

Designing and Implementing a Monitoring Program and the Standards for Conducting Point Counts

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Abstract — Choosing between the apparent plethora of methods for monitoring bird populations is a dilemma for a person contemplating beginning a monitoring program. Cooperrider et al. (1986) and Koskimies and Vaisanen (1991) describe many methods. In the Americas, three methods have been suggested as standard (Butcher 1992). They are: point counts for determining habitat relationships, population size, and population trends; and two demographic methods, constant effort mist netting and nest searching. Below, I discuss the process of choosing methods and suggest priorities. Then, for point counts, I describe in some detail the standards that have been put in place for this method.

CHOOSING MONITORING METHODS

Before monitoring methods are decided upon, goals of the program should be clearly outlined. As part of the goal-setting process, the purposes behind development of a monitoring program should be stated explicitly. I suggest that the following questions be addressed:

1. What is the intent of the monitoring?
 - a. Regional trends or habitat specific monitoring?
 - b. Evaluation of all species, a target group of species, or a single species?
 - c. What is the expected relationship between results of a population change and management actions?
2. How is monitoring to be accomplished?
 - a. What will be the protocol used at each station?
 - b. How will the samples be allocated?
 - c. When will the survey be conducted?
3. How do we judge if the monitoring is successful?
 - a. What are the initial goals of precision?
 - b. What analytical methods will be used to determine if goals are met?

Once these decisions are made, then the manager can proceed with decisions of the methods involved.

A good monitoring program should integrate both population size with demographic measures. A comparison of both types of methods is found in Butcher et al. (this volume). In such a program I would suggest that the basic entity is an administrative **unit**, such as a Forest Service District, a park, a refuge, or a nature center.

The data taken in this program can be used at two geographic scales. At the smaller level, for instance, a state park, they will provide a local assessment of status and trends of landbirds, and permit statements such as: "Scarlet Tanagers have significantly increased on sampled units in the park," or "Hermit Thrushes breeding in the park have had high mortality during migration or the winter in the past two years."

At the larger scale, perhaps a state, the program will permit evaluation of geographic patterns of various attributes of landbirds. Statements that this approach can answer are, for example: "Thrush population increases or reproductive failures are more prevalent in some regions or states." It is important to realize that the program cannot evaluate population status of birds of the entire geographic area, whether regional, state, national, or continental. For example, if samples are only from forested environments, only statements about birds using forested lands can be made.

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I suggest four levels of program be carried out on each unit.

Priority I. Breeding Bird Survey

If the unit has an official Fish and Wildlife Service Breeding Bird Survey route within or near it that is not being surveyed, I recommend that the standard survey be conducted. This involves 50 3-minute point counts along roads at 1/2 mile (1 km.) intervals. The effort takes one person-day at the height of the breeding season, usually in early June. The surveyor must know all vocalizations of species likely to be encountered. This Survey will help detect regional trends in many species in the unit, or its vicinity.

Priority II. On-road Point Counts

As a second priority, I recommend the unit put in at least 250 point count stations. Methods for conducting point counts are described below, and in Ralph et al. (in press a). I suggest that stations be: in habitats representative of the unit; stratified by these major habitats; systematically placed; and placed primarily along secondary roads. This level of effort will require about 10 person-days during the early breeding season, usually in May or June. It is based on the assumption that in the 10-day period, an average of about 25 stations can be censused each day. While we acknowledge the fact that an on-road monitoring program is not without bias, benefits are considered by most workers to outweigh disadvantages, and are at least partly offset by Priority IV, below.

Priority III. Demographic Methods.

Constant Effort Mist-netting Sites

As a third priority, I recommend that the unit establish at least one site to measure demographic parameters by operating 10 mist nets, once per 10-day period, through the breeding season. The methods are described by DeSante (this volume), and detailed in Ralph et al. (in press b). This effort will require about 10 person-days per site, beginning about June and continuing through the end of August. The program will provide information on productivity, survivorship, and movement of many species.

Nest Searching Sites

The substitution of nest searches, the alternative demographic method in the place of mist-netting, is also possible. This method is described by Martin (this volume),

Martin and Geupel (in press), and also in Ralph et al. (in press b). Nest searches involve intensively finding nests in a plot. Typically, one plot can be done in about 20-40 person-days, beginning about May and continuing to about August. At the present time, fewer nest searching sites than mist-netting stations are in operation, enabling fewer comparisons between units.

Priority IV. Off-road Point Counts

As a fourth priority, I recommend that the unit conduct point counts on at least 100 off-roads stations in habitats not covered by on-road point counts. This will require up to 10 person-days during the same period as on-road counts, and assumes about 10 stations per day covered along trails or cross-country.

As more time, personnel, and funding is available, the above programs can be expanded with more stations or sites monitored.

STANDARDS FOR POINT COUNTS

The point counts referred to above are modifications of the unlimited distance point counts (Blondel et al. 1981), and often represent the best compromise between economy of collection effort and precision and accuracy of estimates of population trends or population indexes (Verner 1985, Ralph et al. in press a).

Point counts and their variables

In point counts, birds are counted at a preselected point for a specified period of time. Because counts are greatly affected by many factors, any comparison of counts is strictly dependent on controlling time spent counting, time of day, seasonal effects, observer differences, and other factors that influence probability of detecting birds at a point.

The following standards are some of those developed at a workshop held in Maryland in November 1991, and have been fully developed in a paper in those proceedings (Ralph et al., in press a). The workshop's purpose was to develop components of point count methodology sufficient to: (1) provide trend data for monitoring population changes; and (2) predict population responses to habitat manipulations.

The need for standards has become apparent. Many new bird monitoring programs are currently under development, and most are on a local or regional scale. These local programs have potential to provide a wealth of data, both on local aspects of regional trends, and on comparisons of bird-habitat studies. To permit comparisons between areas and projects, standardization of effort is essential. Point count methodology has applicability in seasons and circumstances beyond those I discuss. Point counts have been used in both the tropics in all seasons, and in temperate areas to monitor wintering migrants.

While there have been many variations of point counts, the standards below comprise the important aspects of doing these censuses.

1. Locate census points systematically on or off-roads. Census points should systematically located with a random starting point, either on roads or off roads. On-road more efficient, but number recorded is different, usually more.
2. Census if possible on tertiary roads, secondary roads, and trails. Observers should attempt to carry out censuses primarily on tertiary roads, then secondary roads, avoiding wide, primary roads. Off-road censuses should be carried out in major habitats not covered by road systems. These should be done on trails, if possible.
3. The number of stations depends upon objectives, but will usually be more than 250. The number of samples necessary to meet program objectives should be derived from statistical evaluation of pilot data. One observer can do about 25 stations per day.
4. Length of each census should usually be five minutes. Time spent at each count station should be five minutes if travel time between counting stations is less than 15 minutes and ten minutes if travel time is greater than 15 minutes. Data should be separated into those individuals seen or heard during the first three minutes and those additional individuals heard in the remaining minutes.
5. Points should be at least 250 m apart. The minimum distance between point counts is 250 m, or 500 m in open habitat, such as grasslands.
6. Record all birds only once. Birds previously recorded at another sampling station should not be recorded again. All individual birds detected at a point should be recorded.
7. Separate birds within and more than 50 m. Birds detected within a radius of 50 m surrounding the center of the point should be recorded separately from those at all distances.

8. Census each station once a season. It is usually better to increase the number of sampling stations, than to repeatedly count a smaller number of stations. An exception should be made for habitats which are very limited and important.
9. Census when detection rate is most stable. Breeding season point counts should be conducted during the time of day and time of year when the detection rate of species being studied is most stable. This is usually before 10:00 in May and June.
10. Avoid inclement weather. Birds should not be surveyed when it is raining, during heavy fog, or when noise from wind on vegetation interferes with counting.
11. Use only highly trained observers. Only observers able to identify all targeted birds by sight and sound should participate in a monitoring or research project using point counts. Proposed national standard training standards with syllabi are underway.

DATA CENTER

In light of additional uses these data have to researchers and managers, it would be useful to have copies of data sent to an accessible central repository, either a national or several regional data centers. A crucial element in implementing a national program would be establishment of these data center(s) to help maintain uniformity of methods, provide data tabulation, interpretation, analysis, and act as a conduit for providing data to agencies and researchers for analysis. Each unit should contribute its data to such a center with personnel having competency in analysis. This center will tabulate data from throughout the region and disseminate information on patterns of change in demography or population trends of species or groups of species. Emergent patterns should confirm current inventory and management practices as adequate or trigger more intensive inventory or research as questions are raised.

CONCLUSIONS

1. Standardization is essential. All methods are compromises. The methods presented here are, as much as possible, compatible with variety of other techniques. When different methods are used, the biologist using them runs a real risk of lack of comparability.

2. Data must be shared fully. An essential part of science is making data available to wide variety of investigators, such as through a data center. If we are not successful in this aspect, the whole enterprise could fail.
3. National or regional data center(s) must be established very soon. A center will tie together the above requirements.

With these programs and standards fully in place, we can expect a continent-wide program to be well underway with widely-compatible data available to all.

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