# BIRD POPULATION SURVEY, INVENTORY, AND MONITORING STANDARDS FOR NATIONAL WILDLIFE REFUGES AND PARTNERS IN THE SOUTHEASTERN U.S.

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(With substantial assistance from the Fish and Wildlife Service Biologists of the Southeast Region's Area III covering south Georgia, Florida, and the Caribbean)

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## PREAMBLE

The following information is intended to assist managers and biologists in the development of standardized data collection efforts for birds as part of a management unit's Inventory and Monitoring Planning effort. For National Wildlife Refuges specifically, reference U.S. Fish and Wildlife Service Draft Manual Chapter 701 FW 2, Inventory and Monitoring of Populations (FWS Chapter; http://www.fws.gov/directives/701fw2.html). Other agencies and landowners cooperating in joint data collection efforts should have similar or compatible guidance.

## INTRODUCTION

***What exactly do the terms survey, inventory, and monitoring mean?***

(1) SURVEY is a general term for any type of inventory and monitoring procedure.

(2) INVENTORY is a term applied to methods determining presence, relative abundance, and/or distribution of species.

(3) MONITORING is a term applied to methods determining population trends or measuring health of populations over space and time.

***Are there defined classes of data collection under the general definition of surveys?***

The FWS Chapter identifies four types of surveys:

Type I: Species Lists.

Type II: Qualitative Surveys (*e.g.*, abundance levels such as rare, uncommon, common, or abundant on checklists).

Type III: Quantitative Surveys with carefully crafted local study designs, with stress on consistent intensity of data collection.

Type IV: Cooperative Endeavors are efforts with increasing emphasis on standardization among areas and often with lessening emphasis on local information needs (at least directly).

The following Levels (cross-referencing Types as defined above) are identified for bird monitoring and inventory plans (S=Standardization for comparisons, R=Relevance for local management, $\geq$=former greater emphasis over latter, >former more emphasis over latter, <=latter more emphasis over former, $\leq$=latter greater emphasis over former):

Level I. Protocols allowing for regional and national database development important for tracking overall status and trends for migratory birds:

S≥R, Type IV

a. Protocols that by themselves may not provide relevant data for local management decision-making include:

1. Breeding Bird Survey (BBS)

2. Breeding Bird Censuses (and Spot Mapping)

3. Breeding Bird Atlases

4. Christmas Bird Counts (CBC)

5. Winter Population Studies

6. Monitoring Avian Productivity and Survival (MAPS)

7. BBird (nest monitoring)

8. Migration Monitoring (transect counts) and mist-netting

9. Hawk Watches

10. Beached Bird Surveys

S>R, Type IV

b. Protocols tending towards standardization and that may be of local relevance for management decision-making (at least indirectly) include (in addition to specific species initiatives):

1. Point Counts

2. Transects, Area Searches, Project Prairie Bird for grassland species

3. Raptor Roadside Counts

4. Beach Nesting Shorebird Surveys

5. International Shorebird Survey (ISS)

6. Secretive Marshbird Surveys

7. Open Water Bird Counts

8. Beach or Ground Nesting Colonial Waterbird Surveys

9. Tree or Brush Nesting Colonial Waterbird Surveys

| | |
|---|---|
| Level II.<br>S=R,<br>Type III | Customized recommendations (situation specific, species specific), based on standardized protocols (mostly same as in Level Ib., but some in Level Ia. [MAPS, BBird] above). These are more relevant locally by focusing on increasing sample size in a single habitat, etc., but data still can be added to collective databases. Analysis of data collected under Level I protocols often necessary first before narrowing in on a more situation or species specific monitoring design. |
| Level III.<br>S<R,<br>Type III | Adaptive management recommendations (*e.g.*, ARM=adaptive resource management) provides increasingly greater links between local management and response by both target and non-target resources allowing for making adjustments where necessary. Usually this level is achieved when specific issues are already identified through either game or endangered species management, after Level I or II surveys have been conducted, and/or driven by other long-existing management priorities that in the past have not been subjected to hypothesis testing. Protocols again may be based in part on the same ones listed in Level I or may be more specialized than in Level II and often are less likely to be useful in collective databases. |
| Level IV.<br>S≤R,<br>Type III | Specific demographic surveys may be an outgrowth of protocols developed under Level III, or based on an identified need derived from Levels I or II where measuring local reproduction and survival become more relevant issues than tracking only numbers of birds over time. Usually these protocols are time intensive and expensive, but provide the best and often ultimate measure of response to local management and/or surrounding landscape influences on local reproduction and survival. |
| Level V.<br>S≤R,<br>Type III | Specific research arising from any of the previous levels or from questions arising elsewhere. Much more intense and specific than at least Levels I through III, may or may not correspond with data collection efforts under Level IV depending on the question in need of answering. Although natural resource questions seemingly are endless, financial resources require that the pool of research needs be limited to very high priority unresolved topics regarding high priority species or groups of species. |

The intent here is to have many important bird conservation issues addressed using relatively inexpensive monitoring and inventory protocols as much as possible. If successful, this strategy would leave a few (if any) but very directed number of issues needing to be addressed at Level V on each management unit. Overall, it is recommended that a good Inventory and Monitoring Plan for birds on each management unit be developed first based on the guidance here and then define separately priority research needs as these emerge either as emergency (*e.g.*, compliance) issues or by not being addressed by efforts under Levels I through IV.

***What types of surveys are the primary subjects of this document?***

Most focus here will be on Level Ib (FWS Type IV) surveys for establishing regional standards among

National Wildlife Refuges and other cooperating partners. Although some focus will be given here also for efforts best classed as Level II (FWS Type III) , and to a lesser extent Levels III and IV, into the broader context of standards, the specifics for these are best left to customizing efforts for local station needs. Level V is relegated more towards specific research needs beyond the scope of this document.

***What this document is not.***

This document is not an attempt to define all the intricate details of any one or all survey techniques or give concise answers to questions of adequate sample size or power analysis (though some guidelines are provided). This also is not an attempt to require compliance of any one management unit, agency, or partnership on the use of the recommended standard protocols given here.

***What this document is intended to be.***

Assuming a wide desire to compare and contrast information and pool resources across management units, this document is intended to be a means for developing close voluntary coordination with like-minded partners locally, regionally, and nationally. Also, the intent here is to help develop a framework for how management, monitoring, and research interests can better be integrated into an adaptive management approach for the future conservation of migratory birds.

## BACKGROUND AND ISSUES

***So, why should birds be counted in standardized ways?***

Many reasons exist for counting birds using standard approaches. For the purposes of this document, several reasons are considered particularly important:

(1) Determining the status (through inventory) and trends (through monitoring) of birds over time and space:

- (a) Within a single habitat in one management unit to compare with the same habitat in other management units.
- (b) Within one management unit with multiple habitats included to compare with other management units with similar mixes of habitats.
- (c) Within a defined geographic area (*e.g.*, region, state, physiographic area, watershed) including data from many management units and habitats, including partnerships with other management agencies and organizations.
- (d) Within one agency over a broad area (*e.g.*, National Wildlife Refuge System, National Forest System, State Wildlife Management Areas).

(2) Long-term monitoring of bird status and trends with all appropriate habitats combined on a single management unit.

(3) Determining the effects of management actions over time and space within one or a group of cooperating management units.

An effort to standardize data collection and management is underway by a committee of FWS biologists covering south Georgia, Florida, and the Caribbean ("Area III"), referred to as A3BC (Area III Biologist Committee). The objectives that A3BC have developed to address monitoring needs include: (1) Monitoring the long-term status and trends of migratory bird populations on Area III National Wildlife Refuges and generating an index to abundance (birds/unit area; birds /unit time) for all Area III physiographic areas combined and, when feasible, for refuges within Area III; (2) Associating management practices (or habitat type) with abundances and trends for migratory bird populations; (3) Monitoring bird population trends in representative habitat types occurring at National Wildlife Refuges; and (4) Developing standard spreadsheet and database programs to facilitate information sharing among participating biologists in Area III.

**Justification**—The National Wildlife Refuge Improvement Act of 1997 (Act) directs the Service to "monitor the status and trends of fish, wildlife and plants." The Act requires the Service to manage the National Wildlife Refuge System (NWRS) as a "system," implying cohesion and consistency in programs across regions.

To address this directive, the NWRS Committee on Refuge Biology developed the **NWRS Biological Needs Assessment** (July 1998) that includes action items relevant to facilitating Act directives. The 1998 NWRS Conference white paper, **Fulfilling the Promise** also addressed the Act's directives including NWRS inventory and monitoring needs.

The A3BC is being proactive in addressing the NWRS Biological Needs Assessment / Fulfilling the Promise mandates to standardize database software and in facilitating the sharing of data across Area III physiographic areas.

**Proposed Strategies**—Survey techniques address refuge/Service objectives, provide estimates of birds/unit area or bird/unit time, optimize time and money (*i.e.*, use volunteers if possible) and include coordination and training to allow proper implementation. Based on Area III's Priority Bird Species List, each refuge will decide which migratory bird taxa will be monitored and the protocols best suited to the station's habitat configurations and inventory needs. Our purpose is to standardize where possible and to facilitate sharing of data across Area III's physiographic areas.

A standardized approach to monitoring birds will be useful at regional and national levels. A critical factor here is the potential to develop a centralized database repository so that all data is coalesced and summarized into one database that provides a landscape-level depiction of population trends throughout Area III.

Hopefully, the A3BC initiative can serve as an inspiration to link together similar efforts within Fish and Wildlife Service and among partners across the Southeast.

***How do we reconcile local station priorities (often requiring development of unique protocols) with the need to standardize techniques for determining status and trends?***

Essentially, this divergence represents the following two extremes:

(1) Favoring protocols that may be best for addressing very local needs, but to the extent that data are not comparable with data collected elsewhere

versus

(2) Favoring protocols that are best for addressing regional to hemispheric needs, but to the extent that there is little apparent local management applicability.

If we are to standardize techniques to compare information within and among management units, we should do so in ways that allow for local management relevance, at least indirectly. An example of how a combination approach should work would be to:

(1) Group data collected for birds using a relatively rare habitat among cooperating management units (no one of which can collect enough data locally to determine trends),

(2) Determine status and trends using the collective dataset for priority species,

(3) If declines are detected for priority species, then conduct more detailed analyses to search for overall patterns (*e.g.* vegetation characteristics, surrounding landscape condition) that may lead to specific management actions on all or a subset of management units where the suspected problem exists, and

(4) Intensify monitoring efforts locally to assess whether recommended management adjustments are improving the status of declining priority species.

***Even with established standards for bird monitoring, should priorities for implementation still be the responsibility of the project leader?***

Yes, in consultation with regional coordinators, partners, and a clear understanding of existing staff capabilities, project leaders should have the final say in what surveys are implemented and define the degree of effort that can be devoted to these each year. As a rule of thumb, the types of surveys adopted should match well with the number and types of priority species and their habitats present on the management unit. For example, if the vast majority of priority species on the management unit are associated with forests, with some open water birds, efforts may be best directed towards forest bird surveys. If enough staff time, expertise, and other resources exist then also conducting surveys for open water birds may be feasible. However, if present staff resources do not exist to survey birds using both forests and open water, then efforts may be best focused on forest bird surveys only. Conducting open water bird surveys with inadequate staff resources then can be the subject of a proposal to appropriate additional funding sources if considered a high enough priority.

In many cases, diversity of habitats (and therefore priority birds) on a single land management unit adds complexity to the exercise of matching up of survey needs with existing staff capabilities and then establishing priorities for data gathering. On most local land management units, it is likely that resources do not exist today to cover all bird species in survey efforts. It is more important to conduct a few surveys well then to spread efforts so thin that the objectives for all survey efforts are poorly achieved. Hopefully, this document will help project leaders make these decisions.

***How standardized data should be stored locally and regionally?***

Depending on the survey effort and partners involved, storage of standardized data may vary considerably from place to place. Using a proposed approach for FWS (again based on the A3BC initiative), recommendations are for now to have groups of ecosystem teams (“Areas”) store data locally as well as combine

these same data with that collected by others into centralized datasets, and these in turn can be stored at regional and national levels as well for judging overall status and trends for birds on National Wildlife Refuges. Other agency and private landmanagers may also store data independently and in cooperation with partners. State agencies may centralize data by state. Collectively, for example, standardized data could then all be stored in regional-national databases with identification datafields established for:

(1) Contributing agency or landowner

(2) State

(3) Physiographic area (or other biogeographical unit as agreed to by partners)

(4) Large administrative unit (*e.g.*, FWS ecosystem teams, national forests and parks, military installations, state wildlife agency regions, district offices for industry)

(5) Local administrative unit (*e.g.*, ranger districts, wildlife management areas national wildlife refuges, state and smaller national parks and military installations, local offices for industry)

(6) Compartment, etc.

(7) Point count, sample site, route number, GPS location, stand number, etc.

(8) Habitat type (composition and structure)

These and other datafields would allow for various combinations of data for analyses at various spatial scales, ownership categories, and habitat types.

## BASIC BIRD MONITORING AND INVENTORY RECOMMENDATIONS FOR THE SOUTHEAST U.S.

The following survey protocols are recommended as regional standards to be considered for implementation of station inventory and monitoring plans for birds. As appropriate, special considerations and references are provided to encourage as much standardization as possible.

### *Landbirds-Breeding*

Point counts: Follow guidelines provided in Hamel *et al.* (1996) with links to guidelines for the Caribbean (Wunderle 1994), and FWS in the Great Lakes and Northeast Regions.

Best used in forested and otherwise terrestrial habitats (shrub-scrub and grassland) and for monitoring trends over time and space.

Not useful for calculating densities, at least per unit area, though some potential for calculating number of detections per unit time of effort.

Emphasis should be on visiting each point once a year initiated during the period from early May

(southern latitudes) to late May-early June (Appalachians) ending by late June. If time permits, visiting point counts multiple times during a single year may be of local relevance, but still select one set of counts only within each year to be compared with subsequent years to best determine trends (*e.g.* a series of points conducted in mid-May one year should not be compared with the same series of points done in mid-June another year).

Vegetation data collection should follow at minimum "Level Two" protocols in Hamel *et al.* (1996, pages 35-36) and several state PIF working groups have data forms prepared (*e.g.*, Georgia, Tennessee, Kentucky, North Carolina, also U.S.D.A. Forest Service; example of Georgia form provided in Attachment I along with some possible revisions under consideration).

For grassland habitats FWS Northeast Region has recommended 100-meter (instead of 50-meter) outer band for recording detections.

Changes in species names by the AOU since Hamel *et al.* (1996) has caused some confusion as to species codes to be used. Until further notice, use the codes as they are listed in Hamel *et al.* (1996), including SOVI for Blue-headed (formerly Solitary) Vireo and RSTO for Eastern (formerly Rufous-sided) Towhee.

The A3BC decided to use a **U.S. Forest Service (Sumter National Forest, South Carolina) database developed in Microsoft® Access** since it was already available. However, need to appoint someone to customize/edit the program for our use. Overall, it was considered a useful database structure but needs broadening to encompass all regions and species diversity (using Hamel et al. [1996] as the standard for developing the species list). Will need to know some other information for database fields (*i.e.*, when/if area was burned). Some version of this database developed by the U.S.D.A. Forest Service will be recommended for general use throughout the Southeast.

This group addressed the need to get in touch with database creator to develop more revisions to accommodate all stations. The creator of database could potentially serve as an expert contact for all Area III Biologists (as well as other users across the Southeast) and be available for questions regarding system (should include a user-friendly query for all biologists).

The following parameters were established for standard protocol development:

- Points should be at least **250m apart** (though there may exceptions where a specific habitat of interest is extremely limited).

- Daily survey efforts should be completed **before 10:00 a.m.**

- Time spent on point counts (5-10 minutes) identified as an issue needing standardization among stations. Since detection improves when sampling up to 10 minutes, the group agreed to try **10-minute counts** to attempt comparison among regions - then compare trends after a 1 year "pilot study" in Area III.

- The group agreed to collect data in **0-3 minute, 3-5 minute and 5-10 minute periods** as per Hamel et al. (1996).

[Time intervals are subject to some debate, but for now 0-3 minutes (to compare with BBS data), 3-5 minutes (minimum recommended by national standards), and 5-10 minutes (recommended for most situations within the Southeast) are recommended. 10-minute counts (but not longer) are recommended to maximize detection rates while not greatly reducing the number of counts that can be done (Smith *et al.* 1993, 1995, 1998 based on extensive work in the Mississippi Alluvial Plain).]

- **50 stations** established as target minimum for number of points per refuge.

- Radius of bands identified as an issue needing standardization among stations. The group agreed to use the **0-25m, 25-50m and >50m bands** to allow for comparison with other agencies...all data within 50m band can later be collapsed into a single value, whereas birds recorded as only within 50m cannot later be separated.

  [Although the Southeast Region uses a **25-meter band** (to better match up detections with vegetation measurements and to be consistent with data collected in the tropics), this extra band width is not universally accepted in the country.]

A3BC is developing a feedback route for local management decision-making based on grouping point count data from cooperators. An example of how this feedback route may work would include data collected from South Florida's National Wildlife Refuges supporting species dependent upon mangroves. Point counts may be the best technique for monitoring trends, but much of this habitat is best accessible by boat (as opposed to car or foot). If point counts can be conducted along "canoe trails" then both data on birds between points (inventory) and at points (monitoring) can be collected. Assuming that at best each refuge can devote enough time to do 20 points per year in mangroves (given need to cover other habitats, etc., during a couple of weeks in May), this likely is not enough to determine trends at the scale of one refuge. If, however, at least 10 cooperating refuges each conduct 20 point counts then sample size is at minimum 200 points specifically for mangroves for refuges in South Florida. If other agencies join in (State, National Park Service, etc.) Then we may be able to raise sample size to somewhere between 500-1000 point counts for this habitat in South Florida using a standard protocol. So now a "statewide" analysis can be done to determine in a relatively few years whether priority species using mangroves like Florida Prairie Warbler and Black-whiskered Vireo are declining or not. If declining, then this information can lead to addressing the question of why these species are declining by looking for relationships within the dataset that lead to clues as to the conditions under which the declines are most pronounced. To close the loop on this example, corrective actions can be identified where appropriate and then upon implementation these actions can be monitored to determine success or need for more directed research.

Two main considerations to initiate the discussion of sample size include understanding the logistics of conducting the work and what the objectives are for both local and cooperative efforts. These considerations likely require much deliberation beyond the scope of this document. For now rules of thumb are provided for consideration. For each defined habitat, a minimum of 10 and preferable 20 points are recommended, for an effort not dependent upon specific habitats, a minimum of 50 and preferably 100 points are recommended. Again, local capability of staff at the local management unit and knowing what other partners working in similar habitats are doing may help in gathering the minimum about of information necessary to judge what sample sizes need to be to answer

questions directly effecting management. See pages 11-16 and 31-34 in Hamel *et al.* (1996) for further discussion of sample size considerations.

Transects: Follow guidelines in Ralph *et al.* (1993) and Wunderle (1994) with some additional considerations.

Generally, transects are poor for determining population trends as this technique does not lend itself to gathering data from large sample sizes (use point counts as described above if monitoring trends is objective).

Transects are better than point counts for comprehensive inventory needs where a specific habitat of interest is limited in distribution. Density estimates and broad habitat relationships may be possible, but requires multiple visits to each transect within a month or a season.

Transects are more easily used in shrub-scrub and grassland or other habitats where observer's attention can be focused more on birds than on footing.

Generally, recommendations are for **100-to-250 m long transects** with suggestions that there be specific time limits established (**10 minutes per 100 m of transect**).

The longer the transects, say 1 km or longer, number of visits per transect may be as few as three per month or nine per season to calculate densities and develop correlations with habitat variables. The shorter the transect the more visits will be required.

A combination of point counts and transects may be possible whereby points may be taken for every 250 m once per year while keeping track of birds detected between points along a walking transect (again recommended only for grasslands and shrub-scrub where walking is relatively easy). Subsequent visits for transects would not include point counts within a season.

***Landbirds-Migration***

Migration monitoring (Cox, Hunter *et al.*): Two related efforts are underway to help frame the "picture" of spring and fall landbird migration in the Southeast. Jim Cox (former Florida PIF State Coordinator) developed a protocol for volunteer contributions from throughout Florida. Since spatial coverage in Florida includes a good number of locations, temporal demands generally are light as volunteers are encouraged to cover areas at least once a month. The second effort includes sites established across the rest of the Southeast, where professionals and volunteers are encouraged to cover sites once a week. Overall on average, sites across the Southeast (including both areas) are covered about twice a month during peak migration periods.

Data to be gathered are intended to answer the following questions at regional and local levels:

<u>Gaining a better picture of migration (both extent and duration) across the Southeast.</u>

(1) What is the relative abundance of each species during spring and fall migrations?

(2) What is the relative abundance of each species from one year/season to the next?

(3) What is the relative abundance of each species, or group of species, to another species, or group of species, among years?

(4) What are the long-term population trends for each species, groups of species, and all migrants?

<u>Identifying important bird areas (IBA's) supporting consistently large numbers of migrants within the Southeast.</u>

(1) What is the relative abundance of each species, group of species, and all species from one place to another across years/seasons?

Ultimately, data will be compiled and reported in tables and maps and information derived from these counts reported in a timely way to contributors and the public (perhaps in a format similar to that used in the Breeding Bird Survey Newsletter). For now, however, we ask that you just have fun birding, keep track of the numbers for each species you observe, and let us know how observer friendly the data sheet is for your use (see below for contacts).

Permanent routes are selected by experienced observers based on where most migrants would be expected to be found in an area while walking about a mile or taking between 2-to-3 hours after sunrise (except on the Gulf coast during Spring when afternoon counts may be more productive).

Observers simply walk a standard route and keep total numbers of individuals for each species observed (seen and heard).

The Southeast Partners in Flight Working Group proposes to test a data sheet (see Attachment II and below for contacts) to standardize migration counts across the region by encouraging interested individuals, bird clubs (including Audubon Society chapters), and land managers to adopt their

favorite birding areas and organize coverage of standard routes at least once a week during migration.

Emphasis on counting landbirds for this test are from **20 March to 1 June** during Spring and **15 August (perhaps as early as 1 July) to 1 November** during Fall.

We encourage selection of sites throughout the Southeast Region. Coverage of sites along western riparian areas, grasslands, and suburban woodlands, are just as important as coastal sites and Appalachian mountain and other woodlands of the Southeastern interior. By adopting your favorite birding site, YOU can greatly assist in developing a regional, local, and ultimately a national, source of data to address the following migratory bird conservation needs:

(1) Help in reviewing communication tower permit applications for addressing potential impacts,

(2) Associate radar and acoustic data with what is actually being found on the ground within important habitats.

Contact the following for instructions, data forms, and to send your completed data sheets to:

Florida
George Wallace
Florida Fish and Wildlife Conservation Commission
3911 Hwy. 2321
Panama City, FL 32409-1658
850/265-3677 (FAX 747-5690)
wallacg@gfc.state.fl.us

Rest of Southeast Region
Cecilia Riley
Gulf Coast Bird Observatory
103 West Hwy. 332
Lake Jackson, Texas 77566
409/480-0999 (FAX 0777)
criley@gcbo.org

The A3BC, due in large part because of most stations being located in Florida, suggested continuing **Florida Migratory Bird Counts** for migration monitoring for transient landbirds Surveying twice a month is acceptable but try to do more if possible...once/week optimum. Need to develop a sense of peak times and direction of movement.

Point counts using screech-owl tapes (as suggested by Bruce Peterjohn, but still need details) may be very useful where transient landbird habitat are essentially islands in otherwise unsuitable habitat (examples may include smaller Cheniers and hammocks amongst "seas" of emergent vegetation or grassland. Use of playback tapes may be useful for attracting in specific migrants and has been recommended for use in the tropics for wintering migrants.

***Landbirds-Winter (grassland, including emergent wetlands, only).*** Outside of the tropical (Caribbean) and subtropical (principally Florida and south Texas) areas, almost all priority landbird species during winter are associated with grasslands or open pine stands with grassy ground cover (including resident and temperate breeding species). (The one exception is Rusty Blackbird which will require specific protocols to survey status and trends of this species in forested wetlands.) Therefore emphasis on surveying landbirds during winter requires techniques that focus on flushing otherwise "secretive" grassland species. These techniques fall into 3 categories of which one standard recommendation has yet to be determined.

Transects: This approach was described above. If the objective is to have a consistent technique for a

grassland habitat throughout an annual cycle then transects may be the better choice. That is, if transects are used for grassland birds during the breeding season and the objective is to compare habitat use of grassland sites during an annual cycle, then keeping with transects may be most appropriate for comparative purposes. However, surveying grassland birds during winter will most likely result in detecting those birds only flushed under foot (calling and singing is infrequent for many priority species). A line transect with only one observer will likely undersample the birds present within habitat patches.

Area-search: This approach has been widely adopted for use in some countries (*e.g.*, Australia) for surveying all habitats during all seasons as it is generally considered volunteer friendly. See Ralph *et al.* (1993) for a more detailed description summarized below specifically for grasslands.

Establish at least **3 plots of at least 10 ha** in size within each defined habitat type. Each observer spends **20 minutes** freely moving within each plot recording as many birds as are detected through flushing or by call.

Surveying each plot **3-to-6 times during winter months** (or twice per month) is recommended for most complete coverage.

Surveying during winter months allows for more flexibility in time of day of survey since flushing birds is not as dependent as songs on time of day. Still, morning surveys are probably better than afternoon (*i.e.*, no later than 5 hours after dawn).

This technique allows for chasing down unfamiliar birds or calls, but since this is a timed survey care should be taken to not spend too much time on any one bird. Therefore it is important that observers become familiar with call notes and flight patterns for as many of the species likely present as possible.

Project Prairie Bird: This approach was developed by Texas Partners in Flight specifically for surveying southeastern grassland birds. Although still experimental, the Project Prairie Bird approach appears suitable for trial throughout the Southeast where significant numbers of priority grassland birds occur. See Shackelford *et al*. (1999) for details.

Teams of three are required to survey each **100-m transect**. The middle observer is the primary recorder and identifier of flushed birds. The other two observers carry bamboo poles that help to flush birds within a 20 m wide area and they can also assist in spotting and identifying birds.

Multiple transects can occur in one field, but must be **500 m apart**.

Each transect should be covered in **2 minutes**, but observers can reflush a bird afterwards that was initially not identified.

At least **3 (preferably 6) surveys per season** are recommended with 1 (or 2) within each of the following periods: (1) 15 November-31 December, (2) 1 January-15 February, (3) 16 February-10 March.

For instruction manual and data forms contact:

Project Prairie Bird Field Coordinator
c/o Gulf Coast Bird Observatory
103 West Hwy. 332
Lake Jackson, Texas 77566
409/480-0999 (FAX 0777)
criley@gcbo.org

***Shorebirds-Migration***

International Shorebird Survey: Refer to Howe *et al.* (1989), Harrington (1995) for further details of this and other shorebird survey techniques.

Primary survey need is to capture peak migration passage times for each species during spring & fall periods in order to make sure adequate habitat is available for all priority species. The International Shorebird Survey (ISS) addresses these data needs.

No formal monitoring initiative has been developed for all shorebirds during migration or winter. However, until something superior is developed for monitoring, the ISS also may be useful for monitoring trends at the larger scale.

ISS also may be used for monitoring trends and for counting foraging waterfowl, waders, and other water birds using impoundments, etc. all year.

Sampling shorebirds using International Shorebird Survey is recommended at minimum to be **once every 10 days** to match the presumed turnover rates of many shorebirds at any one site. Once a week may still be optimum though. Beach surveys themselves may be ISS routes for counting foraging shorebirds (especially if driving on the beach is permitted.

ISS is coordinated through Manomet Center for Conservation Sciences (see Attachment III):

Brian A. Harrington
Manomet Center for Conservation Science
Post Office Box 1770
Manomet, MA 02345
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We will request that each cooperating station conducting ISS do so on approximately **10 day intervals** on or about the following dates to allow for more direct regional comparisons of shorebird movements during both Spring (northbound) and Fall (southbound), respectively. Winter surveys are optional, but desired especially in the Caribbean and at least Florida and Texas (or where winter beached bird surveys are being conducted, see page 23):

Spring (Mar. 10-Jun. 10) Fall (Jul. 11-Oct. 31) Winter (Nov. 1-Mar. 9)

March 15
March 25
April 5
April 15
April 25
May 5
May 15
May 25
June 5

July 15
July 25
August 5
August 15
August 25
September 5
September 15
September 25
October 5
October 15
October 25

November 5
November 15
November 25
December 5
December 15
December 25
January 5
January 15
January 25
February 5
February 15
February 25
March 5

This standardized survey effort would allow for providing very specific recommendations for providing habitat locally based on peak movements through any one area compared with all other areas in the region. This information would be maintained on the website for all shorebirds combined and hopefully for each species as well (the latter, to make sure management targeting all species does not miss the movements of rarer higher priority species) . Other dates during winter (November, December, January, and February) should follow similar 10-day intervals but are considered optional based on available time and intended management that could effect wintering shorebird populations.

FWS Ecosystem Teams covering the entire South Atlantic coast have been working towards coordinating management of impoundments through the development of a website. Development of this website, using both GIS and shorebird population objectives, is awaiting preliminary habitat objectives allocated among all cooperators along the South Atlantic coastline. The recent Western Atlantic Shorebird Association (WASA) initiative to develop a comprehensive website may also serve this purpose and we should look into this before needlessly duplicating effort.

This topic was also discussed with relationship to monitoring coordination deemed necessary to make needed adjustments on where and when habitat should be provided in managed wetlands across the region. Bob Noffsinger is working with Raleigh FWS Ecological Services Field Office to establish shorebird monitoring database for stations using International Shorebird Survey (ISS) protocol in the Southeast.

We hope to receive preliminary data from Fall of 1999 and Spring 2000 from those sites already conducting surveys from southeastern Virginia to Florida. For now Bob Noffsinger will accept and enter all census data received and recruit one refuge in each state to try out the website for entering management information for the fall of 1999, that should help us debug the website by the Spring 2000 initiation date. During the intervening period, we would evaluate use of impoundments managed for shorebirds across the ecosystems and determine if we need to increase managed acres.

Aerial Surveys: For a more complete census of shorebirds for a larger area and detection of key feeding and roosting concentration areas.

During migration periods (also winter, but attempt tie in with waterfowl aerial surveys), attempt to search area for shorebird concentrations at least twice monthly.

Count (estimate) all shorebirds, split among large, medium, and small bodied groups of species. If adequate training is not available to easily group shorebirds into these three groups, lump medium in with large species:

Small-bodied shorebirds are the small plovers (Snowy, Wilson's, Semipalmated, Piping,) and "peeps" (Sanderling, Semipalmated, Western, Least, and Dunlin).

The medium-bodied group consists of the larger plovers (Black-bellied and American Golden), yellowlegs (both Greater and Lesser), Willet, Upland Sandpiper, Ruddy Turnstone, Red Knot, Pectoral Sandpiper, Stilt Sandpiper, Buff-breasted Sandpiper, dowitchers (Short-billed and Long-billed), and phalaropes.

Large-bodied shorebirds include American Oystercatcher, Black-necked Stilt, American Avocet, Whimbrel, Long-billed Curlew, and godwits (Marbled and Hudsonian).

Total numbers censused from aerial surveys can then be used in concert with ISS to determine not only relative, but also absolute, abundances among species.

***Shorebirds-Beach Nesting Species***

Beach nesting shorebird surveys: Beach surveys also would be beneficial although no set protocol at this time.

The main purpose for mentioning beach surveys is for checking up on breeding species (Piping, Snowy and Wilson Plovers, Oystercatchers, Willets, and Least Terns and Black Skimmers as well) which will require substantial walking.

Specific protocol still needs to be fleshed out, but covering an area at a minimum of once a month (and preferably 3 times a month) from April through July should provide a good "understanding" of nesting pairs present and perhaps productivity upon careful inspection. Recommend checking with Jeff Gore FL GFWFC whose worked with Snowy Plovers and Marc Epstein with Merritt Island National Wildlife Refuge who has been working with Wilson's Plovers. We may also employ protocols used to monitor breeding Piping Plover populations.

Population objectives include providing optimal habitat to maintain and increase priority species in the Southeast region. For examples along the Southeastern Coastal Plain, maintain enough high quality habitat to support a present breeding population of up to 55 pairs of Piping Plovers, 300 pairs of Snowy Plovers, 550 pairs of American Oystercatchers, and 1500 pairs of Wilson's Plovers and determine what is needed to double breeding population size for each of these species during the next 50 years. Additional objectives need to be developed and coordinated for appropriate species along Mid Atlantic coastlines, the Coastal Prairies of Louisiana and Texas, as well as for the Playa Lakes region of Texas, Oklahoma, and New Mexico.

***Beach or Ground Colonial Nesting Birds***

For most terns, gulls, and boobies, a number of protocols exist to cover a multitude of potential objectives involving these colonial nesting species. For purposes of establishing standards, objectives here include (1)

monitoring regional population trends, (2) monitor colony site changes over time at the regional spatial scale, and (3) monitor local and regional reproductive success.

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|---|---|
| Colonial Bird Atlases | Periodic Atlases are intended to provide for detecting all active colonies and their characteristics on a periodic (*e.g.*, every 3-5 to 10 years) basis and have been conducted in the past on a state-by-state basis. |

Emphasis is on locating all active colonies and gathering basic information on numbers of individuals, but may not allow for detailed site-by-site gathering of data on reproductive success. More recently, efforts have been underway to group states during a single year to better determine regional trends and net changes in colony sites along the Atlantic Coast. Similar efforts have been proposed for Gulf Coast States. Contact state agency coordinators for details.

| | |
|---|---|
| Annual local surveys | Many states and local land management units conduct annual surveys of colonial nesting species at selected sites but these surveys are rarely coordinated and may not be standardized. |

Emphasis is on gathering more detailed local information which requires multiple visits to colony sites than may be possible during comprehensive Atlas efforts.

Both Atlases and local survey techniques may vary depending on local site conditions and ease of accessability. Commonly employed techniques like those described for the Colonial Bird Register, formerly coordinated by the Cornell Laboratory of Ornithology, include:

(1) visual estimates from fixed wing aircraft;
(2) visual estimates from rotary aircraft;
(3) visual estimates from boat, car, or foot;
(4) aerial photographic count;
(5) total ground count of individual birds (not pairs);
(6) total ground count of nests;
(7) quadrat census (sketch); and
(8) line strip census (sketch) as described in Erwin *et al.* (1984).

Regardless of technique used the following types of information should be gathered:

(1) colony size (hectares);
(2) colony name (identify State, land management unit or closest named town);
(3) time of each survey (military time);
(4) Latitude/Longitude (or GPS coordinates as appropriate);
(5) name of each species (common and scientific name);
(6) total population size (individuals, not pairs);
(7) total active nests;
(8) nesting stage (prenesting, pairing, egg laying, incubation, hatching, downy young, feathered young, young ready for flight, renesting, loafing);
(9) level of disturbance at colony site (describe type and frequency); and

(10) general habitat type (small natural or spoil island, beach).

Other than for Least Terns and Black Skimmers (covered above), most beach nesting bird colonies are reasonably well known or easily located due to the often large concentrations of birds involved. Gathering data on reproductive success is beyond the scope of these guidelines, but would be the ultimate measure of local habitat conditions.

A3BC discussions were focused on the dichotomy between standardized regional and customized local protocols for purposes of making regional assessments. At issue is the need for clear objective setting at both local and regional levels. Objectives for surveying local colonies are tied to measures of overall habitat quality, most often for aquatic resources. However, a local decrease in nesting colonial waterbirds may not be due necessarily to local decline in overall habitat quality as the colony may have simply moved to another location away from the local land management unit and overall regional populations are stable or even increasing. The opposite may also be true with local increases, but with overall regional declines underway.

Tracking regional patterns of colony numbers and population sizes is necessary for understanding the overall status of each species, but customized local efforts make the search for regional patterns difficult or impossible. Therefore, until a specific standardized protocol emerges for annual local surveys, each station will continue conducting surveys as dictated by the station's existing wildlife inventory and monitoring plan. Each cooperator would summarize yearly trends of numbers of individuals at each colony site at minimum as a simple regression (see Erwin *et al.* 1984). Then groups of cooperators can qualitatively compare trends among sites by simply indicating increases (+), decreases (-), or no trend for each species from each site in the search for broader patterns in regional population trend. The quality of results from this crude meta-analysis approach is dependent on the quality of specific survey protocol designs, but despite wide variance in protocols this approach may still be able to assess population trends at a regional scale.

Monitoring use of foraging habitat may be tied in with International Shorebird Survey protocol following standard routes on a 10-day interval throughout the year, or seasonally as appropriate.

***Tree or Brush Colonial Nesting Birds***

Basic survey approaches for long-legged waders and allies, pelicans, frigatebirds, cormorants, anhingas, and sooty and noddy terns are similar to those described above for beach nesting species. Techniques broadly fall also into periodic atlases and annual local surveys, but aerial counts (totals or transects) and photographic techniques are more likely to be employed (Bancroft 1991). These latter two techniques may be productive for some species, but present specific challenges for other species.

Access to many tree-nesting bird colonies are difficult and suggestions for determining total numbers of individuals include the use line-of-flight roost counts (often conducted at dusk as birds come in to roost) or use of photographs made from aircraft. For line-of-flight counts, suggestions have been made to include counts conducted during the same time period from different locations to better cover birds coming into roost from various directions. This approach is dependent upon local decisions to focus on a specific site and may not provide comprehensive coverage beyond the local roost site, depending on funding and availability of staff. Regardless of the number of people involved, the ability to make regional comparisons may only be possible by comparing birds detected per unit time of effort (if multiple parties are involved then time of effort is additive, as is done in Christmas Bird Counts). Bi-weekly to monthly counts during the season(s) roosts are active are suggested (keep in mind that different birds may be involved from breeding

to non-breeding seasons at the same roost site).

Infrared photo surveys where birds are counted from photographs may also be useful, but only "white" species are likely to be identified. Since populations of many "dark" long-legged waders and pelicans are in need monitoring attention, other approaches should be considered to cover these species. Clearly there is a need to conduct research to determine the best way to standardize protocols for regional comparisons to be the most useful for conservation planning.

Monitoring especially long-legged waders in foraging habitat may be conducted using the International Shorebird Survey protocol with standard routes covered at 10-day intervals throughout the year, or seasonally as appropriate. Other protocols for identifying important foraging areas may not otherwise be conducive for developing standard monitoring protocols.

***Marshbirds***

Secretive Marshbird Surveys: Mostly focused on breeding season, a combination of passive listening and taped playback for hard to detect species are usually recommended.

Marshbirds within the Southeast U.S. and Caribbean include Pied-billed Grebe, American and Least Bitterns, Masked Duck, all rails and crakes, Purple Gallinule, Common Moorhen, American and Caribbean Coots, Common Snipe, Marsh and Sedge Wrens, Common Yellowthroat, Seaside and both Sharp-tailed Sparrows, Red-winged Blackbird, and Boat-tailed and Great-tailed Grackles. Most of the these species breed within the Southeast U.S. and Caribbean and all are found in winter.

Recommendations for surveying breeding marshbirds are based mostly on the "Proceedings of the Marsh Bird Monitoring Workshop" (Ribic *et al.* 1999) and include the following points:

(1) Establish as many sample points as possible along defined routes transversed by canoe, foot, or bicycle trails (motorized vehicles are not recommended). Data forms should list **detections within 100 meters of the point and beyond 100 meters**.

(2) Sample points should be spaced **250 meters apart**.

(3) Time spent at each point should be **12 minutes** allowing for (a) 5 minutes of initial passive listening, (b) 1 minute of tape with 30 seconds of listening for each of 4 target species, and (c) end with 1 minute of post play-back passive listening.

(4) Season of surveys should be within **15 May to 30 June**, and for monitoring purposes preference is given to doing more sample points versus conducting multiple visits to the same points. However, if staff time permits repeating each sample point 3 times during the season may be useful for estimating densities and may allow for better understanding of bird-habitat relationships (keeping in mind that year-to-year monitoring efforts should use only one set of replicates during the same relative time period for consistent comparisons).

(5) Time of day for surveys is recommended to be **from ½ hour before sunrise to no longer than 4 hours after sunrise**. The same direction and order of sample points should be used from one year to the next to maximize likelihood of detecting population trends.

(6) For playback species, order from the "least intrusive" to the "most vocal" species. For example, Black Rail, Yellow-breasted Crake, and/or Least Bittern, should be done before King or Clapper Rails, which should be done before American Bittern and/or Pied-billed Grebe. Although Virginia Rail and Sora may breed in the region, they do so in very low numbers, while Common Moorhen and American Coot are low priority species. In addition to Yellow-breasted Crake in the Caribbean, though, including the high priority Caribbean Coot in tape playback surveys is suggested. Obviously the target species will need to be selected based on geographic location and should be coordinated among cooperating land managers within ecosystem units, etc.

(7) As with point counts for landbirds, sample size is difficult to determine without clear objectives for each land management unit or larger cooperative planning region. For now, each cooperating station with extensive marshlands should strive to establish at least 50 sample points, cooperating stations with limited marshlands should strive to establish at least 25 sample points. Stations with capability to establish less than 25 sample points, may still contribute to regional databases, but other higher priority survey needs perhaps should take precedent (exceptions may include rail use of small and scattered depressional wetlands such as Carolina bays).

Other specific recommendations are provided in Ribic *et al.* (1999). Surveying for non-breeding marshbirds may be as important as for breeding populations, but it is unclear whether the same techniques can be employed. For now the same protocol is recommended with use of tape playback for at least rails which are known to respond throughout the year. During the non-breeding season use of playback for Virginia Rails and Soras should be considered and may replace bitterns and pied-billed grebes which are mostly silent outside of the breeding season. Seasonal movements are likely to be dynamic during the non-breeding season and revisiting sample points once every 10 days is recommended to best determine peak periods of occurrence (and theoretically peak dependence on optimal habitat conditions being provided).

An alternate approach for surveying non-breeding marshbirds would be to include all detections made for these and open water birds (which include grebes, masked duck, gallinules, moorhens, and coots) detected along International Shorebird Surveys.

Breeding season detections of singing or calling wrens, yellowthroats, and sparrows along either International Shorebird Surveys or marshbird routes (if different) may suffice for estimating status and trends. Non-breeding season counts for these species may be better conducted using an area-search or Project Prairie Bird protocol, depending on ease of walking through the marshes in question.

***Open Water Birds***

Loons, grebes, waterfowl, coots, and other waterbirds may be best surveyed using established routes and driving these using something similar to International Shorebird Survey. Recommended 3 surveys per month.

Waterfowl (aerial) surveys like those supported through the Fish and Wildlife Service's Migratory Bird Management Office conducted provide important data for waterfowl population status and trends and may also be helpful for other waterbird species. State wildlife agencies frequently have the lead in aerial waterfowl surveys and recommend frequency should be 2 surveys per month from early October to early March. In addition, aerial shorebird surveys should be from early July to early October and from early March to early June (again 2 surveys per month).

Bob Noffsinger (FWS Manteo, North Carolina) has developed a standard data form for North Carolina and may suffice for the entire region.

***Pelagic Birds***

Open ocean surveys are beyond the scope of most cooperating land and water managers, nevertheless the need to better understand seabird populations status and trends and differences in oceanic habitat use especially along the Gulf Stream are becoming increasingly important for recently recognized species in trouble (like Black-capped and Bermuda Petrels, but also for tracking concentrations of Greater, Cory's, and Audubon's Shearwaters). Refer to Lee (1986, 1995) for methods to conduct standardized oceanic surveys.

Beached bird surveys protocols are described by Simons (1985) and may be useful for determining increasing contaminant or other problems resulting in spikes in the numbers of dead loons, gannets, and pelicans concentrated along coastal open water habitats or other species typically considered more oceanic mortality washing ashore.

***Raptors***

Other than specialized surveys needed for high priority raptor species, general raptor surveys are grouped into two basic types (1) winter roadside counts and (2) stationary hawk watches during migration.

For local monitoring efforts, standardized roadside counts in open country are preferred over stationary hawk watches, but a national network of hawk watches may allow for determining national trends for some species more closely associated with forests and therefore difficult to monitor through other means (principally Broad-winged, Sharp-shinned and Cooper's Hawks).

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| Winter Raptor Roadside Counts: | Useful to map raptor distributions, calculate relative abundance (standard route lengths and time of survey are important), and delineating habitat use. |

Raptor roadside counts are described by Gawlik and Bildstein (1990) and Fuller and Mosher (1987). One or two observers should travel at **moderate speeds** (average about 20 miles per hour) by motorized vehicle on roads with good visibility (*i.e.*, open-rural country), scanning both sides of the road and recording all raptors observed. Routes should be long enough (over 10 miles) to include all local habitat types and should be completed within a single day and should be conducted between **0800 to 1730** keeping in mind that the activity of many raptors increases later in the day as thermals develop. Recommended that **2-3**

**surveys are conducted each month from late September to late March** with direction of travel reversed from one survey to the next. If staff and time permits, conducting roadside raptor surveys throughout the year may be instructive.

Migration Hawk Watch Sites: Usually established where large numbers of migrating raptors are encountered on a frequent basis during either northbound and (principally) southbound migrations; excellent outreach opportunities where such sites exist.

Hawk Watch Sites are established and guidelines for conducting raptor counts are coordinated by the Hawk Migration Association of North America (HMANA; see http://www.hmana.org). Within the Eastern Continental Flyway there are 4 sites in North Carolina, 6 in South Carolina, 6 in Florida, and 1 each in Kentucky and Tennessee. Within the Gulf/ Caribbean Continental Flyway only 1 site now exists and it is in Alabama within the Southeast FWS Region (but another 4 sites are in Texas). Data forms and regional coordinators are identified on the HMANA website.

***Species in need of Specific Survey Protocols***

Bermuda Petrel (nesting)
Black-capped Petrel (nesting)
Audubon's Shearwater (nesting)
White-tailed Tropicbird (nesting)
West Indian Whistling-Duck (nesting and roost sites)
Wood Duck (nesting)
Mottled Duck (Florida subspecies, nesting)
Masked Duck (Caribbean populations, nesting, wintering)
Swallow-tailed Kite (nesting and roost sites)
Snail Kite (Everglades subspecies, nesting and foraging)
Bald Eagle (nesting and foraging)
Sharp-shinned Hawk (Puerto Rican subspecies)
Broad-winged Hawk (Puerto Rican subspecies)
Short-tailed Hawk (Florida population, nesting)
Crested Caracara (Florida population, nesting)
American Kestrel (Southeastern subspecies, nesting)
Peregrine Falcon (nesting, migration)
Limpkin (Florida monitoring, surveys for remnant Puerto Rico populations)
Black Rail (breeding and wintering)
Yellow Rail (winter)
Yellow-breasted Crake (breeding and winter)
Sandhill Crane (Florida and Mississippi subspecies, nesting)
American Woodcock (nesting and wintering)
Least Tern (roof-top nesting)
Black Skimmer (roof-top nesting)
White-crowned Pigeon (nesting and foraging sites)
Plain Pigeon (surveys for Puerto Rican subspecies)
Puerto Rican Parrot (nesting)
Mangrove Cuckoo (point counts versus taped playback)
Barn Owl (nesting)
Puerto Rican Screech-Owl (survey for remnant Virgin Islands subspecies)
Burrowing Owl (Florida subspecies, breeding)
Short-eared Owl (winter surveys for temperate subspecies; nesting Greater Antillean subspecies)
Northern Saw-whet Owl (Appalachian breeding populations; coastal migration monitoring)
Chuck-will's-widow (breeding)
Whip-poor-will (breeding)
Puerto Rican Nightjar (breeding)
Black Swift (breeding in Caribbean)
Yellow-bellied Sapsucker (Appalachian breeding subspecies)
Red-cockaded Woodpecker (breeding)
Florida Scrub-Jay (breeding)
Bewick's Wren (breeding and winter; survey for both Appalachian and Eastern subspecies)
Golden-winged Warbler (breeding)
Cerulean Warbler (breeding)
Elfin Woods Warbler (breeding)

Swainson's Warbler (breeding)
Seaside Sparrow (breeding and winter)
Nelson's Sharp-tailed Sparrow (winter)
Saltmarsh Sharp-tailed Sparrow (winter)
Bachman's Sparrow (breeding)
Grasshopper Sparrow (Florida subspecies, breeding)
Henslow's Sparrow (breeding and winter)
Painted Bunting (Eastern subspecies, breeding and wintering)
Yellow-shouldered Blackbird (breeding and roosting)
Rusty Blackbird (winter)
Red Crossbill (breeding in Appalachians)

**Proposed Needs for FWS Area III (which may be useful for determining needs in Areas I and II as well as for other agencies and cooperators)**

***Findings:***

! The A3BC estimates that **18 FTE's** (including three specifically for the Caribbean) and appropriate equipment over and above present capabilities (which includes good use of existing volunteer workforces) will be needed to adequately conduct all the priority migratory bird monitoring protocols among all Area III Fish and Wildlife Service stations.

[Independent of the A3BC exercise, Project Leaders among Southeast Refuges on May 19, 1999, determined the number of additional biologists and biotechs required to acheive minimum staffing to be 30 in Area III; 36 for Area II, and 28 for Area I]

Given that long-term regional trend data is needed, it will be necessary to provide long-term resource commitments to individual stations. For example, seasonal biological technicians could be hired to conduct point count and migratory bird surveys. They could also be responsible for regional survey coverage and needs as these may not be the same at the local level.

! We will require **one FTE** to provide long-term computer support for Area III biological programs.

! A **"webmaster"** will be required to coalesce electronically disseminated data and to coordinate future multi-agency data-sharing activities.

! We will require **one candidate/existing Area III employee** dedicated to future development of databases for other migratory bird needs (*i.e.*, other than point counts).

! Training requirements for A3BC efforts must include:

1) **Training opportunities in Microsoft® Access** database development and use.

2) **Training opportunities in GIS applications.** This will be required to allow participating biologists to integrate GIS technology with monitoring databases to allow efficient and effective assessment of management needs.

Training and applied software use will allow biologists to address resource issues beyond migratory bird monitoring and to more effectively use computer databases to compile and report on other important regional and refuge-specific taxa. The A3BC is coordinating the training logistics and obtaining cost estimates for training sessions. The National Conservation Training Center in West Virginia or other training locations will be considered.

! Acquisition of an estimated **5-10 GIS-compatible computers with ESRI products** (Arc/Info and/or ArcView and needed extensions) and **Microsoft® Access software packages** will be required. Currently, not all A3BC stations are equipped to handle Microsoft® Access and GIS capabilities, therefore, upgrades will be necessary to develop this network.

! The NWRS Biological Needs Assessment identified a need to enhance funding for biological programs through RONS and MMS. **Area III ecosystem teams will have to identify and pursue these funding mechanisms** to support implementation. The A3BC believes it is incumbent upon the ecosystem teams within Area III to address funding sources to allow A3BC to implement the quality migratory bird monitoring network it has been charged with developing.

! The A3BC will also need Area III to identify **one existing Region 4 employee** appointed to develop a centralized data repository to track the status and trends of migratory birds (e.g., perhaps at the level of Nongame Migratory Bird Coordinator). We request that any direction/coordination in this venture be directed by this position. Someone will be needed to compile and investigate broad scale patterns across the landscapes and compare among stations.

The A3BC believes that the Service must assume a leadership role in this initiative by inviting all interested state and federal agencies and NGO's to work together on this as much as possible. The A3BC challenges Area III ecosystem teams to pursue establishing these partnerships.

The A3BC believes that the personnel, equipment and training needs identified above are critical to successful implementation of the stated tasks.

***Concluding Thoughts:***

A3BC agrees and supports the development of standardized protocols to the extent logistically possible for the collection of data and maintenance of databases. This will allow for the comparison of data among sites and will allow us to monitor long-term and regional trends.

We agree to and will be conducting a pilot year evaluation using point counts for 10 minute intervals. The database system suggested is the data system developed by and currently used by the Forest Service. Access training is needed at NCTC for all participating biologists at each station to ensure that everyone is on the same page.

We realize that the intensity and timing of surveys for monitoring long-term and regional trends may not be the same as those used at the individual station for monitoring local trends, but we will try to coordinate efforts whenever possible. Regarding standardized vs. refuge-specific protocols and regional comparisons, each station should continue conducting surveys as per station's wildlife inventory and summarize trends through time. Someone will be needed to compile and investigate broad scale pattern across the landscapes and compare among stations to determine patterns. Collecting data in "birds per unit time" would facilitate comparisons. Meta-analysis will be dependent on specific survey protocol designs but may still be able to assess population trends in geographic regions (*i.e.*, decline in north, increase in south).

We suggest that each station evaluate their priority species (with regard to the sensitive and geographical issues surrounding them) and establish methods to address these issues. This may mean conducting more surveys for a particular group in order to obtain coordinated data to detect trends. Focusing resources on one group will limit other project resources, but will provide consistent data. Resources can be supplemented with volunteers but they will need training to ensure that a level of quality is maintained.

If long-term regional trend data is needed, it will be necessary to provide resources to individual stations.

For example, a seasonal biological technician could be hired to conduct surveys for migrants. They could also be responsible for regional survey needs as they may not be the same as local survey needs.

Finally, we agree it is important to put effort into surveys that will provide pertinent data. It is better to obtain quality data with adequate accuracy and precision than to obtain large quantities of less accurate data for detecting trends.

Area III Refuge Biologist's Committee

**END.**

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# Attachment I
# Sample Vegetation Data Collection Form for Landbird Point Counts

# Attachment II
# Migration Monitoring Dataform

4. Each migration count location should be visited at least once per week during the migration season (Spring: 20 March - 01 June; Fall: 15 July - 01 November). Daily coverage for each migration count location would be ideal.

5. All individual landbird migrants detected, either by sight or sound, should be recorded and tallied on this sheet. Other species groups (e.g., shorebirds, herons, egrets, waterfowl) can also be recorded, tallied, and submitted. Although the data will not be analyzed for this project for other species groups, these data could be useful in the future.

6. Along with individual birds, the number of individuals in a flock should be estimated, recorded, and tallied by species.

DATA TO BE RECORDED:

A. Day, Month, Year - use numeric value to record month (e.g., April = 04, September = 09, December = 12). Day and year are self-explanatory.

B. Location Name - observer should give a name to each site for which data is recorded (e.g., Ladner Tract, East Ship Island, Audubon Sanctuary).

C. Nearest Town - give the name of the nearest town or prominent map feature whose latitude and longitude can be determined.

D. County/Parish, State - self-explanatory.

E. Observer Name/Address/Phone - record the name, address, and phone number of the observer(s). Use the following format to print name: First Name, Middle Initial (if have one), Last Name (e.g., Mark S. Woodrey).

F. Habitat Types (on route) - record all habitat types and % coverage which occur at each migration count location (total should equal 100%). Habitat types are listed on the front page. This information should be re-evaluated annually unless there is a drastic change during a migration period.

G. Surrounding Landscape - record the surrounding landscape and % coverage (within a 1 mile radius circle) of the migration count location (total should equal 100%). Landscape categories are listed on the front page. This information should be re-evaluated annually unless there is a drastic change during a migration period.

H. Wind Code - record wind code (e.g., 0, 1, 2, 3, 4, or 5) according to the codes listed on the front page.

I. Wind Direction - record the wind direction using one of the following codes: N, NE, E, SE, S, SW, W, or NW.

J. Sky Code - record sky code (e.g., 0, 1, 2, 3, 4, 5, or 6) according to the codes listed on the front page.

K. Start/End Temp. - record the starting and ending temperature in degrees Fahrenheit ($^{o}$F).

L. Start/End Time - record the starting and ending time in military format (e.g., 7:00 am = 0700, 1:00 pm = 1300).

M. Species - record the common name of species detected during the migration count.

N. # of Individuals - use this column to keep track of individuals and flocks of birds detected. Recording and tallying by sex and/or age for any species is optional.

O. Total - use this column to write in the total number of individuals of a species detected during your migration count.

*PLEASE RETURN COMPLETED DATA SHEETS TO:*

*Cecilia M. Riley*
*Gulf Coast Bird Observatory*
*9800 Richmond Ave., Suite 150*
*Houston, TX 77042*
*(713) 789-4226*

# MIGRATION MONITORING PROGRAM
## GUIDELINES AND DATA SHEET

Day: ____ Month: _____ Year: _____ Location Name:

Nearest Town:

## Attachment III
## Introductory Letter Regarding International Shorebird Survey

July 1999

Dear

As Director of the International Shorebird Surveys (ISS), I am writing with hopes that you can help identify a staff person or perhaps a volunteer from your area to monitor shorebird numbers at . We believe this could prove useful to you in making management decisions and to us in better monitoring population changes in shorebirds.

The ISS has been operated by Manomet for 25 years. Under a new MOU with the USFWS, including the Division of Refuges, Manomet has agreed to promote the International Shorebird Survey data collection and reporting for the benefit of USFWS staff. USFWS support enables us to provide better information back to refuge biologists and managers for their local management decisions.

What kind of sites are we looking for? The Survey focuses on migration seasons. We are looking for inland and coastal locales where shorebirds occur regularly (by tens or more) during spring and/or fall migration. Because we request that counts be made about once every 10 days during migration, we are looking for survey routes or locations that are readily accessed. We are not looking just for major sites; 'minor' sites may play very special roles during certain years and during the migration periods of juvenile shorebirds.

The project is aimed to last for decades, and so low-cost operations is important.. A volunteer-based project offers an advantage of economical operation, but a disadvantage of being difficult to monitor and oversee. We need your help to identify staff or potential volunteers, and if enlisted, to be in touch with them during the field seasons to find out if they are meeting project protocols and deadlines. When possible volunteers are identified to us, we will contact them to provide additional information about the ISS, and to describe the reasons we are asking for their help. If they agree to help, we will ask them to report to you or your designee on a thrice-monthly basis the dates when they have made their counts. We ask that you let us know if the cooperator is not maintaining a thrice-monthly schedule. By using volunteers, we doubt that the project would use more than half an hour of your time during each of the key migration months, April-May and July-October.

In return for you oversight help, the ISS would agree to provide you with a copy of data collected at REF_NAM , and to identify any species using your refuge in numbers that would be considered important on a national scale. Should your location prove to be a key shorebird stopover, and should you request it, we would also agree to work with you to seek funds for developing or refining shorebird conservation and management options at REF_NAM.

Manomet has a long history of shorebird research and management activity. We currently are responsible for governance of the Western Hemisphere Shorebird Reserve Network, for development of a United States Shorebird Conservation Plan, for operation of the ISS, for production of Shorebird Management Training Workshops through the USFWS National Conservation Training Center, and for numerous research initiatives. We would gladly provide more information to interested persons. Information can also be found at www.manomet.org, especially in the wetlands section of that site.

If you are willing to become involved in this refuge-based project, we would ask for the following before 1 September 1999:

? A letter identifying the refuge. If possible, please include a map showing what specific locations should be checked for shorebirds.

? The name and contact information for the person you are recommending as a counter. (This should be a person accomplished in shorebird identification. If the person is not on your staff, we also hope that you will secure that person's permission before "volunteering" them.)

? The name of the contact person at your refuge with whom we should communicate in the future. We would appreciate having the mailing address, telephone and fax numbers, and e-mail address.

We have included a page of additional information about the ISS. We can, of course, provide lots more information, or answer specific questions you may have. Just let us know.

Why is this important?

1. Populations of many kinds of shorebirds are in rapid decline. We need to improve our abilities to detect change in order to know (a) if conservation and management initiatives are working at regional and national levels, and (b) to continue to track population changes and identify its causes.

2. With its emphasis on waterfowl and wetlands, the national wildlife refuge system is heavily used by shorebirds and almost certainly is playing a critical role in maintaining key stopover habitats.

3. The national wildlife refuge system offers an enormous management potential — with minimal effects on traditional management goals — to reverse effects of habitat loss to shorebird populations.

4. Good information is needed for improved management

Please feel free to contact us with questions — e-mail is preferred (bharr@manomet.org), but phone/fax (508/224-6521 tel., 508/224-9220 fax) is OK too.

Thanks for considering this request.

Sincerely,

Brian A. Harrington

cc: Mary Anne Young, Div. of Refuges

Table 1. Southeast U.S. regional standard protocols for nongame bird surveys and recommended range of dates.

| Target Species Group | Protocol | Season | Dates recommended for protocol (double underline=preferred, dashed—optional) JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC |
|---|---|---|---|

| | | |
|---|---|---|
| SHOREBIRDS | International Shorebird Survey (ISS) (Winter) (3/month) | Migration |
| (*e.g.*, plovers, oystercatchers | Beach Nesting Survey (1-2/season) | Breeding |
| COLONIAL-NESTERS "Seabirds" (typically beach or ground nesting) | Colonial Waterbird Surveys (1-2/season) (To be determined) Atlases (5-yr. intervals) | Breeding |
| Long-legged Waders (typically tree, or brush, includes all Pelecaniformes) | (Colonial Waterbird Surveys (1-2/season) (To be determined) Atases (5-yr. intervals) | Breeding |
| MARSHBIRDS (*e.g.*, rails, bitterns, marsh wrens, seaside sparrows) | Secretive Marshbird Surveys (3/season) | Breeding |
| (*e.g.*, rails) | Secretive Marshbird Surveys (3/month) | Non-Breeding |
| PELAGIC; BEACHED BIRDS (*e.g.*,tubenoses, loons pelicans, gannets, gulls, terns,) | Ocean Surveys (3/month) | All |
| | Beached Bird Census (3/month, with ISS) | All |

Dates recommended for protocol (double underline=preferred, dashed—optional)

| Target Species Group | Protocol | Season | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPEN WATER (*e.g.*, grebes, loons, pelicans) | Routes (by road or boat) (3/month) | All | | | | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Aerial (2/month) | Non-Breeding | Waterfowl | Shorebirds | |
| (waterfowl, shorebirds) | | | Shorebirds | Waterfowl | |
| RAPTORS | Roadside Counts (2-3/month) | All | | | |
| | Migration Hawkwatch (3+/season) | Non-Breeding | | | |
| LANDBIRD | | | | | |
| Forest, shrub-scrub, grassland | Point Counts (once/yr.) | Breeding | | | |
| Shrub-scrub, grassland | Transect (6-9/season) | Breeding | | | |
| Grassland | Transects (6-9/season) or Area Search (3-6/season) | Breeding | | | |
| Forest, shrub-scrub | Along routes or at discrete points (latter with use of screech-owl tapes) (2-4/mth.) | Migration | | | |
| Grassland | Area Search or Project Prairie Bird (3-6/season) | Non-Breeding | | | |