INTRODUCTION

Program History

In 2003, the Rocky Mountain Bird Observatory (RMBO) began working with the Carson National Forest (CNF) in New Mexico to improve our knowledge of the status and habitat requirements of avian species in this forest. This program, known as *Monitoring the Birds of Carson National Forest* (*MBCNF*), is designed to provide population status and trend data for most diurnal, regularly-occuring breeding landbirds of the region. Over the last four years, RMBO has established bird survey transects in seven habitats throughout the CNF: aspen, grassland, mixed conifer, pinyon-juniper, ponderosa pine, sage shrubland, and spruce-fir. In 2006, we established new transects in the Valle Vidal (VV) Ranger District of the CNF in four habitats: grassland, mixed conifer, ponderosa pine, and spruce-fir.

Reasons for Monitoring

Much like the canary in the coalmine, birds can be excellent indicators of biological integrity and ecosystem health (Morrison 1986, Croonquist and Brooks 1991, Bureau of Land Management 1998, Hutto 1998, O'Connell et al. 2000, Rich 2002, U.S. EPA 2002, Birdlife International 2003). Because they comprise a diverse group of niche specialists, occupy a broad range of habitats, are sensitive to both physical and chemical impacts on the environment, and often reflect the abundance and diversity of other organisms with which they coexist, birds can be useful barometers of environmental change and for measuring the sustainability of human activities on ecosystems.

Bird communities reflect an integration of a broad array of ecosystem conditions, including productivity, vegetation structure and composition, water quality, and landscape integrity (Adamus et al. 2001). The response of bird communities to changes in the environment can be examined at a variety of spatial scales, making them a powerful and practical tool for evaluating the broader effects of resource management, conservation and restoration activities, or other environmental changes. And because birds are generally abundant, conspicuous, and relatively easy to identify, they offer tremendous logistical and economic advantages over other taxonomic groups for monitoring their populations. Also, birds are popular with the public and there is a strong and growing interest, both nationally and internationally, to manage and conserve bird populations, many of which are exhibiting long-term population declines (Sauer et al. 2003).

Aside from serving as environmental indicators, birds are a tremendous economic resource in and of themselves. A recent federal economic report found that 46 million birdwatchers across America spent $32 billion in 2001 on bird watching and related activities (USFWS 2003). This spending generated $85 billion in overall economic output and $13 billion in federal and state income

taxes, and supported more than 863,000 jobs. In addition to being an economic attraction, birds also pollinate, disperse seeds, and consume pests of ecologically and economically important plants, thereby providing ecosystem services worth many billions of dollars. Thus declines in bird populations diminish a valuable economic resource that could have profound negative implications for regional and local economies, both directly and indirectly.

In order for birds to be conserved on a global scale, people in all areas must assume responsibility to conserve the species and habitats for which they are stewards, and population monitoring forms the backbone of avian conservation. Without current monitoring data, conservation efforts are likely to be misguided and inefficient. For these and other reasons, monitoring is mandated by legislation such as the National Environmental Policy Act (1969), Endangered Species Act (ESA; 1973), and the Forest Management Act (1976), as well as by various state laws, Forest plans, Preserve management plans, and other long-range plans (Sauer 1993, Manley et al. 1993).

Effective conservation depends on adequate monitoring information. To date, resource managers have relied on data derived from the Breeding Bird Surveys (BBS), for bird population information. The BBS, however, is a road-based, volunteer-dependent survey that does not effectively sample many species or habitats (Robbins et al. 1993, Sauer 1993), and does not reliably decipher population trends at small geographic scales (Sauer 2000). Furthermore, the design and implementation of the BBS are such that results generated from these efforts are often inconclusive due to the difficulty associated with interpreting index counts (Sauer 2000) and numerous confounding variables (Robbins et al. 1986, Bohning-Gaese et al. 1993, Sauer et al. 1994, James et al. 1996, Thomas 1996). For these reasons, BBS data are generally insufficient to guide local or regional management decisions.

Given the declines of many species of North American breeding birds, there is an urgent need for monitoring programs that serve as an “early-warning system” to identify declining species and the causes of declines so that natural resource managers can proactively prevent further declines. RMBO’s monitoring programs are designed to be comparable, repeatable, data rich, long-term, multi-scale and accessible, so that managers can make informed decisions to effectively conserve birds and their habitats.

Monitoring Objectives

RMBO’s bird monitoring programs are designed to provide population trend or status data on most regularly-occurring breeding species within each program area. Initially, we expect to collect data to provide “early-warning” information for all species that can be monitored through a habitat-based approach. After establishing this monitoring framework, we anticipate collecting more demographic information and testing *a priori* hypotheses to determine the possible reasons for known declines and to better inform management decisions.

Herein we discuss the initial "early-warning" monitoring framework, the monitoring goals and progress.

The specific objectives of RMBO's monitoring program are:

1.) to integrate existing bird monitoring efforts in the region to provide better information on distribution and abundance for most breeding landbirds, especially priority species;
2.) to provide basic habitat association data for most bird species to address habitat-management issues;
3.) to provide long-term trend or status data on most regularly occurring breeding species in the region, with a target of detecting a minimum rate of population change of -3.0% per year over a maximum time period of 30 years;
4.) to maintain a high-quality database that is accessible to all of our collaborators as well as the public in the form of raw and summarized data and,
5.) to generate decision support tools such as population density models that help guide conservation efforts and provide a better measure of our conservation success.