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RECENT TRENDS IN WESTERN SCREECH-OWL AND BARRED OWL ABUNDANCES ON BAINBRIDGE ISLAND, WASHINGTON

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ABSTRACT—In an ongoing 15-y study concerning population dynamics of Barred Owls (*Strix varia*) on Bainbridge Island, Kitsap County, Washington, I documented a steep decline in the Western Screech-Owl (*Megascops kennicottii*) population and a steady increase in the Barred Owl population. From 1995 through 2010, I conducted 358 auditory playback surveys that showed both changes in abundance and spatial distribution of both species on the island. Statewide Christmas Bird Count data from the same time period also reflect an overall decline in the Western Screech-Owl population and an increase in the Barred Owl population. Further, at least 2 other studies have shown Western Screech-Owl to be prey for Barred Owl, also contributing to the body of evidence that leads to a possible correlation between the increasing number of Barred Owls and the decline of Western Screech-Owls.

Key words: abundance, Barred Owl, *Megascops kennicottii*, *Strix varia*, Western Screech-Owl, Washington

The Barred Owl (*Strix varia*) is a recent colonist to the Pacific Northwest and is considered a forest habitat generalist here, although it is often found in lowland forests in association with water in other parts of its range (Mazur and James 2000; Buchanan 2005a). Barred Owls prey on a wide range of species, including birds (Mazur and James 2000), and have been documented taking smaller owls, including the Eastern Screech-Owl (*Megascops asio*) and Long-eared Owl (*Asio otus*) (Bent 1938; Mazur and James 2000) in other parts of its range. A Barred Owl was observed eating a Western Screech-Owl (*Megascops kennicottii*) in the Langley, British Columbia area in 2001 (COSEWIC 2002). A recent study in western Oregon identified 9 Western Screech-Owls in pellets of Barred Owls (Wiens 2012). The prey base used by Barred Owls across their range is diverse and well documented (Mazur and James 2000). On Bainbridge Island, the most common food sources from personal observations, pellet analysis, and nest remains appear to be birds, commonly including American Crows (*Corvus brachyrhynchos*), and small mammals.

The Western Screech-Owl has been a common species in western Washington low elevation forests and riparian habitats (Cannings and Angell 2001; Buchanan 2005b). Given the similarity in habitat used by Western Screech-Owls

and Barred Owls in the Pacific Northwest, and the fact that Western Screech-Owls are potential prey of this larger owl, it is possible that Barred Owls may have a negative impact on Western Screech-Owl populations. This impact seems to be occurring elsewhere as Elliot (2006) reports the decline of Western Screech-Owls in lower mainland British Columbia, and the concurrent establishment of the Barred Owl. Here I present Barred Owl and Western Screech-Owl occurrence data from owl surveys conducted since 1995 on Bainbridge Island, Washington, as well as Washington State Christmas Bird Count data that show a strong correspondence between the expansion of the Barred Owl population and the steep decline in the Western Screech-Owl population.

METHODS

Bainbridge Island is located 5 km west of Seattle, Washington, in Puget Sound and is approximately 16 km long by 7 km wide, with 77 km of shoreline covering an area of 72 km². Bainbridge Island had a population of about 18,000 people in 1995, rising to 23,025 by 2010. Habitat conditions on the island include open farmland, large forested parks, a central small town, and interspersed suburbia. Much of the island remains rural. The highest point on the island is about 120 m. My calling surveys were

conducted mostly in the rural portions of the island.

I began the project in 1995 by conducting auditory playback surveys at night to determine the location of owls within the study area. During the first 4 y, I only recorded locations where owls were detected. Beginning in 1999, I recorded all locations including those where owls were not detected. I conducted surveys annually, starting in September, with 69% (247 out of 358) conducted during non-breeding and territory-initiation months (October–March). I called vocally or played tapes of Northern Pygmy Owl (*Glaucidium gnoma*), Northern Saw-whet Owl (*Aegolius acadicus*), Western Screech-Owl, Barred Owl, Barn Owl (*Tyto alba*), and Great Horned Owl (*Bubo virginianus*) at each habitat-appropriate station and listened for responses for a total of at least 10 min. During each survey I typically visited 6 to 10 stations/night, usually between 03:00 to sunrise. I defined an owl survey, or “trip” as a dedicated effort in which stops were made at 3 or more stations and terminated trips in the event of a weather change. Locations surveyed in 1995 were all resurveyed in subsequent years. After 2000, I divided the island into a northern and southern half to prevent intruding on the same owls weekly, and to more effectively cover more of the total area. I did not standardize the order of calls played, though I generally started with the small owls first, and worked up in size. Usually, I would not continue with calls if I received a response from a Barred Owl or Great Horned Owl out of concern for the safety of smaller owls that may have been responsive to earlier calls, but not detected. For the purposes of my study, the season began in September (when the young from the previous season had dispersed from the natal site) and ended in August.

Over the 15 y of this project I conducted 358 surveys and calculated the mean number of Barred Owl and Western Screech-Owl detections per survey for each year. Additionally, I annually conducted a census of the Barred Owl population in June and July when detection of the young was relatively easy. After 2008, the Barred Owl population was greater than my ability to accurately census and I stopped collecting Barred Owl census data.

To place my observations on Bainbridge Island within the context of the region, I

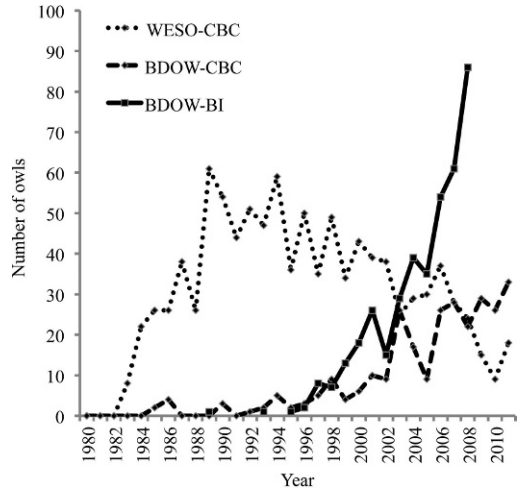


FIGURE 1. Changes in abundances of Barred Owls (BDOW) and Western Screech-Owl (WESO), 1980–2010 based on auditory playback surveys on Bainbridge Island (BDOW-BI), and Audubon Christmas Bird Count data for Washington State (BDOW-CBC, WESO-CBC).

summarized Christmas Bird Count (CBC) data from all counts conducted in Washington State. It should be noted, however, that the CBC owl data are not corrected for observer effort. I graphed the number of each species reported by year and assumed that owling effort did not change statewide during the years included in my analysis.

RESULTS

Barred Owl abundance on Bainbridge Island has increased dramatically from the initial detection in 1993 to 2008 ($n = 174$) and still appears to be increasing (Fig. 1). Associated with this increase, Western Screech-Owl detections have declined as detections of Barred Owls have increased (Fig. 2, Fig 3). The beginning of the strong decline in Western Screech-Owl detections (1998–1999) coincided with the year of the highest mean number of Barred Owl detections/survey ($n = 81$) The trends I observed are comparable to those from statewide CBCs that indicate declines in Western Screech-Owls and increases in Barred Owl (Fig. 1) detections since 1992. Figure 3 plots the trends in spatial distributions of the 2 species on the island over the course of the study period.

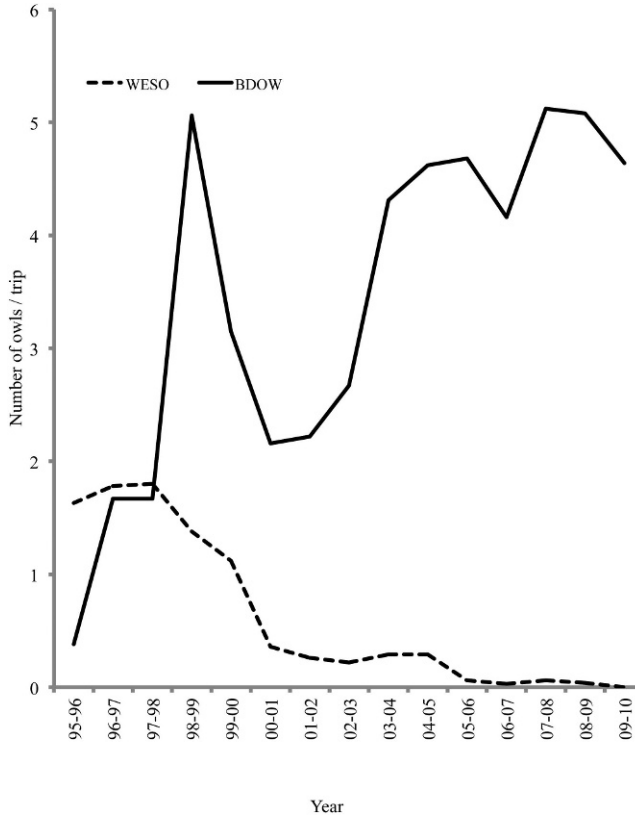


FIGURE 2. Average numbers of Western Screech-Owls (WESO) and Barred Owls (BDOW) detected/trip by year during auditory playback on Bainbridge Island, WA, 1995–2010.

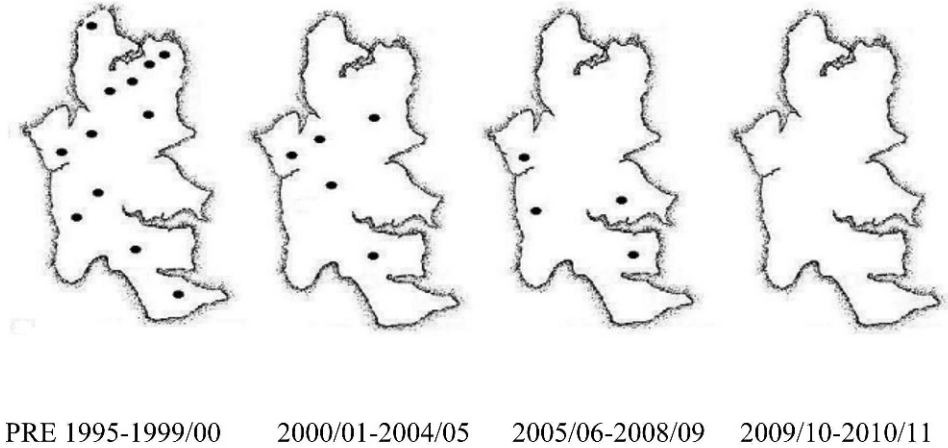
I made 2 observations that demonstrate Barred Owls are a potential predator of the Western Screech-Owl. On 5 January 1997, another observer and I witnessed a Barred Owl make an unsuccessful attack on an adult Western Screech-Owl that was responding to a tape recording of its call. The Western Screech-Owl had come into open view at night and was perched about 12 m from us when a Barred Owl made an unsuccessful pass. The 2nd incident occurred at a Western Screech-Owl nest box behind my house where I observed the male nightly from April 2000 to August 2002. On 5 June 2002, I was awakened by loud distress “chuck” calls given by adult Screech-Owls (the “bark” call; Cannings and Angell 2001). Moments later, I heard a single-note call from a Barred Owl at close range and found fledgling Screech-Owl feathers on my driveway the next morning.

DISCUSSION

Barred Owls lay eggs usually the 1st or 2nd week in March, while Western Screech-Owls lay eggs the 1st week in April. This leads to a “head start” by Barred Owls over Western Screech-Owls. Western Screech-Owls fledge at the same time parental Barred Owls are most pressured to find food for their young. Fledged, juvenile Western Screech-Owls are extremely vocal, leaving them vulnerable to nocturnal predators.

Although my survey methodology changed somewhat during this study (and was not completely systematic), I feel that the results suggest real changes in owl abundance. When I began conducting surveys in 1995, I detected Western Screech-Owls at 11 locations on the island. As of 2010, I am no longer aware of any Western Screech-Owls on the island. On the other hand, Barred Owls were not present on the

Western Screech-owl



Barred Owl

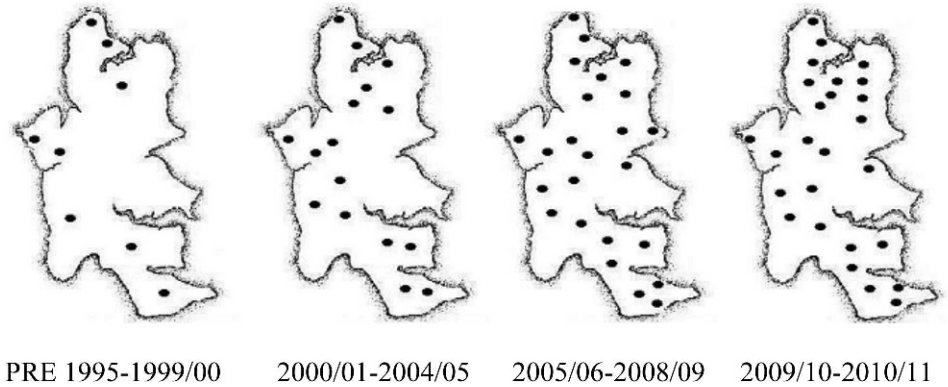


FIGURE 3. Changes in the spatial distributions of Western Screech-Owls and Barred Owls on Bainbridge Island, WA, 1995–2010.

island until January 1993 (Bill Mahoney, pers. comm.), and as of 2010 there were ≥ 25 pairs.

Concern also has been expressed about the possible effect of Barred Owl presence on the Northern Spotted Owl (*Strix occidentalis caurina*) (USDI 1990, 1992; Gutiérrez 1994). This concern should be extended to other species as well. Although it is possible that changes in detection rates merely reflect changes in calling rates as the smaller owls attempt to avoid advertising their presence to potential predators, there is clearly reason for concern. Barred Owls are

known to prey on smaller owls (Bent 1938), and Western Screech-Owls (COSEWIC 2002; Wiens 2012).

As stated, my data suggest that Barred Owls have had a negative impact on Western Screech-Owl populations on Bainbridge Island, and the trends in detection rates of Western Screech-Owls on Bainbridge Island are similar to trends statewide (CBC data; Tracy Fleming, pers. comm.). In the mid 1990s, the Washington Birder newsletter started a county listing of all Washington State birds. At that time, 24 of 39

counties ranked the Western Screech-Owl as Code 2, Uncommon, and 6 counties ranked the Barred Owl as also uncommon. As of December 2011, only 14 counties rank the Western Screech-Owl as Code 2, Uncommon, while 15 counties now rank the Barred Owl as uncommon, and 2 counties list the Barred owl as Code 1, Common (see Matt Bartels County Checklist — Washington Birder, December 2011 data, at http://wabirder.com/bartel_co_checklist.html; accessed 21 February 2012). Therefore, there is an urgent need for surveys to determine the status of Western Screech Owls and other small owl species (such as the Northern Saw-whet Owl and Northern Pygmy-Owl), as well as studies to understand interactions between native owl species and the Barred Owl. Lastly, it may be important to conduct a statewide status assessment of the Western Screech-Owl, as my data suggest the possibility of a substantial change in its population may be taking place in Washington.

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