



Analysis of California Migration Patterns using NEXRAD and On-the-ground Data

Project # 06-329

Background:

Migration is a critical and potentially population-limiting time period for birds, and given that many migratory bird species are in decline, advancing our knowledge and understanding of the spatiotemporal distribution patterns of migration is crucial to conservation endeavors. However, there are numerous challenges to understanding and studying migratory patterns at various scales.

Objective:

One approach to broadening the scale and increasing our knowledge of migration in California is to examine the use of radar imagery. This can be done using Next Generation Radar (NEXRAD), which is a Doppler radar system used for weather surveillance. From this it is possible to determine temporal and spatial patterns of migration through surveillance of migratory bird departures (<http://virtual.clemson.edu/groups/birdrad/>).

Summary of Approach:

To investigate avian migration patterns throughout California at both the regional and local scale, PRBO Conservation Science, in collaboration with Clemson University Radar Ornithology Lab examined and compared migration monitoring data from NEXRAD radar stations throughout California and standardized mist-netting from various locations throughout California. We compiled data collected from the two methods for the spring and fall migration periods over a 5 year period (2000 – 2004).

Benefit:

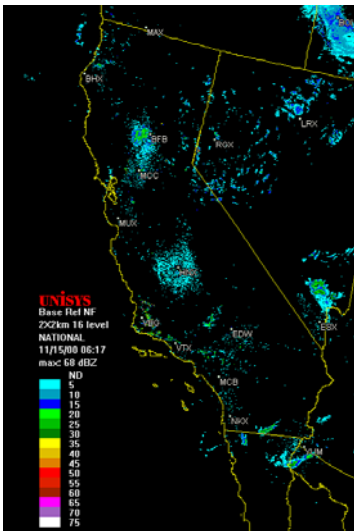
Gaining a better understanding of when birds migrate and where concentrations of migrations occur, such as stopover habitat, will help inform land and resource management practices that may impact birds. These include identifying critical migratory stopover habitats, determining what the best method may be for conducting site impact assessments (e.g. potential impacts of wind turbines), or how to minimize the risk of bird – aircraft conflicts over California.

Accomplishments:

We found that Doppler radar and standardized on-the-ground data collection yielded interesting and important results, however the correspondence between the two methods was relatively weak. To enhance our knowledge of migration in California and identify important stopover sites for conservation, we need to increase both on the ground data collection and the use of radar technology that detects and identifies birds at lower elevations. An intensified and coordinated effort of relatively low-tech bird counts, coupled with an automated and portable acoustic-marine radar system targeted at key sites, would provide the information necessary to identify important landscape features and sites that concentrate migrants. These sites may then be targeted for restoration, protection and management, which will be crucial steps in the conservation and recovery of California's and the new world's unique avifauna.

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Two methods of monitoring migration in California: NEXRAD radar (left), showing migrating birds in color, and standardized mist-netting (right), showing a Pacific Slope Flycatcher, a migratory songbird, captured in a mist-net.

However, this method has not been used before in California, and it is therefore important to determine how migration data derived from NEXRAD radar compares to on-the-ground data collection methods, such as standardized mist netting.