# Breeding Bird Density and Demography on the Patuxent Research Refuge

- ***The Challenge:*** During 1959-1972, PWRC scientist Chandler Robbins and others studied breeding birds on a 40-ha forested plot on the Patuxent Research Refuge; the study was among the first designed to estimate population size from capture data on banded birds. The existence of this historical long-term dataset presented an opportunity to assess how the local bird community has changed over the years. A local study plot is also ideal for evaluating new or alternative methods for sampling bird populations.

- ***The Science:*** We repeated the study during the nesting seasons of 2005 through 2010, capturing birds in mist nets, banding them, and noting their age, sex, and capture date and location on both first capture and any subsequent capture. We also sampled the bird population acoustically, recording their vocalizations on a small array of microphones moved to points across the plot. Recently developed spatially explicit capture-recapture methods are being used to estimate densities of species captured and banded for both the original and recent time periods. These methods were adapted to estimate bird density from data extracted from the sound recordings, specifically the intensity of Ovenbird songs on different microphones in the array.
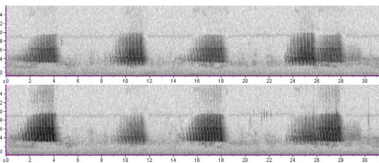
- ***The Future:*** The density of Ovenbirds on the study plot appears to have increased in recent years, and other common birds (Acadian Flycatcher, Red-eyed Vireo, Tufted Titmouse, Wood Thrush) generally varied within their earlier density range. A few species, however, are now rare or absent, including Kentucky Warbler and Hooded Warbler, which have also declined regionally. Acoustic estimates of Ovenbird density were consistent with estimates from capture-recapture data, but more precise. This new method is also desirable in that it does not require that birds be captured and handled, and it archives the sounds so they can be reviewed or re-sampled. It offers an alternative to other methods to estimate density from aural cues, which require field observers to accurately record distances to birds or other information that can be difficult and taxing to collect.

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