able to obtain approval for a pilot removal experiment with scientific collecting permits from FWS's Division of Migratory Bird Management and the California Department of Fish and Game (now Wildlife).

This brought me to that moment in February 2009, when I took aim at that first barred owl. It would be so much more palatable if these beautiful birds could be removed through nonlethal means, but that's not a feasible option. Being highly territorial, barred owls have a biological imperative to fly up and challenge an intruder, which quickly puts them within ideal shotgun range. Capturing barred owls is much tougher, and would raise the question of what to do with hundreds of captive owls. Intellectually, I believe that some barred owls need to be lethally removed in an experimental context, but when faced with the reality of actually shooting one, it remains an internal struggle. Almost five years after that first shot, I still get anxious when prepar-



Credit: Janice Diller



ing to fire, but I have learned that it can be done quickly, efficiently, and humanely.

Results Worth the Pain

Offsetting the traumatic moments of shooting barred owls have been highs associated with the positive response from spotted owls. Although we have not yet done the first full analysis of the spotted owl response to removing 81 barred owls to date, we already know that most sites are quickly re-occupied by spotted owls once the barred owls are removed, and the number of occupied spotted owl sites has rebounded in the removal areas.

For example: Working with Dumbacher in 2006, we collected a few barred owls from a Green Diamond area where spotted owls had not been seen for three years. Yet just 13 days following the barred-owl removal, I returned to the site and was elated to see that the site’s original banded pair of spotted owls had returned; they flew up to me looking for a free mouse as I neared their traditional nest site. In another case following barred owl removal, a female spotted owl returned *seven years* after a series of barred owls had overtaken her territory.

For me, the issue of lethal removal boils down to a sort of “Sophie’s Choice.” Shooting a beautiful raptor that is remarkably adaptable and fit for its new environment seems unpalatable and ethically wrong. But the choice to do nothing is also unpalatable, and I believe also ethically wrong. If human actions—including major alterations of spotted owl habitat and paving the way for the invasion of its eastern cousins—have put spotted owls at risk of extinction, don’t we have a societal responsibility to at least give them a fighting chance to survive?

Despite some protests that this is an unfair choice of one owl over another, the real choice is to conserve both species of owls or only one. From what we have seen with the pilot removal program in northern California, I believe the removal experiments recently approved by the FWS (FWS 2013) will show that it is technically and economically feasible to implement a range-wide barred owl management plan that will allow for coexistence of the two species. This might occur through a system of spotted owl management areas that are a subset of spotted owl critical habitat areas where removal is feasible. In such areas, barred owls could be maintained at sufficiently low numbers—perhaps less than 20 percent of the potential owl sites—so spotted owls could thrive.

I have confidence that this could work because controlling barred owls is not like dealing with invasive species that are difficult to remove and have the potential to rapidly recolonize areas. Demographically, barred owls are similar to spotted owls in having relatively low fecundity and high adult survival, which means a relatively modest artificial increase in adult mortality—of perhaps 20 percent—should cause the barred owl population to substantially decline (Diller and McDonald 2007).

Ultimately, we may learn that there are options beyond barred owl removal. But for now, the bird’s invasion is so rapid and extensive that we do not have time to wait for other options. Managing barred owls over millions of acres would involve substantial cost and killing thousands of barred owls. Whether our profession or society at large can accept this cost remains to be seen, but we all need to know there are no easy choices in this conservation dilemma, and the choices made now will likely determine the future of the northern spotted owl. ■

This article has been reviewed by a subject-matter expert.

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