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Developing a coordinated bird monitoring program for the Intermountain West

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ABSTRACT

Monitoring programs for birds have provided useful information for decades, but they could be even more effective if they were better coordinated. A new approach, called "Coordinated Bird Monitoring" (CBM), is being developed at the national level. Progress on CBM has been particularly rapid in the intermountain west. The approach includes clear description of management issues to be addressed, identification of the focal species and the survey objectives, selection of survey methods and estimation of sample sizes needed to achieve the objectives, and cooperation by all stakeholders in carrying out the needed work. CBM plans are being developed in several western States. This approach should increase the usefulness of bird monitoring programs at the local, regional, and continental level during the coming 2-4 years.

INTRODUCTION

Numerous biologists and managers are collaborating to develop a coordinated approach to bird monitoring in the intermountain west. The goal of the project is to improve the efficiency of bird monitoring programs. Collaborators have developed much of the infrastructure needed for the program. Here I discuss the need for the program, its emerging structure, and work we expect to complete in the next few years. We hope this information will encourage more people to participate in the effort.

WHY A COORDINATED APPROACH IS NEEDED

Monitoring population size has provided critical information for nearly all major - and thousands of minor - wildlife issues during the past several decades. Examples in which knowledge of trend in population size has been critical to the success of management programs include (1) identification of pesticides as a serious threat to wildlife (Carson 1962); (2) recovery of species from pesticide impacts (Sheail 1985); (3) declines of individual species such as Spotted Owls (*Strix occidentalis*, Gutiérrez et al. 1995) and Sage Grouse (*Centrocercus urophasianus*, Schroeder et al. 1999), (4) declines of groups of species such as those in eastern thickets, grasslands, and western riparian habitats (Askins 2000), and (5) the recovery of species under management such as the Peregrine Falcon (*Falco peregrinus*, White et al. 2002), Kirtland's Warblers (*Dendroica kirtlandii*, Mayfield 1992) and many waterfowl (Williams et al. 2002). The lack

of baseline and trend information has been as damaging, in several major wildlife issues, as the presence of reliable data has been helpful. For example, following the Exxon Valdez oil spill, millions of dollars were spent trying to determine the impacts of the oil spill. This task was complicated, and in some cases problematic, due to the dearth of pre-spill data on population trends and distributions (Spies et al. 1996). Effective monitoring programs, and analyses based on them, help managers in many ways, including identifying species at risk, revealing possible causes of declines, describing high-quality habitat, setting habitat objectives, and evaluating and refining management (including harvest) programs. Thus, bird monitoring programs have a long and successful history, one which specialists in other taxa such as most mammals, reptiles, amphibians, and virtually all invertebrates, can only envy.

Despite the value of many past monitoring programs, however, much opportunity exists for making these programs even more valuable (Anderson 2002, Williams et al. 2002). Many programs collect data without a clear vision for how the data will be used; much of the data collected is not contributed to permanent repositories and is thus quickly lost; many "long-term" programs are initiated without long-term support and are discontinued after 5-10 years, a period too short to produce useful trend estimates; disagreement exists about the best methods to use in monitoring programs; and many species are poorly covered throughout all or significant parts of their range. A comprehensive approach, developed by representatives from all of the bird groups and from several disciplines (e.g., data management, statistics, and GIS as well as birds), is thus needed.

STRUCTURE OF THE COORDINATED BIRD MONITORING (CBM) PROGRAM

The basic approach (Fig. 1) involves answering the following questions: what management issues will the monitoring program help us address (goals), what information is needed (objectives), what methods will be used (strategies), and who will assume responsibility for each component of the program (implementation plan). Each of these topics is briefly discussed below.

Management Issues. Identifying species at risk and causes of declines is widely recognized as an important issue in wildlife management (Brown et al. 2001, Downes et al. 2000, Pashley et al. 2000, Williams et al. 2002). This goal is thus always a part of the CBM approach. A second general - and widely endorsed - goal is to achieve better integration between monitoring and management. The integration may be useful at any spatial or administrative level. Numerous groups are identifying areas in which monitoring can improve the way management activities are conducted. For example, in Nevada, CBM participants have selected six management issues (in addition to identifying species at risk) for initial work. The issues are effects on birds of (1) human activities in riparian habitats, (2) loss of wetlands, (3) fire in sagebrush, (4)

Figure 1. Steps in developing coordinated bird monitoring plans.

Goals
▼
Objectives
▼
Strategies
▼
Implementation
▼
Plan

restoration work in pinyon-juniper habitat, (5) loss of aspen, and (6) effectiveness evaluation of habitat conservation and restoration measures. Special efforts will be made to conduct surveys in these habitats for several years, after which new short-term priorities will be identified. The Intermountain West Joint Venture (IWJV) is interested in working with the CBM group to evaluate success of IWJV projects. Details will be discussed during the next several months.

The general approach for defining information needs is sometimes referred to as "conservation accounting," to distinguish these activities from monitoring for the restricted purpose of estimating long-term trends. Three sub-activities under conservation accounting are project tracking, assessing effectiveness, and evaluation and refinement. Tracking refers to gathering information on the number of projects, goals, acres treated, and other information that describes the work that was done. Assessing effectiveness means determining if intended results occurred. Most projects affect habitat, and monitoring habitat responses is thus important. Ultimately, however, the purpose of bird conservation is to restore or support bird populations, so population monitoring is also needed. Information is always needed at the project level to determine whether birds used the treated area in the expected ways. If several projects are carried out in a region, then monitoring at the regional scale may be needed. Finally, monitoring at the rangewide level is also needed both to determine whether the populations increased and to put responses at the smaller scales in perspective. For example, the rangewide population may be declining or a range shift may be occurring. This information is needed to interpret population trends at the regional or local level. Evaluation and refinement means using the results from tracking and effectiveness assessments to improve future conservation efforts. CBM is particularly important in the assessment stage, but specialists in monitoring need to be involved in designing the tracking process, to insure that data needed for monitoring are collected, and in helping to refine projects, to insure that monitoring results are properly interpreted. Thus, CBM should be viewed as one component of the larger conservation accounting effort.

Information needed. A list of species that warrant monitoring, using the general principle that we should monitor species we would try to conserve if we knew they were declining, has been produced for all of Canada and the United States. The list has 659 species, of which more than 400 occur regularly in the

intermountain west. In developing the CBM program, all of the species from this list that occur regularly in the planning area, at any time of year, are potential focal species. An early step in the process is to identify which of these species will be focal species for the program. For example, some groups are developing CBM plans only for certain groups of birds (e.g., shorebirds) or only at a certain time of year such as the breeding season. In the Nevada plan, the numbers of species about which information is needed, to address the six management issues identified in the plan, varied from 14 to 286.

A second step is to identify the kind of information needed about each of the focal species. Three general categories of information have been defined: long-term trends, spatial patterns in abundance, and productivity. Trends include trends in the average number of birds present (e.g., during migration) as well as trend in population size; patterns in abundance are needed for tasks such as comparing treated and non-treated areas or to identifying heavily used habitat; productivity is needed to identify sources and sinks or high and low quality habitat. CBM plans identify which information - trends, abundance, or productivity - will be collected to address each management issue. For example, in the Nevada CBM plan, trend data are of highest priority for identifying species at risk, and abundance data are most important for addressing the other five management issues.

The final step in describing the needed information is to set quantitative goals for each management issue. Much work has been done on the goal for trend analyses. Bart et al. (2003) suggested that the goal should be 80 percent power to detect a 50 percent decline occurring during 20 years. Various statistical parameters were also described, and they recommended that the goal should be achieved throughout the species' range or an area the size of the eleven western States, whichever was smaller. Achieving the monitoring goal for much smaller areas, such as a single State, was not considered feasible. Thus, States need to work together to ensure that they each contribute the information needed to achieve the trend accuracy target. Quantitative objectives must also be set for the other management issues to be addressed.

Methods. Nine general survey methods have been described, and recommendations are being developed about the best methods for accomplishing each of the three survey objectives - trends, abundance and productivity - for each of the 659 species that warrant monitoring in Canada and the United States. These recommendations are being used in the development of new programs at the continental level and should be useful to biologists choosing methods for their local programs. In the Nevada CBM plan, for example, a table has been produced with survey methods as rows and management issues as columns. The entries report the number of species, for each management issue, to be surveyed using each method.

Estimates are then made of the required sample size for each survey and objective. For trend estimates based on the Breeding Bird Survey, and other similar programs, estimates have been made for each Province and State of the

number of routes needed to achieve the trend accuracy target for 80 percent of the species that warrant monitoring (Bart et al. 2003). Sample sizes needed to achieve this accuracy target with other surveys are being developed at the continental level. Sample sizes needed to achieve the accuracy targets for other management issues must often be developed at the State or regional level, but guidelines for such analyses are being developed as part of the CBM effort. The result of these analyses is a well-defined program of surveys needed to address the focal management issues and the sample sizes needed for each survey.

Roles and Responsibilities. The final step is deciding who will take responsibility for each component of the plan and whether the work will be done in-house or by contract. This decision must be made by people in the participating organizations, and they, or their staff, must therefore be involved in the earlier stages of the analysis, especially the identification of management issues to be addressed. A Steering Committee is thus needed to oversee development of the CBM program.

STATUS AND EXPECTED PROGRESS

The CBM approach was developed by the Partners in Flight Western Working Group in collaboration with the other bird conservation initiatives. Participants decided to develop State CBM plans and then to combine them into a westwide plan. Work has begun in most western States and should be completed in all States during the next 1-2 years. The long-term approach is to have annual meetings at the State level and to meet every 1-2 years at the westwide level to identify new regional projects and review progress on past projects. For example, two States might have interests in a sagebrush project and might appeal to other States with significant sagebrush areas to join with them in planning and carrying out their study. Others might put different suggestions before the group, which would then prioritize the proposals and decide which to implement immediately.

CONCLUSION

The CBM approach is an experiment. We do not yet know how successful it will be. In many other areas, however, development of a clear vision and strategy for achieving it has helped participants achieve far greater success than they thought possible before developing the comprehensive design. As noted above, monitoring should be viewed as one component of conservation accounting, which is itself an integral part of the general conservation effort. Development of the CBM approach thus has the potential not only to improve the efficiency of bird monitoring programs but, more importantly, to help achieve the broad conservation goals that many of us feel will be critical in the coming decades in the intermountain west.

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Important Bird Areas in Nevada

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The Lahontan Audubon Society recognized 12 new Important Bird Areas (IBAs) across the state of Nevada by the end of 2002. These sites, which include the Carson Valley in western Nevada, the Sheldon National Wildlife Refuge (NWR) in northwestern Nevada, and the Virgin River in southern Nevada, highlight the wide variety of bird habitats found in this diverse state and contribute to the portfolio of nine previously recognized IBAs. The process of nominating and reviewing sites in Nevada is still ongoing, and the Lahontan Audubon Society expects to recognize several more IBAs before the process shifts to advocating for the long-term management of these landscapes.

IBAs are sites that provide habitat essential for the breeding, feeding, wintering or migration of one or more species of birds. IBAs may be areas of any size and either publicly or privately owned, and share characteristics such as high bird diversity, priority conservation species, or the presence of unusually large numbers of birds. To be recognized as an IBA, a site is nominated and then evaluated by a Technical Advisory Committee comprised of biologists and land managers from across the state who assess each site's statewide significance for birds. The list below briefly describes the IBAs recognized to date.

Started in Europe in the mid 1980's by BirdLife International, the Important Bird Areas Program has been a powerful conservation tool. Building on a program initiated by the American Bird Conservancy, the National Audubon Society pioneered the first statewide IBA project in Pennsylvania in 1995. The IBA program is currently underway in more than 45 states, and more than 500 IBAs have been identified in the United States alone. By working through partnerships to identify those places that are critical to birds during some part of their life cycle (breeding, wintering, feeding, migrating), Audubon hopes to minimize the effects that habitat loss and degradation have on bird populations.

The Nevada IBA Program is a cooperative venture between the Lahontan Audubon Society and the National Audubon Society. The Nevada IBA Program is supported by generous grants from the National Fish and Wildlife Foundation, the A. B. Schultz Foundation, The Whittell Fund, Patagonia, Inc., The Stout Foundation, and the Harris Foundation.

Ash Meadows NWR. This area has a significant concentration of breeding Southwestern Willow Flycatchers, as well as Yellow Warblers and Yellow-billed Cuckoos. It also is a migratory stop-over for neotropical breeding birds, and it includes 22 species of waterfowl representing 23,000 individuals.