

The Identification of Military Installations as Important Migratory Bird Stopover Sites and the Development of Bird Migration Forecast Models: A Radar Ornithology Approach

Background:

The conservation of migratory birds on military installations is a growing issue, as populations of many species are in decline and fragmentation continues to threaten high-quality habitats. Many of the declining species depend on a variety of habitats, including grasslands, wetlands, early successional habitats, and mature forests. Department of Defense military installations provide these high-quality habitats for hundreds of breeding and wintering birds. Collectively and individually, military installations represent unique and important resources that likely play an important role in the health and viability of bird populations within and beyond the installation boundaries in all regions of the country. By identifying where, when, how long, and in what concentrations migratory birds inhabit temporary stopover sites or pass above military training airspace, affected installations would be able to improve both military readiness and species conservation.

Objective:

The objectives of this study are to (1) identify military installations that have important migratory bird stopover sites (i.e., hot spots); (2) document the pattern of bird migration at these installations; (3) verify those sites identified using radar technology as migratory bird stopover hot spots; and (4) develop forecast models of bird migration for installations and surrounding areas.

Process/Technology Description:

This project will begin by determining those military installations located within 120 kilometers of a WSR-88D radar. Data from the appropriate radar(s) will be used in conjunction with algorithms developed at the Clemson University Radar Ornithology Laboratory (CUROL) to determine which of those bases are located in a geographical area that is an important migratory bird stopover area. Once an installation is deemed important, archived WSR-88D data will be used to characterize the patterns of bird migration in spring and fall for a subset of the bases and to describe the daily and seasonal patterns of movement. A multivariate forecast model of bird migration then will be developed using archived radar data (for birds) and surface and aloft weather variables recorded by the National Weather Service (e.g., temperature, wind direction, wind speed, barometric pressure, humidity). Once target installations have been identified, on-the-ground surveys will be initiated on at least two installations that show the most consistent annual hot spot patterns. Those sites then will undergo detailed site characterization and, ultimately, will be delineated on

topographic maps and provided as a layer in a geographic information system (GIS). The end result will be a desktop computer-based model for use by military personnel to forecast bird migration through and near the base.



Prairie Warbler using stopover habitat in coastal Alabama.

Expected Benefits:

Maps that show the relationship of bases to important stopover areas will assist natural resource managers in the management and conservation of military lands for migratory birds. The locations of these stopover areas will allow the determination of specific habitats that are being used by the migrants. By monitoring migrations in relation to these stopover areas, it also will be possible to determine the dates when the areas are likely to be occupied and when the areas no longer have migrants (i.e., seasonal occurrence). With the forecast model, it will be possible to predict when dense migrations of birds are likely to occur based on weather forecast variables during the periods of spring and fall migration. (Anticipated Project Completion - 2008)

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