

Monitoring Neotropical Migrants on Managed Lands: When, Where, Why

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Abstract — Relevant wildlife monitoring on managed lands lies somewhere between monitoring everything and monitoring nothing. Knowing the population status of all birds on a managed area would be potentially useful information but would be costly to collect, but without monitoring no link between management and wildlife populations can be made. A decision making process for developing appropriate monitoring programs on managed lands is outlined.

INTRODUCTION

Monitoring for the manager is a means of assessing consequences of management activities. Monitoring needs are shaped primarily by management goals for the area. Details of any monitoring program should take into account management priorities, regional monitoring programs, the type of feedback information necessary to assess management activities, and the resources available to conduct monitoring surveys.

This paper outlines a decision making process that can be used to develop bird surveys on managed lands. This process focuses on needs of managers and not groups who monitor birds with regional, state, or national mandates to monitor birds as, for example, under the requirements of the Fish and Wildlife Conservation Act and Resources Conservation Act or for the purposes of setting wildlife hunting regulations.

Management Objectives

While monitoring programs can be developed for all species of birds, such a comprehensive system would be exceptionally expensive. Consequently, monitoring is most appropriate for species with active management objectives. Since each management objective involves a unique suite of biological, economic, and political factors monitoring programs may need to be developed separately for each objective.

Management's role in controlling population numbers

If management activities have little impact upon populations of birds using an area, then there is little need for the manager to develop a monitoring program for those species. Monitoring birds during migration is often an example of such a situation. In most instances, neotropical migrants will use a broad range of habitats during migration. Consequently, no special effort in most regions is needed to manage habitat for such migrants. Information on population increases or decreases could be readily collected, however, such information would not be used to modify local activities and would needlessly consume staff time.

While it may not be in the manager's best self-interest to collect monitoring information on bird populations not directly tied to local management goals, there are a number of national and regional monitoring programs that may have or need sampling stations on their property. Programs such as the North American Breeding Bird Survey, and the Monitoring Avian Diversity and Productivity Program provide important early warning signals for declines in a broad range of species. These programs allow conservationists to determine if population declines in species' populations are occurring throughout a species range or are merely local. To effectively collect such data over broad geographic ranges these programs depend upon volunteer and agency support. Consequently, monitoring activities by such outside groups should be encouraged and facilitated.

If, as is often the case, management activities have potential to significantly affect the distribution and abundance of birds using the area, then some form of population monitoring is warranted. Prior to the search for the most appropriate

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monitoring techniques, the relationship between local populations on the management area and regional populations must be considered.

Birds are affected by changes that occur both on the managed area and in the surrounding landscape. Cover, water, and food conditions of the surrounding area influence the number of birds present within the management area. For neotropical migrants, factors during the time of year spent away from the management area could have a greater controlling influence on population numbers present than local management activities do.

Populations of birds that commute seasonally or daily outside of management areas are influenced both by local management activities and by factors outside that area. The percentage of the population using an area at any moment is influenced by the size of the overall regional population and environmental conditions both on and off the management area. Under such circumstances, without additional information on regional populations, surveys conducted only on the management area can yield misleading interpretations of the success of an area's management program for that species.

Regional information on bird populations often exists in accessible, summarized formats. Programs such as the North American Breeding Bird Survey, National Audubon Christmas Bird Counts, and now a number of other state, provincial, and federal programs all attempt to estimate regional population trends. Population trends from the North American Breeding Bird Survey can be obtained from Bruce Peterjohn, USFWS, Laurel, MD 20708. Christmas Count data are published in *American Birds* and computerized data can be obtained from this author. Regional population trends, compiled from many sources, are available for neotropical migrants from each of the regional Partner's in Flight management groups. Each of the regional management groups have also developed schemes for neotropical migrants that rank each of the species in the region by regional vulnerability and conservation need.

Ultimately, monitoring information will be used by the manager to assess how well populations are doing on the managed area and whether such population changes warrant shifts in management activities. To do so will require, in most cases, the evaluation of not just local population trends are on the managed area, but regional and continental population trends. For example, population trends of Red-eyed Vireos may have declined by 50% over a 10-year time period on a local management area. Does such a decline warrant a management response? Maybe. It will depend upon the answers to a number of questions such as: Are Red-eyed Vireos a species of management importance to the local manager? Are Red-eyed Vireos declining regionally? Are they declining continentally? Are Red-eyed Vireos an abundant, ubiquitous species in that region or are they scarce as hen's teeth? Are the factors causing the declines likely to be located in the breeding area or in the wintering area? The answers to such questions will influence decisions regarding when to take management action.

In some instances regional information on population status of birds is non-existent or of insufficient detail. New regional surveys can be instigated by coordinating with other regional Partners in Flight groups (especially the Monitoring Working Group), state, provincial, federal, and private groups interested in developing better information for those same bird species. Alternatively, it may be sufficient to add additional sampling points to existing survey programs.

While such surveys may provide useful general information on the regional population trends of species using managed areas, some level of monitoring must occur on the site to put into perspective the role that site has in maintaining regional population levels.

Local Monitoring Strategies

Intensity of effort

Accurate and precise estimates of population size or trend can be developed for any species or group of species. However, as statistical rigor increases so do costs. Budgetary constraints will require that some compromise be made between statistical robustness and cost. In many situations statistically rigorous techniques are not required. Those situations occur when populations exhibit long-term stability, there are no obvious population threats, management techniques are tested and effective, and when management has little potential to change that site's population status.

The appropriate monitoring intensity for each species/group/habitat fall largely into levels listed below.

1. No Monitoring - Those species/groups/habitats not currently on the management list. Note, however, that the manager is faced by the dilemma of ever changing management lists and changes in the relative conservation problems a species faces over time. Common species today can become the species of management concern tomorrow (e.g., would you have put the Passenger Pigeon on your list of species of management concern in the early 1700's?). The ultimate solution is to collect information on all species. Unfortunately, fiscal responsibility dictates the setting of monitoring priorities and that some species will have to remain unmonitored. While complex monitoring programs cannot be developed for all species, a basic inventory list of the species occurring within the management region is an ideal project for bird-watching clubs.

Choice of monitoring techniques

2. **Low Intensity Monitoring** - The species/groups/habitats in this group need only periodic checks on their status due to past stability, large current population size, or low potential for management to affect change in population status. Such monitoring can consist of yearly checks (e.g., local bird watchers report that all the woodland warblers are still present during the breeding season in the management area) or longer cycles of more intensive counts (e.g., Wood Thrush nest success checked every 5 years, cowbird surveys every 3 years).
3. **High Intensity Monitoring** - For a small group of species/groups/habitats a relatively high intensity monitoring system must be implemented because abrupt changes in population status can occur and management activities may control the species' short- and long-term survival (e.g., Kirtland's Warbler, Golden-winged Warbler).

Identifying management trigger points

One way to think about determining the level of intensity of monitoring necessary for a species is for the manager to ask: Under what circumstances will I react to changes in population status of a species? If the manager is unlikely to take any action to indications of changes in population status, then monitoring birds is superfluous. If a manager reacts only to major changes, then quick and dirty look-sees are usually most appropriate. If management has to respond quickly to changes in distribution or abundance of species, then a monitoring program that yields a good estimate of population status is required.

For each survey, even the quick and dirty type, it is important to outline before the survey begins what types of changes will trigger a response by the group managing those lands (e.g., How big a drop in numbers can be tolerated before further actions or investigations are warranted?).

If the monitoring measures of population status are coarse, changes in population status can trigger greater monitoring effort to confirm that a problem indeed exists. In situations where the current monitoring technique is already yielding precise and accurate estimates, changes in local and regional population numbers should cause direct management actions.

Once species to monitor have been chosen and an appropriate monitoring intensity determined, the process of choosing the best monitoring technique can begin. In practical terms, the best technique will be those techniques that yield an adequate estimate of the species' population size at the lowest cost.

For species/groups/habitats measured at low monitoring intensity, the traditional look-see approach is usually adequate. Specific information collected will vary with species and circumstance. For example, if scrub-nesting birds are managed, some gauge to status and numbers can be garnered from area checklists collected by local birdwatchers and from sightings by staff during working hours. If there are a number of heronries on site (not neotropical landbirds, but close enough), a check during the peak breeding season for signs of activity may be sufficient. In the course of collecting such measures, consideration should be given whether information coming in is representative of the population as a whole or only of isolated subpopulations.

For detailed surveys, repeated only at intervals of several years, and more intense level surveys needed for fine-tuned management systems, greater consideration must be given to the statistical techniques employed. The species, geography area to be surveyed, habitat, levels of precision, and number and type of individuals available to collect information all must factor into selection and development of a monitoring program. To establish the optimal sampling scheme and monitoring techniques for the species and situation the manager should consult with regional monitoring experts and especially involve statisticians during the development phase. The Partner's in Flight Monitoring Working Group is another source of statistical consultation.

Development of statistical sampling protocols and monitoring techniques has become quite technical. Cookbook solutions are difficult to apply to the spectrum of situations that a local manager will confront. The manager should take responsibility for making decisions regarding the species and intensity of monitoring most appropriate for their situation, but it will usually require statistical consultation to translate those needs into methods, sampling schemes, and analyses most optimal for the situation and budgetary constraints faced by the manager.

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