Impacts of Barn Owls on Scripps's Murrelets on Santa Barbara Island

Nadav Nur
nnur@pointblue.org

Scripps's murrelets (*Synthliboramphus scrippsi*), an endemic seabird species of conservation concern, nest on Santa Barbara Island, where they are subject to predation on adults by barn owls (*Tyto alba*) and on eggs by deer mice (*Peromyscus maniculatus*). Point Blue led a population modeling analysis to quantify the expected population-level benefits to murrelets of a reduction in adult mortality, and considered potential effect of changes in rates of egg depredation by mice.

We analyzed field data on owls and murrelets collected for 2007-2012. Breeding season surveys for Santa Barbara Island murrelets indicated that the population declined from 1991 to 2010, by an average of 1.2% per year. We estimated current absolute mortality rates due to owls at 3.4% to 5.3% per year. We developed population-dynamic models to project future population growth under three hypothesized "predation" scenarios, ranging from 0% to 80% reduction in mortality due to owls, and with respect to three "population-trend" scenarios.

A 50% reduction in owl-related predation mortality can turn an apparent population decline into near-stability or population increase (0.3 to 1.5% growth per year). With an 80% hypothesized reduction in owl-related mortality, a population increase of 2% or more per year is projected under all three population-trend assumptions, which if sustained over a 20 year period, can be expected to produce total population growth of 53% to 70%. Our models predict that if owl predation on murrelets were reduced, the population would still grow, even with a moderate increase in egg depredation.

Reduction in mortality due to owls is key to promoting the long-term recovery of the Scripps's murrelet but potential indirect effects on murrelets due to changes in egg depredation need to be studied. (Figure pg. 2).

Main Points

- Scripps's murrelets on Santa Barbara Island have declined since the 1970's
- Reduction in barn owl predation is key to long-term recovery of murrelets.
- A 50% reduction in owl-predation can lead to population near-stability or increase.
- An 80% reduction in owl predation can support a growing murrelet population under a range of future scenarios.

Nur, N A. L. Harvey, S.K. Thomsen, R. Bradley, and J. Jahncke. 2013. Modeling the Population-level Impacts of Barn Owls on Scripps's Murrelet Population Trends on Santa Barbara Island. Unpublished report to NFWF.

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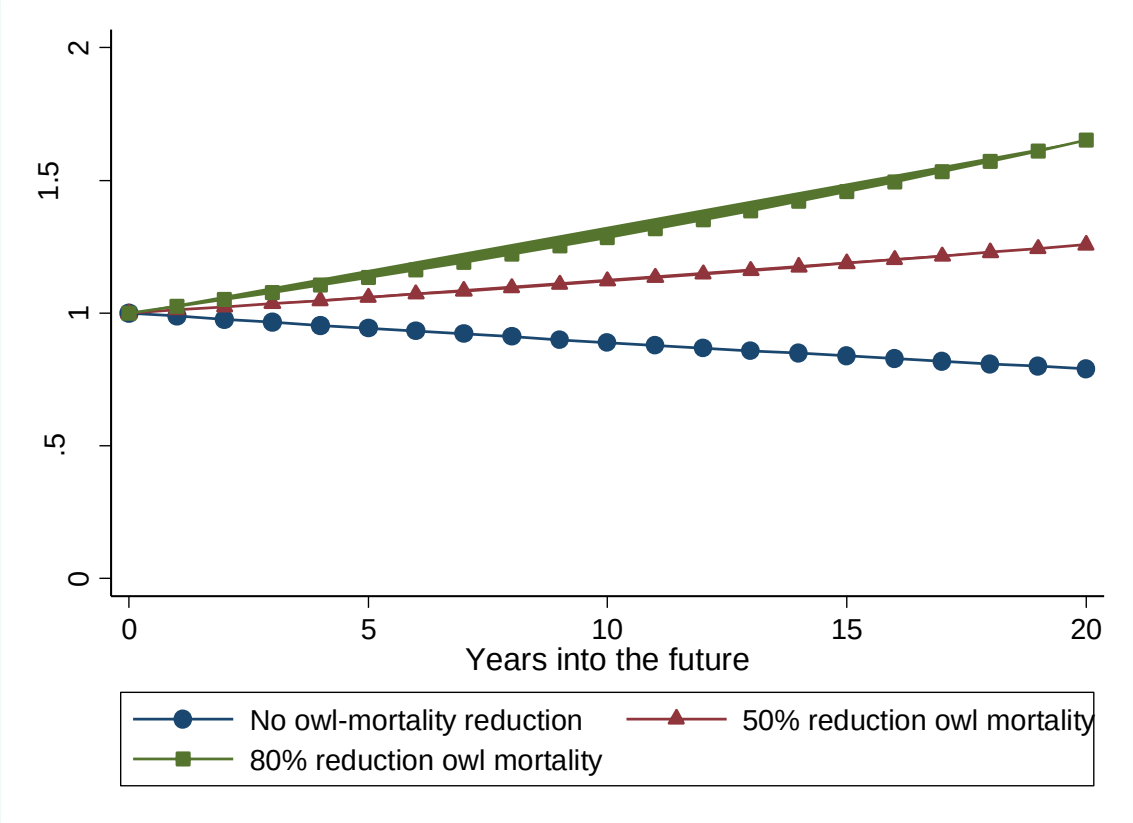

Figure 1. Santa Barbara Island Scripps's murrelet population size projections under three levels of reduction of murrelet mortality due to barn owls: 0% reduction, 50% reduction, and 80% reduction. Population projections are modeled assuming the current trend is that of moderate decline (trend most consistent with observed data for 1991-2010). Depicted is the relative population size over a 20-year period with Year 0 set to 1.0.