

Project Completion Report

Rocky Mountains Cooperative Ecosystem Studies Unit (RM-CESU)

Project Title: Distribution and Status of Breeding Birds in the Sky Islands of Northern Sonora

Project Code: UMT-191, P08AC00032

Type of Project: Research

Funding Agency: National Park Service

Partner University: University of Montana

NPS Agreement Technical Representative:

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Start Date of Project: September 26, 2008

End Date of Project: August 31, 2013

Funding Amount: \$48,900.00

Project Summary,

The Madrean Sky Island region includes more than 30 distinct mountain ranges at the northern end of the Sierra Madre Occidental and is bisected by the international boundary between the U.S. and Mexico. These mountains have been referred to as Sky Islands because they support isolated "islands" of montane vegetation dominated by pine (*Pinus* sp.) and oak (*Quercus* sp.) that rise up out of lowland "seas" of desert scrub and grassland. Although the Sky Island region is ecologically distinct and world renowned, information resources that are available for managing and conserving wildlife are vastly different on either side of the international boundary. In southern Arizona, the distribution and abundance of wildlife and vegetation communities are largely known whereas in neighboring northern Sonora, Mexico there is little information and what does exist is largely historical. Despite these limitations, national parks and other protected areas that are managed by the NPS and other agencies in the U.S. and by the Comisión Nacional de Áreas Naturales Protegidas (CONANP) in Mexico, offer excellent opportunities to conserve, manage, and enhance natural resources throughout the Sky Island region.

Starting in spring 2009, the Ph.D. student Aaron Flesch and his team worked in the Sky Islands of northern Sonora and studied distribution and abundance of breeding birds and linking these data with existing information from Arizona. With use of existing data from NPS' Sonoran Desert Network and other sources, the researchers described biogeographic relationships in the region and assessed the relative effects of vegetation, climate, spatial, biotic, and historical factors in explaining distribution and diversity. To implement this effort, we formed an internationally collaborative team of scientists, resource managers, and non-governmental

groups (NGOs), and work cooperatively with local landowners. To estimate bird abundance, we used distance sampling along line transects from early May until late July. Distance sampling involves measuring the perpendicular distance to birds detected from a line or point and allows estimates of abundance to be adjusted for variation in detectability. The cooperators placed transects along canyon bottoms and on forested slopes in both random and representative areas across a range of forest types. To assess biogeographic relationships across the entire Sky Island region, we compiled data on abundance, occupancy, breeding status, and species richness for Sky Islands in the U.S., and then combined these data with information that we collected in Mexico, using a variety of techniques (e.g. principal components analyses).

The products of this project include:

1. Descriptions and range maps of distribution and breeding status of over 150 species of birds across 26 Sky Islands and 6 areas in the adjacent Sierra Madre in Mexico.
2. Estimates of density and relative abundance of >100 species of birds at Sky Island and regional scales.
3. Estimates of breeding species richness at Sky Island and regional scales.
4. Quantitative descriptions of bird-habitat relationships and patterns of abundance across elevation and among vegetation communities across the region.
5. Biogeographic analyses of community composition of breeding birds across 26 Sky Islands and 6 areas in the adjacent Sierra Madre in Mexico surveyed during this effort and data from 22 additional Sky Islands in the US provided by Arizona Game and Fish Department.

Number of students participating in this project : one Ph.D. candidate, Aaron Flesch, see his publications and presentations at <http://www.aaronflesch.com/>

Five University of Montana work-study students participated in aspects of this project.

Other RM-CESU agencies or research partners who participated in this project:

U.S. Fish and Wildlife Service, Division of Migratory Birds

University of Arizona

Sky Island Alliance

Comisión Nacional de Áreas Naturales Protegidas

Arizona Game and Fish Department