

Monitoring Bird Populations: The Role of Bird Observatories and Nongovernmental Organizations

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Abstract — Nongovernmental organizations (NGOs) currently participating in Partners in Flight have been monitoring bird populations in North America for decades. These regional organizations have strong grass roots and private sector support and are able to conduct truly long term studies by using nontraditional funding sources and staffing with dedicated volunteers and personnel. NGOs are well positioned to provide the expertise needed to implement and maintain long term monitoring programs that are required to document normal and anthropogenic fluctuations in neotropical bird populations. An integrated monitoring scheme that samples both population trends and demographic parameters of populations across both broad geographical regions and local microhabitats is needed. We recommend NGO sponsor monitoring programs that are intensive and localized; habitat or land-use based; employ standardized protocols; utilize volunteers as well as professionals; attract grass root support; and provide regular results that can direct management. Specific recommendations and examples on implementing such a program are presented.

INTRODUCTION

A fundamental goal of the Partners In Flight (PIF) initiative is to maintain populations of bird species while they are still relatively common (Senner this volume). This will enable cost effective responses before a species undergoes serious population decline. Ideally we would develop a comprehensive management plan for every species based on the latest scientific research. Unfortunately for a vast majority of nongame bird species little to no data exist on such basic information as density, productivity, survival, dispersal, or even habitat preferences (Martin and Nur, this volume). To collect this type of data requires long term studies of bird populations (Wiens 1984). However, in North America long term studies focused on population biology of species are few (O'Connor 1991). To implement long term monitoring studies of neotropical migrants, a cooperative approach between Nongovernmental organizations

(NGOs) and state and federal agencies is required. In this paper we outline how NGO's may help in such a program and present suggestions for implementing a coordinated standardized effort.

Examples provided by Spotted Owl, Golden-cheeked Warbler, and numerous other species have shown that collecting baseline data after a species is declared threatened or endangered ("T and E") is cost prohibitive (O'Connor 1992). Out of necessity, many current management plans for "T and E" species are based on population data from different species in a different habitat. An important and key component of PIF is to develop and maintain baseline monitoring programs that trigger cost effective management responses before species show serious decline. Baseline monitoring also provides the documentation to convince land managers and the public that habitat preservation may be required.

THE ROLE OF NON-GOVERNMENTAL ORGANIZATIONS

Many NGOs are actively participating in PIF. They represent a diverse group ranging from private agricultural organizations to regional, national, international educational and

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research organizations. Their missions and interests are far too diverse to summarize here, but, in general they offer a wide range of experience and expertise in science, education, management and/or public policy (Senner this volume).

The most common type of NGOs active in PIF are "regional bird organizations" (Table 1). The mission of these organizations is conservation of bird populations and their habitats through research, monitoring and education. For many their primary goal is to provide credible science-based information for policy formation.

Table 1. — North American Bird Observatories currently active in the Partners In Flight Initiative.¹

<i>Organization</i>	<i>Location</i>	<i>Contact</i>	<i>Phone</i>
Alaska Bird Observatory	Fairbanks AK	Tom Pogson	907 456 5156
Cape May Bird Observatory	Cape May Point NJ	Paul Kerlinger	609 884 2736
Colorado Bird Observatory	Denver CO	Mike Carter	303 659 4348
Hawk Mountain Sanctuary	Kempton PA	Laurie Goodrich	215 756 6961
Long Point Bird Observatory	Port Rowan ON	Michael Bradstreet	519 586 3531
Manomet Bird Observatory	Manomet MA	Linda Laddy	617 224 6521
Point Reyes Bird Observatory	Stinson Beach CA	Geoff Geupel	415 868 1221

¹ This list was compiled from the PIF newsletter (Vol. 2, No. 1), and ICBP NGO mailing list (George Schillinger, personal communication). The list is not intended to be comprehensive and excludes many bird oriented organizations that may be active in the PIF initiative. Bird oriented NGO's with more national and international scope were also excluded.

Regional bird organizations are in a unique position to play a critical role implementing most of the PIF's objectives. Typically they are membership based nonprofit organizations that have strong regional and grass roots support. They garner regional support by actively involving members in data collection and education programs, and interpret scientific results through publications and outreach programs. Most also conduct long term studies on nongame bird populations.

Monitoring and longterm studies of bird populations have typically been avoided by U.S. biologists for a variety of reasons and are relatively scarce in North America (for review see O'Connor 1991). Our current understanding of nongame bird population biology has come from a few long term studies (e.g. Holmes et al. 1986, Wiens and Rotenberry 1981). With the exception of a few volunteer-oriented projects (e.g. US. Fish and Wildlife Service's (USFWS) "Breeding Bird Survey" (BBS), National Audubon's "Christmas Bird Counts", and Cornell Laboratory Of Ornithology's "Nest Record Scheme" and "Resident Bird counts") and a few universities that focus on concept oriented research, regional bird organizations are the only entities in North America conducting long term (greater than 3 year) monitoring studies on bird populations.

Point Reyes, Hawk Mountain, Long Point, Manomet, and Cape May Bird Observatories all have ongoing landbird monitoring programs that have been in existence for 20 years or longer. Many monitoring methodologies currently being recommended and employed by various PIF working groups

have been based on NGO long term studies. (e.g. DeSante and Geupel 1987, Hussell et al. 1992, Ralph et al. in press, Martin and Geupel in press)

These programs survive over the long term by using a combination of: 1) Non-traditional research funding sources (e.g. membership) not tied to specific personnel, initiatives, or specific grants. 2) Staffing with students, interns, amateurs, and professional volunteers at relatively low costs. These people are willing to participate because of the unique hands-on, intensive training they receive and the satisfaction of participating in meaningful data collection. 3) Low turnover of staff biologists allowing project continuity. For example PRBO scientific staff currently averages over 15 years.

These programs provide the long term data vital to understanding bird population dynamics. They provide critical information on natural fluctuations and allow proper evaluation of effects of human caused environmental disturbances (Wiens 1984). Monitoring bird populations over time, in conjunction with other interdisciplinary monitoring or research, can yield results that reveal important causal relationships (Temple and Wiens 1989, for examples see DeSante and Geupel 1987, Sherry and Holmes 1992, Nur and Geupel this volume).

At present, long term monitoring programs sponsored by regional NGOs are widely dispersed across North America. The recent fledging of new organizations such as the Alaska, Colorado, Missouri, and Gulf Island Bird Observatories, to name a few, are beginning to fill some geographic gaps. They now provide regional expertise and, in the future, valuable results from longterm data bases. Clearly there is a need for many more such organizations as efforts to maintain vitally important data bases increase.

For the past 27 years Point Reyes Bird Observatory (PRBO) has been monitoring nongame bird populations throughout California, and now Mexico and many Western states. A current monitoring program that may serve as model for PIF is PRBO's Pacific Flyway Project (Page et al. 1992). The project utilizes hundreds of volunteers and collaborates with a variety of private companies, governmental agencies, international biologists, and land managers. The objectives of the program is to monitor shorebird density and usage of most wetland habitats west of the Rocky Mountains. The project provides training workshops for volunteer censusers, and scientifically credible information for land managers. Now in its fifth year, it represents the only long term data base on seasonal populations of shorebirds in the west.

Another example of the value of long term monitoring is provided by PRBO's Landbird monitoring program (Nur and Geupel this volume). Results have shown a strong correlation of landbird productivity with rainfall and unprecedented reproductive failure in 1986 (Fig. 1, DeSante and Geupel 1987). If other monitoring programs were in existence the geographical extent of the problems in 1986 would be known. This program, now in its 18th year, has survived by using hundreds of volunteers to collect data and limited financial support from the

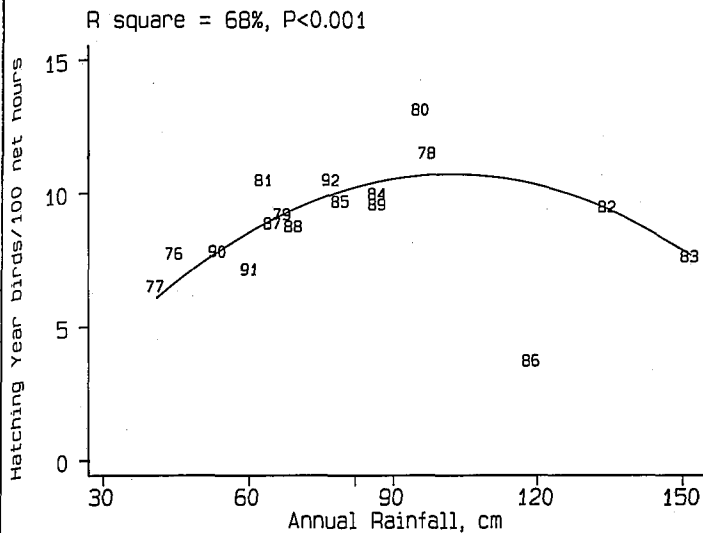


Figure 1. — The number of new, hatching year birds (representing 51 locally breeding species) banded per 100 net hours as a function of total annual rainfall (1 July to 30 June) from 1976 through 1992 at the Palomarin Research Station (see DeSante and Geupel 1987 for methods of standardized mist netting).

membership of PRBO. The protocols from this program are now being adapted for use in nationwide monitoring programs (DeSante, this volume, Martin and Geupel, in press)

Regional NGOs are instrumental in implementing and, more importantly, maintaining long term monitoring programs. In summary they offer the following:

1. Regional expertise in methods, site selection, habitat and/or species focus.
2. A pool of well trained volunteers and professional biologists to collect data and collaborate.
3. Training to university, state, federal, and international agency personnel.
4. Institutional sponsorship at relatively low costs with long term commitments.
5. Intensive monitoring of primary population parameters.
6. Coordination of monitoring programs, both regionally and internationally, without political agendas.

RECOMMENDATIONS FOR IMPLEMENTING A MONITORING PROGRAM

An integrated monitoring scheme that samples both population trends and demographic parameters of populations across both broad geographical regions and local microhabitats is needed (Temple and Wiens 1989, Ballie 1990, Nur and Geupel this volume).

The USFWS' Breeding Bird Survey (BBS) is a model program and has provided sound evidence of broad scale declines in population size in many populations of Neotropical

migrants across North America (Robbins et al. 1989). However, other studies have demonstrated substantial geographic variation in population trends of individual species and these broad-scale declines inferred from BBS data are not reflected regionally (James et al. 1992) or locally (Hagen et al. 1992). Thus broad scale programs such as the BBS, that are not habitat based or integrated with other studies, are unable to provide the resolution needed to identify causes of population decline. More importantly these programs do not identify specific management practices or habitat conditions that a land manager can modify to enhance bird populations

In order to produce meaningful results that can trigger a management response we suggest that NGO sponsored monitoring concentrate on long term data bases that monitor demographic and habitat association patterns locally. These program should be targeted at specific habitat types or land uses typically associated with smaller administrative units such as forest districts, preserves, parks, or refuges. Larger units, such as forest service regions, bioregions, states, or even continents should focus instead on population trend data from roadside point counts.

Localized monitoring data bases that are widely dispersed may have a problem with interpretation due to spatial variation and scale. Because bird populations may vary substantially between sites, even within the same habitat type, results may differ from site specific biases. In other words, changes observed locally may not be representative of changes on a broader scale. (O'Connor 1991).

The standardization of protocols among sites may significantly reduce this problem. Therefore biologists participating in monitoring programs must be willing to foster, coordinate and accept common methodologies and protocols. Forthcoming, comprehensive training programs for wildlife managers and workshops conducted in cooperation with NGOs, universities, and PIF Working groups may help significantly in this regard.

NGO sponsored programs should also integrate with other biological studies whenever possible and provide usable information on a regular basis. It is unlikely that any program can survive beyond a few years without yielding some results on annual basis. Even simple presence/absence data tied to a particular habitat or management practice may provide valuable information they will justify a program's existence.

The methods of monitoring employed are dependent on the objectives of the land holder, funding, and skills of the personnel involved. It is important that a fairly simple procedure (e.g. Area search) be used in any program in order to attract and recruit new observers and lay persons. The use of amateurs in a program may also provide the grass roots support that ensure a program survives over the long term.

The following recommendations for implementing a monitoring program reflect the objectives discussed above and have been discussed by the monitoring working group of PIF (Butcher 1992). All are outlined in more detail in Ralph et al. (in press), Bibby et al. 1992 and elsewhere as noted.

- 1) Select and register a site that fits current land use definitions or habitat criteria (e.g. grazing, controlled burning, recreational park land, preserve or mixed riparian woodland etc.). Define plots within a site that are at a minimum of 3 ha in size and over 100 meters from the edge of the defined habitat/land use. Exact plot size is dependent on bird density (see Robbins 1970). If sites, plots or census stations are not definable, a habitat assessment procedure should be employed at each plot and/or census station (see Ralph et al. (in press) for methodology).
 - 2) Determine annual species presence or absence, density index (population size), and species richness using one of the following standardized methods:
 - a) Area search: Recently adopted for the Australian Bird Count, this method is a time constraint census, similar to a "Christmas Bird Count" (Ambrose 1989). Conducted a minimum of once a year, this is an ideal method for volunteers in that it requires little observer training and mimics the method that a group of birders would use for "birding" a given area.
 - b) Spot mapping: This method is used by hundreds of volunteers annually that participate in the Cornell Laboratory's Resident Bird Counts (Hall 1964, Robbins 1970). It is considered to be labor intensive (8 visits per year required), subject to considerable analyst and observer variability (Verner and Milne 1990), and not applicable to non-territorial or wide ranging species. However unlike other methods provides an absolute measure of density.
 - c) Point counts: The cornerstone of the BBS census this method is considered to be the most cost effective and scientifically reliable. National standards have recently been adopted (Ralph, personal communication). This method requires skilled observers who have had considerable training at the census sites.
 - 3) Monitor primary population parameters, as suggested by Temple and Wiens (1989) and Pienkowski (1991), using one or ideally both of the following standardized methods (Nur and Geupel this volume).
 - a) Nest monitoring: Allows determination of breeding productivity by locating nests and monitoring outcome. Unlike nest record schemes, nest should be monitored in specific plots or study areas. This allows breeding productivity to be correlated with habitat conditions and/or management practices. Methods for locating, monitoring, and determining outcome and preventing human caused depredation of nests are described in Martin and Geupel (in press). Nest monitoring while relatively labor intensive requires limited training and is an activity well-suited for volunteers.
 - b) Constant effort mist netting: Provides an index of productivity and adult survivorship by banding and aging birds captured in a standardized array of mist nets. Nets must be operated a minimum of once every ten days throughout the breeding season (May through August). The proper handling of migratory birds requires intensive training and permits from the USFWS Bird Banding laboratory.
- Both nest monitoring and constant effort mist netting have recently been adopted in North America by two national monitoring programs; Martin's "BBIRD" (Martin and Nur this volume) and DeSante's "MAPS" (this volume), respectively. Both programs pool local demographic data across regional and national scales. While long term results of these studies are forthcoming, preliminary indications are promising. Participation in these programs will provide land managers with the best data that may be linked to local habitat conditions and at the same time provide collaborative data on regional and national trends.
- In conclusion: the need for habitat specific long term monitoring is clear. Current funding and logistical support is not adequate for most agencies to implement such a program. Fortunately PIF fosters a cooperative network of NGOs private, and governmental agencies. With minimal funding and using the approach outlined in this paper, working partnerships may be formed. With a cooperative and coordinated monitoring effort we have good chance of achieving the goals of the PIF.
- While these monitoring programs may not provide a management plan for every species, they will put us a major step forward in understanding nongame bird populations and educating the public on the utility and need for maintaining and restoring habitats for birds as well as humans.

ACKNOWLEDGMENTS

We would like to thank the staff, members, and volunteers of the Point Reyes Bird Observatory for their continued support of longterm studies. Dan Evans, Deborah Finch, George Schillinger, Peter Stangel, and Laurie Wayburn provided valuable comments on earlier drafts of this manuscript. This is PRBO contribution number 575.

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