

Monitoring Bird Migration in the Caribbean Basin: Multi-national Cooperation Can Close the Loop¹

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Abstract

The Gulf Coast Bird Observatory (GCBO) and the Southeastern Working Group of Partners in Flight have developed a protocol to monitor landbirds with volunteer observers performing avian censuses in the field. Field observations are compiled within a powerful internet database, and recording and summary capability is maintained by the GCBO. More than 100 observers have supplied data from sites primarily in the southeastern United States. Results of three case studies are presented, illustrating the application of migration monitoring data to land conservation, community education, and research hypothesis generation, not only in southeastern United States, but across the Caribbean Basin as well. Such results will allow us to make appropriate decisions for habitat conservation of migratory songbirds during their passage through the southeastern United States. Because the protocol is easy to perform and widely applicable, we suggest this protocol be used as a means to monitor migration throughout the Caribbean Basin.

Key words: citizen science, conservation planning, internet-based data management, monitoring migration, Neotropical Migratory Birds, stopover habitats, volunteer observers.

Introduction

The essence of the Partners in Flight (PIF) process is the voluntary cooperation among a variety of groups with distinct agendas (Pashley et al. 2000). This cooperation is largely based on the implementation of conservation activities directed to sustain migratory bird populations in the western hemisphere (Baxter, this volume). Practical considerations govern such cooperation and can produce both substantial and tangible benefits to secure the future of migratory birds in the western hemisphere (Fitzpatrick, this volume; Riley, this volume). Interest in the conservation of birds in the Caribbean islands is also great. In over 11,000 papers listed by Wiley's (2000) comprehensive bibliography of Caribbean ornithology, more than 2,400 refer to species status, over 1,100 address species' conservation, nearly 500 relate to migration, and almost 500 pertain to endangered species. Caribbean islands are the primary wintering grounds of a number of species, some of which are extremely rare, such as the Bachman's Warbler (*Vermivora bachmanii*) (Hamel 1986). Studies of species wintering primarily in Caribbean habitats contribute to our understanding of the role of the nonbreeding season in the life cycle of these migrants (Latta 2001, Rubenstein et al. 2002).

Monitoring migratory birds during their passage is a key to identifying preferred landscapes, habitats and migration routes of these species (Gauthreaux and Belser, this volume). Despite sincere efforts, the Partners in Flight process has been unable to integrate the efforts of independent nations and islands of the Caribbean Basin into a functional partnership to preserve the fauna. These efforts have been hindered by differences in language, distances and barriers posed by water, and high endemism on individual islands. While acknowledging the challenges to such cooperation, we present one approach that would integrate workers of differing capabilities, interests, and time into a single mechanism to monitor movements of birds across the Gulf of Mexico and Caribbean.

The Migration Monitoring Program of the Gulf Coast Bird Observatory (GCBO 2002b) is a flexible yet comprehensive, citizen-science protocol that observers in the Caribbean Basin may use to observe, record, and share information about the geographical and temporal distribution of Neotropical migratory birds. The

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Migration Monitoring Program permits interested people to conduct projects of short duration or within a limited area. Individually, these projects may not constitute sufficient scope so as to be "publishable," but in aggregate, they become a powerful window from which we can learn about the behavior of the migratory birds. Some of these efforts have produced sufficient information to identify and justify the acquisition of conservation properties, as well as to document the seasonal movements of landbird migrants in distinct, often high-volume areas in the southeastern United States. The Migration Monitoring Program, through its internet-based data entry and retrieval focus, enables one to record and explore extensive details of avian migration.

The Gulf Coast Bird Observatory and the Southeastern Working Group of Partners in Flight have developed a protocol to monitor landbird migration (Riley et al. 2001). There are multiple objectives of this citizen-science program: to obtain data on spring arrival and fall departure, to identify staging and dispersal areas, to determine species-specific migratory pathways, to compare movements spatially and temporally, to identify 'hot-spots' and their variability from year to year, to assess weather effects on flight pathways, to identify key stopover habitats, and to identify primary corridors between coastal areas and interior breeding sites.

Methods

The protocol for the Migration Monitoring Program is simple. Volunteers select a site (of any size/shape) that may be of interest to them, with the single restriction that it must be surveyed in four or fewer hours. All migratory birds seen or heard during the survey period are recorded. Basic weather variables (wind speed and direction, sky conditions, start and ending temperatures) taken from the Breeding Bird Survey methodology are collected each sample date. In addition, volunteers provide general information about the habitat surveyed by selecting from a menu of habitat types, and surrounding landscape categories. Volunteers survey their sites a minimum of once per week during the appropriate migratory season; in spring: 20 March - 1 June; and in fall: 15 July - 1 November. The GCBO distributes data sheets, compiles inputted data, and maintains the database (GCBO 2002a). One of the greatest strengths of the approach is the ease of automated data entry via the GCBO website (GCBO 2002b).

Results

The Migration Monitoring Program is now in its sixth year. As of March 2002, 104 volunteer participants have submitted data on spring and fall observations from more than 93 locations, primarily in the southeastern United States (13 different states) and one site in Belize (table 1, fig. 1). Migration monitoring can be used to accomplish a variety of conservation activities. Here, we focus on three examples, including land protection activity, community education, and research hypothesis generation facilitated by the program.

Table 1— Five of the 93 sites with the largest species richness that are included in the GCBO-Southeastern Partners in Flight Migration monitoring database.

Number of species	Location
132	Sabine Woods, Texas
119	Paradise Pond, Texas
117	Kennesaw Mountain, Georgia
109	Bayou Sauvage National Wildlife Refuge, Louisiana
98	River Legacy Park, Texas

MIGRATION MONITORING LOCATIONS

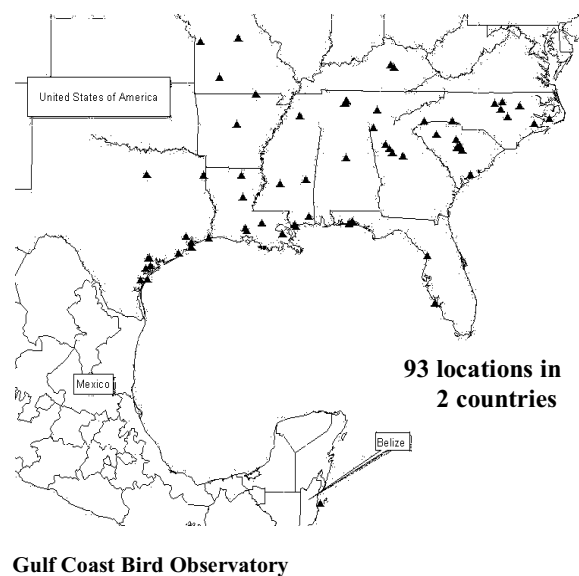


Figure 1— Distribution of the initial 93 sites in the Migration Monitoring network.

Land Protection Activity

One of the sites, Paradise Pond, near Port Aransas, Texas, is an example of how the Migration Monitoring Program was used to support a land protection effort at important stopover habitat for neotropical migratory

birds in areas near the Gulf of Mexico shore and Caribbean Sea. One volunteer observer, Joe Frandolig, selected the site as his post for the Migration Monitoring Program. In four years of work, (1998-2001), Mr. Frandolig contributed 270 hours of field observations, during which he observed 5,436 individuals of 119 migratory species at Paradise Pond. More than a dozen species with high PIF priority scores have been recorded from Paradise Pond, including Prothonotary Warbler (*Protonotaria citrea*), Bay-breasted Warbler, (*Dendroica castanea*), Painted Bunting (*Passerina ciris*), Kentucky Warbler (*Oporornis formosus*), Dickcissel (*Spiza americana*), Blue-winged Warbler (*Vermivora pinus*), Cerulean Warbler (*D. cerulea*), Wood Thrush (*Hylocichla mustelina*), Golden-winged Warbler (*V. chrysoptera*), Worm-eating Warbler (*Helminthos vermivorus*), Black-throated Blue Warbler (*D. caerulescens*), Prairie Warbler (*D. discolor*), and Bobolink (*Dolichonyx oryzivorus*). The data gathered in Mr. Frandolig's efforts were used to secure support for land acquisition and infrastructure enhancements for the new Paradise Pond Bird Sanctuary.

Community Education

The gathering, recording, and disseminating of information on migratory bird activity have direct applicability to community education and planning in addition to site-specific conservation. These efforts are also a great eye-opener for people who conduct the work because they provide direct, current information that participants can offer to their local communities as education. From participants' observations, we can learn about the effects of land conversion activities on bird migration in communities surrounding the monitoring site. Jim Sipriola of Arlington, Texas, another volunteer participant in the Migration Monitoring Program, noticed a decline in migrant populations while monitoring his site over a four-year period. He proposed that this decline might be related to land use changes in the vicinity of his monitoring site and formed an advisory group to monitor site management activity. Such information, gathered locally and presented in community forums by a resident citizen, is a powerful and credible stimulus for community education and local conservation activity.

Research Hypothesis Generation

Opportunities to use data in the Migration Monitoring database extend beyond identifying valuable sites for conservation purposes. Because the land area of the Caribbean is small but widely spread, neither a single observer nor a small group of observers could ever hope to survey it. However, the Migration Monitoring protocol accommodates a widely scattered sampling by allowing multiple observers to record information obtained at multiple sites in an all-inclusive database.

Such extensive data can reveal insights into the timing and pathways of migration by individual species. Such has been the case for a neotropical migrant of great concern, the Cerulean Warbler (*Dendroica cerulea*). Numerous observations of Cerulean Warblers in spring and fall migration have been made and recorded from Kennesaw Mountain, Georgia by a group of dedicated observers led by Giff Beaton. Observations of the Cerulean Warbler at this location are far more numerous than at other localities in this program. Parker (1994) and Garrido and García Montaña (1975) have documented the movement of Cerulean Warblers across the Gulf of Mexico. Parker (1994) provides a wealth of details on the spring migration of Cerulean Warblers, based on a short period of observations in the highlands of Belize. Garrido and García Montaña (1975) report a very small number of Cerulean Warblers observed in Cuba, but noted that all incidence of the warbler occurred in fall, and almost always in the Peninsula de Guanahacabibes, the very western part of the country. It has been suggested that the birds seldom occur in Cuba, even in the fall (Garrido, pers. comm.). Though scarce, the information presented by Parker (1994) and Garrido and García Montaña (1975) is sufficient to frame a hypothesis that the axis of Cerulean Warbler migration across the Gulf of Mexico is from the mainland of Central America to the central Gulf Coast, in both fall and spring. Without more information, this hypothesis is just idle speculation. Data accumulated in Migration Monitoring such as Cerulean Warbler records from Kennesaw Mountain, will make possible the refinement and subsequent testing of this hypothesis and many others like it. Such hypothesis testing will be a further stimulus to conservation action in the Caribbean Basin.

Discussion

Analyses of data from the Migration Monitoring Program will allow us to make appropriate decisions for conservation of migratory songbird habitats during their passage through the southeastern United States. The example of Paradise Pond Bird Sanctuary illustrates how data gathered as part of this program can support the implementation of conservation actions that protect habitat for migratory birds. Opportunities for conservation actions similar to the Paradise Pond Bird Sanctuary exist throughout the Caribbean Basin. The Migration Monitoring protocol is an effective tool because it allows multiple volunteer observers to visit localities and gather and record observations that would otherwise be too costly if performed as a detailed research project. The database, armed with query capabilities, permits interested parties to identify migratory pathways and to use these identifications to pose and model hypotheses of migratory movements of

individual species at specific times. The community of volunteer observers who submit observations to the database will undoubtedly feel a sense of ownership and responsibility towards their site, and are likely to become more active towards the conservation of migratory bird habitat in their communities.

The Migration Monitoring protocol is easy to perform and is widely applicable. Thus, we suggest the Migration Monitoring protocol as a means to monitor migration throughout the Caribbean Basin. However, no data has yet been submitted from any Caribbean site. Several obstacles may contribute to the failure of attracting cooperation among colleagues who live or who work in the Caribbean.

Some discussion of the potential barriers to cooperation may prove useful. We identify island geography, distance, language, the labor pool of observers, endemism, and political constraints of international treaties as obstacles to cooperation among Caribbean partners. The geography of the Caribbean is an obvious and most vexing contributor. Distances among potential sites are great, and the practical difficulties of travel make overcoming these distances difficult. In addition, four languages are spoken on the Caribbean islands: French, Dutch, English, and Spanish. Human populations on these island nations are typically small, reflecting limited labor pools of knowledgeable local citizens to conduct the myriad of activities involved in scientific, ornithological, and conservation activities (Carey, pers. comm.). The high level of endemism characteristic of the islands leads to difficult choices for local conservation action. The greatest contribution that a Caribbean nation can offer to conservation of biodiversity is the maintenance of healthy populations of its endemic taxa, creatures that are especially valued and proudly recognized by citizens of that nation. This heightened attention to endemic birds may require leaving the monitoring of migratory birds as a desirable secondary goal. Still, the Migratory Bird Treaty, an umbrella for international conservation of migratory birds, only applies to Canada, Mexico, and the United States of America. Avenues for cooperation to sustain and protect migratory birds offered by that treaty do not include nations of the Caribbean Basin, Central or South America.

In spite of the growing interest in the study of patterns of migratory bird movement in the Caribbean (Wiley 2000), detailed data on location, timing, effects of local weather events, and volumes of movement by migratory birds are scarce. A migration monitoring project has operated in Florida since 1993 (Riley et al. 2001; Wallace, pers. comm.) and has been useful in identifying conservation sites, monitoring the movements of species, and clarifying the status of migratory birds during passage. The opportunity to follow this model

and to employ the voluntary observations of local residents and visitors to Caribbean islands exists throughout regions of the Gulf of Mexico.

Central to this protocol's success is the internet-based data entry and retrieval capability supported by the Gulf Coast Bird Observatory. A critical addition to the existing database will be the translation of instructions and web-based data entry interface into French, Spanish, Dutch, and ultimately Portuguese, so that the utility of the system will be increased by the full range of potential users, including participants from the Caribbean islands. Similarly, a need exists to develop a composite list of species where all the names of potentially-occurring birds are readily accepted by the error-checking routines of the data-entry software. Provisions regarding local names for all birds in the American Ornithologists' Union Checklist (American Ornithologists' Union 1998) will facilitate this task. We look forward to its accomplishment.

Finally, observations from the Migration Monitoring database will be available in the future for consolidation with other, wide-ranging efforts that are currently in the planning stages such as the eBird internet website (eBird 2002).

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