

FINAL DRAFT

Avian Conservation Implementation Plan
Salt River Bay National Historic Park and
Ecological Preserve

National Park Service
Southeast Region



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In cooperation with

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And Bird Conservation Partners
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TABLE OF CONTENTS

Introduction..... 3

Background 3

The North American Bird Conservation Initiative 4

The Southeastern Bird Conservation Initiative: National Park Service 5

Role of NPS in Avian Conservation..... 5

Park Description 7

Avian Resources of Puerto Rico and the US Virgin Islands..... 8

Avian Conservation in Salt River Bay National Historic Park and Ecological Preserve (SARI) 10

Park Identified Needs for Avian Conservation..... 11

Coordination with Regional Conservation Initiatives 11

North American Bird Conservation Initiative 11

North American Waterfowl Management Plan..... 12

Partners In Flight 12

United States Shorebird Conservation Plan 12

Waterbird Conservation for the Americas..... 14

Integration of NABCI Goals and Objectives into Park Planning and Operations: NABCI Implementation
 Recommendations 14

Inventory 15

Monitoring 15

Habitat Restoration 16

Threat Management..... 17

Research 18

Compliance 18

Outreach 19

Partners and Partnerships 20

Funding Opportunities 20

Contacts..... 23

Literature Cited..... 25

Appendixes

PUERTO RICO AND VIRGIN ISLANDS Watch List

Bird-Habitat Relationships for Puerto Rico and Virgin Islands, West Indies

US Fish and Wildlife Service Species of Conservation Concern (2002) for the Caribbean – Puerto Rico and the U.S. Virgin Islands (BCR 69)

Introduction

This Avian Conservation Implementation Plan (ACIP) is provided to the staff at Salt River Bay National Historic Park and Ecological Preserve (SARI) to serve as guidance to identify, document, and undertake bird conservation activities in the park and with neighboring communities, organizations, and adjacent landowners. This plan may identify goals, strategies, partnerships, and perhaps specific projects for the park to participate in existing bird conservation planning and implementation efforts associated with the North American Bird Conservation Initiative (NABCI). Under the auspice of NABCI, appropriate bird and habitat conservation goals may be recommended as identified in the appropriate existing national or regional bird conservation efforts aligned with this initiative: Partners In Flight (PIF), North American Waterfowl Management Plan (NAWMP), US Shorebird Conservation Plan (USSCP), and Waterbird Conservation for the Americas (WCA). For example, parks in the Appalachians and the Cumberland Plateau will have few if any high priority waterbird conservation issues at a regional landscape or greater scale. As such, little information regarding waterbird conservation will be presented in the ACIP, unless there is an identified park need for this species group, or other mandates, such as federal laws. Similarly, because SARI has both coastal and upland habitat, recommendations will be provided in the ACIP for landbirds, waterbirds, and habitat conservation derived from the appropriate PIF bird conservation plans. However, all high priority bird conservation issues for SARI will be discussed and integrated as appropriate.

Information and data presented in the ACIP have been obtained from several sources: 1) interviews with SARI staff 2) SARI bird conservation partners 3) the Puerto Rico and US Virgin Islands Bird Conservation Plan (Nunez-Garcia and Hunter 2000), 4) NPS databases, and 5) personal communications with bird conservation specialists in the region. This plan has been reviewed by SARI resource management staff and managers, South Florida/Caribbean Inventory and Monitoring (SF/C I&M) Network staff, and bird conservation partners and approved by SARI management. Optimally, this plan will be incorporated into the park's management documents and updated annually to reflect completed projects, newly identified needs, and shifts in bird conservation priorities in the region.

SARI is not obligated to undertake any of the proposed actions in this plan. The plan is provided to offer guidance to SARI to voluntarily support important park, regional, and perhaps national and international bird conservation projects for which SARI is a primary participant in the proposed actions.

Background

During the past thirty years, monitoring programs across North America have documented declines of certain bird species populations and their habitats, often severe (Sauer et al. 2000). The decline has caused great concern among scientists, biologists, biodiversity proponents, ecologists, land managers, etc., and the bird conservation

community in general. Birds are recognized as critical components of local and global genetic, species, and population diversity, providing important and often critical ecological, social, and cultural values. Their overall decline has stimulated a worldwide focus on conservation efforts and North American interest in bird conservation is rapidly becoming a focus of government, non-government, industry, and private interests and expenditures.

Many state, federal, and non-governmental wildlife agencies and organizations (NGO's) have recognized this alarming bird decline trend and have joined forces in several extensive partnerships to address the conservation needs of various bird groups and their habitats. The primary initiatives are:

- North American Waterfowl Management Plan
- Partners in Flight
- U.S. Shorebird Conservation Plan
- Waterbird Conservation for the Americas

The North American Bird Conservation Initiative: While efforts associated with these plans have generated some successes, it has been increasingly recognized that the overlapping conservation interests of these initiatives can be better served through more integrated planning and delivery of bird conservation. The *North American Bird Conservation Initiative (NABCI; <http://www.nabci-us.org/main2.html>)* arose out of this realization. The vision of NABCI is simply to see ***“populations and habitats of North America’s birds protected, restored and enhanced through coordinated efforts at international, national, regional, state and local levels, guided by sound science and effective management.”*** NABCI seeks to accomplish this vision through (1) broadening bird conservation partnerships, (2) working to increase the financial resources available for bird conservation in the U.S., and (3) enhancing the effectiveness of those resources and partnerships by facilitating integrated bird conservation (U.S. NABCI Committee 2000). Together, the four bird conservation initiatives mentioned above, as well as several other local and regional partnerships, work collectively to pursue this vision.

NABCI is guided by a set of principles that establish an operational framework within which the Initiative and its partners may conduct integrated bird conservation in the U.S. These will articulate a common understanding of the relationship between NABCI, the individual bird conservation initiatives, and all partner entities to ensure recognition of existing federal legislative and international treaty obligations, state authorities, and respect for the identity and autonomy of each initiative. The fundamental components of the conservation approach to be used by NABCI are expressed within its goal:

To deliver the full spectrum of bird conservation through regionally-based, biologically-driven, landscape-oriented partnerships.

The Southeastern Bird Conservation Initiative: National Park Service: In 1999, the Southeast Region of the National Park Service (NPS) recognized the importance of coordinating existing bird conservation goals into planning and operations of national park units in the southeast, that is, integration of NABCI. In support of this recognition, the Southeast Regional Office NPS approved and allocated eighty-eight thousand dollars, cost sharing 1:1 with the US Fish and Wildlife Service (FWS) Region 4 (Southeast) to hire a biologist to conduct this two-year project (Interagency Agreement FS028 01 0368). This project is unique in the NPS, and perhaps the nation, and represents a potential model for better coordinating regional bird conservation programs and activities within and outside the NPS. It further represents a progressive action toward institutionalizing bird conservation as a programmatic priority in the Southeast Region of NPS, and potentially the nation.

As envisioned, the integration of NABCI into the Southeastern NPS involves:

- 1) Development and delivery of Avian Conservation Implementation Plans (ACIP),
- 2) Coordination with NPS Inventory and Monitoring Program,
- 3) Development of a web based project site,
- 4) Establishment or enhancement of bird conservation partnerships,
- 5) Identification and exploration of potential funding opportunities, and
- 6) Technical guidance and assistance as needed or requested.

This ACIP fulfills one aspect of the plan outlined above, and serves as a basis for future bird conservation actions in SARI and with adjacent partners or landowners.

Concurrently, the development of a Memorandum of Understanding (MOU) between the FWS and the NPS to implement Presidential Executive Order (EO) 13186, **Responsibilities of Federal Agencies To Protect Migratory Birds**, calls for integration of programs and recommendations of existing bird conservation efforts into park planning and operations. Complementing each other, the MOU and the Southeastern Bird Conservation Initiative will advance bird conservation in the Southeast Region of the NPS beyond current regional NPS efforts.

Role of NPS in Avian Conservation

The interagency agreement that facilitates this partnership supports both FWS and NPS management policies. Specifically for the NPS, the agreement supports and advances the **Strategy for Collaboration** (March 2000), a visionary document developed and signed by the Southeast Natural Resource Leaders Advisory Group (SENRLAG), a consortium of 13 land and resource management agencies in the Southeastern United States whose vision is to encourage and support cooperation in planning and managing the region's natural resources. Furthermore, the agreement is aligned with and implements a variety of NPS Management Policies (2001) including but not limited to External Threats and Opportunities, Environmental Leadership, Cooperative Planning, Land Protection, and especially Natural Resource Management that details policy and

management guidelines which apply to bird conservation. Important policies in the Natural Resource Management chapter include:

- Planning for Natural Resource Management
- Partnerships
- Restoration of Natural Systems
- Studies and Collection
- General Principles for Managing Biological Resources
- Plant and Animal Population Management Principles
- Management of Native Plants and Animals
- Management of Endangered Plants and Animals
- Management of Natural Landscapes
- Management of Exotic Species
- Pest Management
- Fire Management and
- Water Resource Management

The NPS is the fourth largest landowner in the United States, consisting of over 380 national park units covering 83 million acres of land and water with associated biotic resources (www.nps.gov). The 64 units in the Southeast Region of the NPS represent 16% of the total number of park units in the national park system and cover approximately 5% of the total land base in the entire system. Park units in the Southeast Region include national seashores (Canaveral National Seashore, Cape Hatteras National Seashore), national parks (Great Smoky Mountains National Park, Everglades National Park), national recreation areas (Big South Fork National River and Recreation Area), national preserves (Big Cypress National Preserve, Salt River Bay National Historic Park and Ecological Preserve), national battlefields (Cowpens National Battlefield, Fort Donelson National Battlefield), national monuments (Fort Matanzas National Monument, Ocmulgee National Monument), and others such as the Blue Ridge Parkway, Obed Wild and Scenic River, and Timicuan Ecological and Historic Preserve.

Southeast NPS units provide habitat for over 400 species of migrating, breeding, and wintering birds and include a wide range of Federal and State listed threatened and endangered species. Likewise, these units also provide nest, migration, and winter habitat for most of the eastern species identified in the national bird conservation plans in need of conservation attention.

Additionally, the NPS attracts over 280 million visitors to the parks each year, 120 million of these in the Southeast Region, affording excellent recreational bird watching and opportunities to strengthen bird conservation interpretation, outreach, and education programs. These opportunities, the NPS mission, policies, and organization all lead to the conclusion that the NPS is an extremely valuable partner and contributor to bird conservation in the region.

Nationally, the status of birds in national parks is largely unknown, although many parks have adequate knowledge regarding bird occurrence in the parks (<http://www.npwrc.usgs.gov/resource/othrdata/chekbird/chekbird.htm>). Parks often play a role in ongoing regional bird conservation efforts. Indeed many of these parks are often important to regional, national, or international bird conservation, and many have been designated as Important Bird Areas (IBA's) by the National Audubon Society. To date, there are approximately 64 NPS units that are designated IBA's, 35 of which are considered of global importance (<http://abcbirds.org/iba/aboutiba.htm>). In the Southeast Region, the NPS has 13 IBA's.

The **NPS Inventory and Monitoring (I&M) Program** has been developed to provide management driven scientific information to national park managers so that resources can be adequately protected within national parks. One of the first phases of this program is to inventory vertebrates, including birds, within the 260 national park units in the program. Once completed, data from the inventories will provide an account of the occurrence and abundance of birds in all the national parks in the program. These records will be stored in the NPS I&M NPSpecies database (<http://www.nature.nps.gov/im/apps/npspp/>). Coordination with I&M network staff is important to developing long-term bird monitoring programs that fulfill both park and NABCI objectives.

Park Flight is a NPS international partnership initiative that directs funding toward a variety of NPS programs that involve conservation of Neotropical migratory birds whose life history range covers a US national park and a Latin American protected area. A relatively new program, Park Flight offers parks the opportunity to partner with a Latin American national park or protected area to cooperate on developing bird conservation and education projects (NPS 2002).

Recent increases in NPS base funded programs such as inventory and monitoring, exotic species management, habitat restoration, and fire management all indicate that national park managers recognize that park lands are increasingly subject to a variety of threats and conditions that must be improved to provide the quality of national park experience articulated in the NPS Organic Act (1916). Programmatic funding in these areas will increase the ability of national parks to provide quality habitat and conditions for increased wildlife conservation, including birds. Furthermore, private interests and non-profit conservation organizations have initiated programs, including grant programs, to provide much needed funding to national parks to meet backlogs of identified yet unfunded needs.

Park Description

SARI is the only known site where members of the Columbus expedition set foot on what is now U.S. territory. The park contains the only ceremonial prehistoric ball court ever discovered in the Lesser Antilles, village middens, and burial grounds. The area was a focal point of various European attempts to colonize the area during the post-Columbian period by the Spaniards, French, Dutch, English, and Danish. The site is

marked by Fort Sale, a remaining earthworks fortification from the Dutch period of occupation. Salt River's natural significance and beauty derive from the association of upland terrestrial, estuarine, and marine environments within a small geographic area. It encompasses the single largest mangrove system remaining in the Virgin Islands. The mangroves and the bay's seagrass beds provide important foraging and nesting habitats for many resident and migratory birds in the territory. The submarine canyon at the entrance to Salt River Bay, together with the sheer outer wall (with its diversity of deep water corals, caverns, grottoes, and ledges) descending to almost 2,000 feet, is one of few such features found worldwide (NPS 2001).

SARI is co-owned by the National Park Service and the US Virgin Islands territorial government. The VI Department of Planning and Natural Resources' (VIDPNR) Division of Fish and Wildlife (DFW) has primary responsibility to cooperate with the National Park Service in the management of SARI.

Avian Resources of the U.S. Virgin Islands

The Virgin Islands are part of the West Indies, a chain of islands that extends from Florida to Venezuela and separate the Caribbean Sea from the Atlantic Ocean (see PIF and NPS location maps below). These tropical Islands are located within 17-19° latitude North and 64-68° longitude West about 1,609 kilometers from Florida and 805 kilometers from Venezuela.

The U.S. Virgin Islands are located about 64 kilometers east of the Puerto Rico. These Islands comprise an archipelago that includes St. Thomas, St. John, St. Croix, and numerous uninhabited small islets and cays. The three main Islands were bought by the U.S.A. from Denmark in 1917 and are now U.S. Territory with a total area of 340 km².

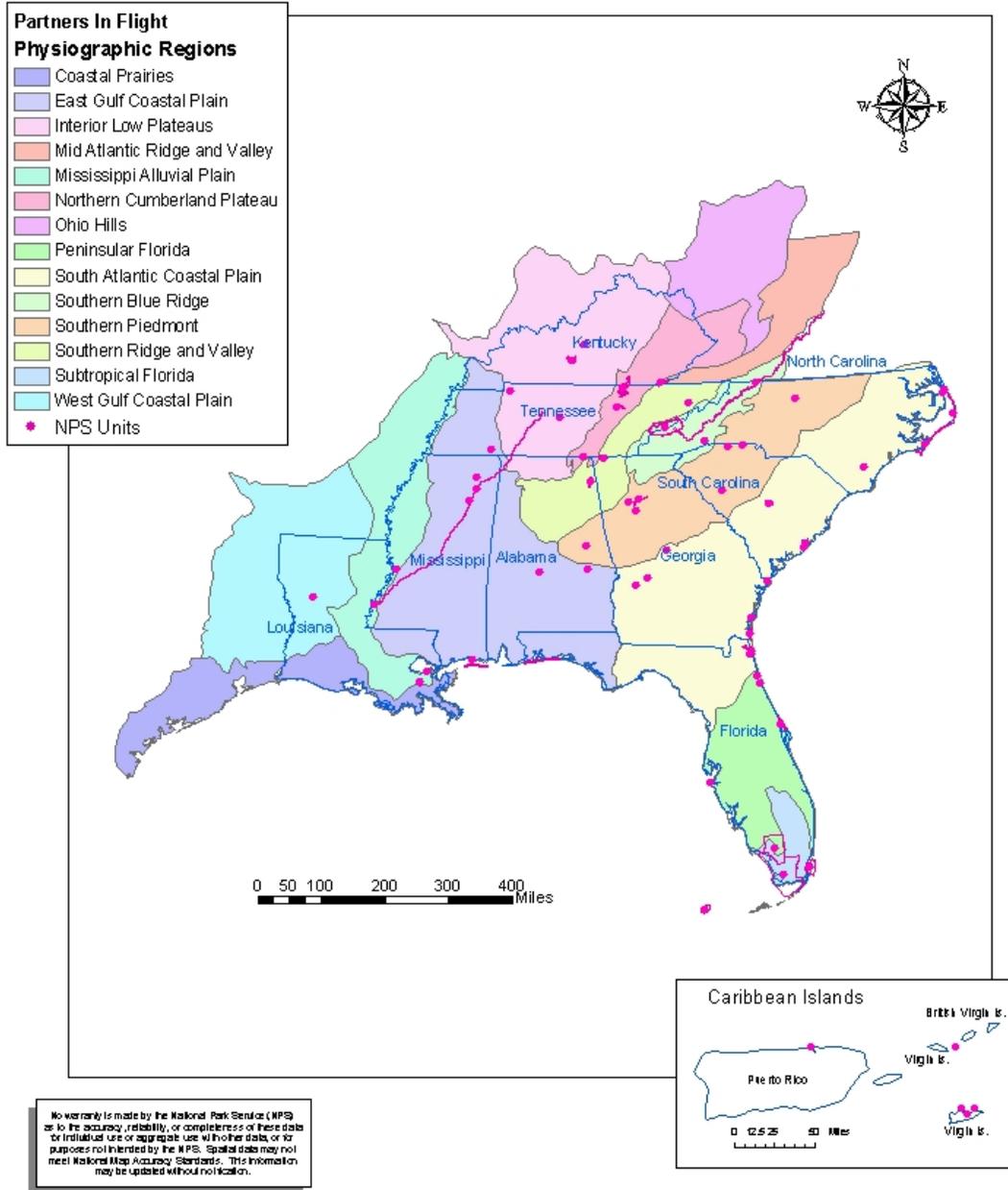
The number, size and shape of the islands comprised within this region combined with climate, topography, geological processes, and human activities have produced a tremendous diversity of habitats. Historically different types of forest covered most of the land area of the Virgin Islands. However, forest conversion caused by agricultural and other land use practices have shaped the present landscape. Forested landscape in the U.S. Virgin Islands is typified by sub-tropical dry forest and littoral shrubs.

Including vagrants, exotics and fossils, the total number of bird species in the region sums to 364. Presently, 210 species are known to occur in the Virgin Islands (Raffaele 1989). Recent studies indicate that these numbers may change as many native forms may be reclassified as species or subspecies on their own. Raffaele (1989) categorized the regional birds species as follows: 97 breeding permanent residents (60 in the Virgin Islands), 11 breed and leave (10 in the Virgin Islands), 134 non-breeding migrants and visitors (129 the Virgin Islands), 31 introduced probable breeders (6 in the Virgin Islands), and five introduced possible breeders. As the numbers indicate,

Partners in Flight (PIF) Regions

Southeast Region (SER)

National Park Service
U.S. Department of the Interior



migrant species comprise almost half of the species playing a major role in the ecology of the region.

The oceanic nature of the islands in the region has resulted in increased endemism, with the family *Todidae* occurring in the West Indian islands but found nowhere else. Raffaele (1989) considered 51 species to be threatened in the region, mostly because of the detrimental effects of habitat alteration.

Avian Conservation in SARI

Avian Biodiversity: SARI has an avian inventory and a checklist based on Christmas Bird Count data. Other checklists may include inaccuracies (McNair personal communication). SARI staff has identified the need to update existing checklists and to make these available to the public. Recently, the VIDPNR DFW has conducted an avian inventory but has not produced an updated checklist.

Verified records of birds in SARI have been entered into the NPS I&M program's database, NPSpecies, and may be viewed via the internet at <http://www.nature.nps.gov/im/app/npspp> with a user identification and password combination authorized by the NPS for NPS personnel and NPS cooperators. Again, accuracy in the data is questioned (McNair personal communication).

Threatened and Endangered Species: The Brown Pelican forages on SARI and is the only federally listed species known to regularly occur in SARI. The recently delisted American Peregrine Falcon occurs as a rare winter visitor in the park and vicinity.

A number of USVI Territory **Listed** species occur in SARI including Roseate Tern, White-crowned Pigeon, White-cheeked Pintail, Great Blue Heron, Great Egret, Snowy Egret, Black-crowned Night Heron, and Least Tern. The list of USVI Territory Listed species is currently being updated (McNair, personal communication).

Several high priority PIF species for the Caribbean occur in SARI (see Appendix A). Prominent among these species are White-crowned Pigeon, White-cheeked Pintail, Brown Pelican, Scaly-naped Pigeon, Antillean Crested Hummingbird, Lesser Antillean Bullfinch, and several Neotropical migrants.

Park Priorities: Park staff and consultants have not identified any particular species that is a park management concern or high priority for conservation. Rather, park staff is concerned about conserving all birds and their habitats in SARI. However, several species that occur in SARI are high priority in the Caribbean and conservation efforts in the park could focus on these species or groups of species.

Inventory: Inventory is considered complete for SARI (McNair personal communication). Most current inventory information is presence/absence but breeding bird distribution and abundance throughout the park is desired.

Monitoring: Avian monitoring projects at SARI include:

- Christmas Bird Count (CBC)
- VIDPNR based bird survey
- White-crowned Pigeon monitoring project
- Least Tern monitoring project

Research: Scientific research is permitted within the park. Research projects at SARI include:

- Pre- and Post-Hurricane Hugo comparison of bird populations, with emphasis on resident and migratory landbirds (completed by VIDPNR DFW)

Outreach: The park does not have interpretive and outreach programs related to birds and bird conservation.

Park Identified Needs for Avian Conservation

SARI has identified several projects that would increase the avian knowledge of the park. These are:

Inventory

- Complete a thorough inventory, including distribution and abundance of birds year around. An inventory recently completed by DFW of USVI contributes to this objective.

Monitoring

- Identification of priority species and monitoring needs
- Establish a monitoring program for species that nest and roost in SARI, with a emphasis on priority species
- Establish a monitoring program for federal and territorial listed species

Research

- Compare pre-Hugo mangrove bird data with current mangrove bird demography

Recent research by DFW contributes to this objective.

Coordination with Regional Conservation Initiatives

North American Bird Conservation Initiative

NABCI bird conservation planning units, referred to as Bird Conservation Regions (BCR), are often larger than other planning units associated with other plans, such as Partners In Flight. For example, SARI is within the NABCI BCR 69 that includes all of the Commonwealth of Puerto Rico, the US Virgin Islands and the British Virgin Islands

and includes the physiographic region designated by Partners in Flight as Puerto Rico/Virgin Islands (see BCR map below; compare to PIF map).

Several NABCI BCR's have coordinators whose primary responsibility is to coordinate all bird conservation planning in the BCR, across all agencies and organizations. Currently, the Caribbean BCR does not have a designated coordinator; however, the assistant coordinator for the Atlantic Coast Joint Venture (ACJV) can provide valuable assistance to SARI with implementation of aspects of this ACIP.

North American Waterfowl Management Plan (NAWMP)

The NAWMP (<http://northamerican.fws.gov/NAWMP/nawmphp.htm>) is completed and has been revised several times, incorporating updated goals and strategies based on new information. This plan is one of the most successful bird conservation delivery programs in the United States, being monetarily supported by the North American Wetlands Conservation Act (NAWCA). This plan can be consulted for priority waterfowl conservation needs in the Virgin Islands. The ACJV assistant coordinator has coordination responsibility for the USVI.

Partners In Flight

Goals and strategies for the Caribbean can be found in the draft bird conservation plan, previously submitted to the park (Nunez-Garcia and Hunter 2000). The park will receive updates of the plan as they are completed. The current plan identifies priority bird and habitat conservation goals that must be implemented in order to achieve bird conservation success in this region. Because the Partners In Flight bird conservation plan for this region is better developed than other plans, and includes all species, SARI will utilize this plan more than any other plan to participate in NABCI implementation.

Similar to NABCI BCR's, PIF physiographic areas often do not have designated coordinators. However, state level non-game agencies with investment in PIF will establish key personnel to develop partnerships among cooperators in the physiographic area. The Virgin Islands territorial government, Department of Planning and Natural Resources (VIDPNR) has prime responsibility for implementation of the Puerto Rico/US Virgin Islands Partners in Flight bird conservation plan and can be instrumental in implementing recommendations identified in this ACIP and projects important to bird conservation relative to the Virgin Islands' role in Caribbean bird conservation.

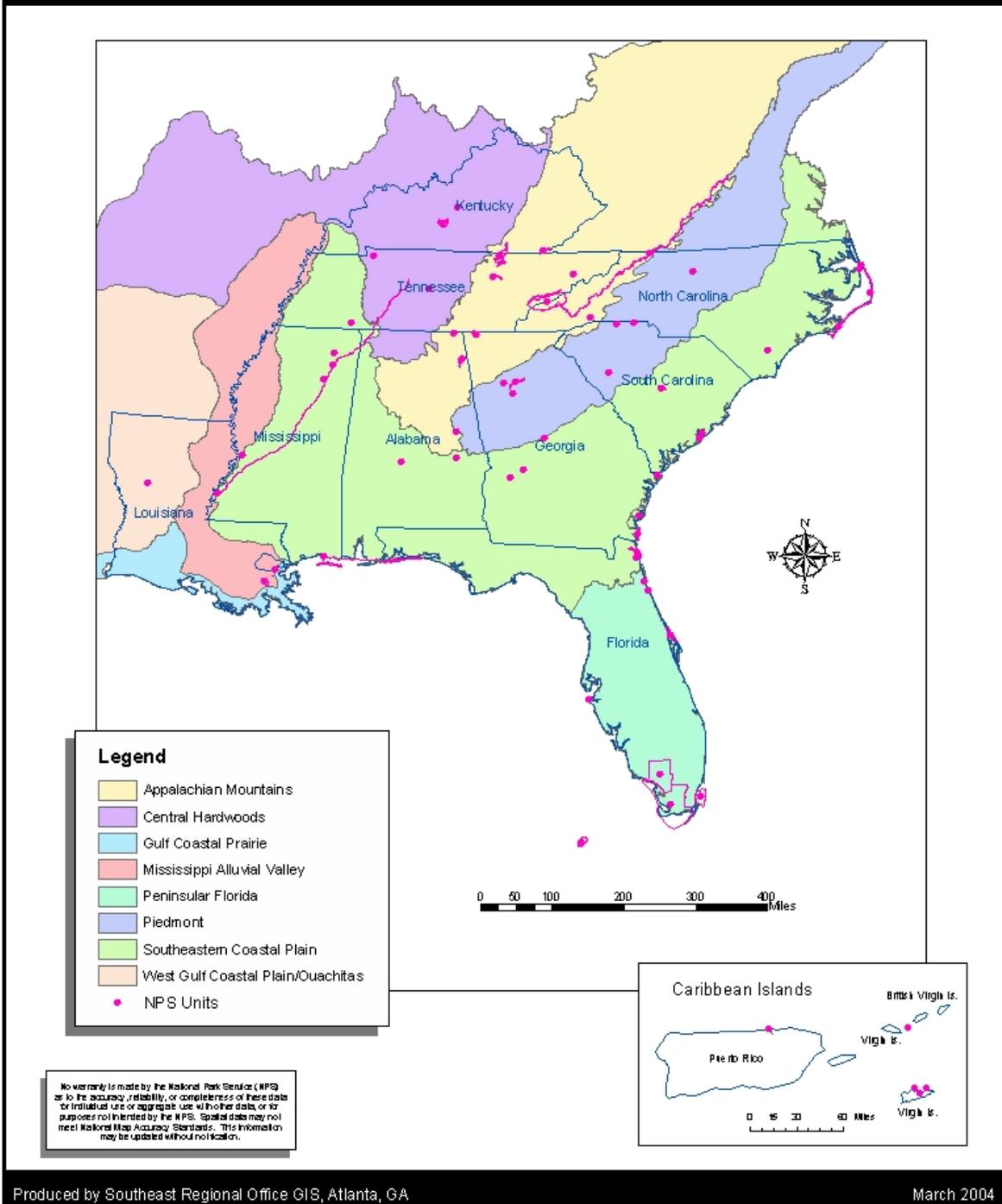
United States Shorebird Conservation Plan (USSCP)

The USSCP has been completed and is available on the world wide web (<http://shorebirdplan.fws.gov/>). A regional step down plan is in preparation by FWS personnel and should be available in 2004.

Bird Conservation Regions

Southeast Region (SER)

National Park Service
U.S. Department of the Interior



Produced by Southeast Regional Office GIS, Atlanta, GA

March 2004

Waterbird Conservation for the Americas (WCA)

The WCA plan has been completed and is available on the World Wide Web or can be ordered from the US Fish and Wildlife Service National Conservation Training Center (<http://www.waterbirdconservation.org/>).

Integration of NABCI Goals and Objectives into Park Planning and Operations

NABCI Implementation Recommendations

To successfully achieve park-established goals and actively participate in NABCI, the park could implement a variety of projects in different NPS programs. Most of these projects would require some level of participation by many existing park programs and could either be achieved through NPS funding, or more likely, through establishing or improving partnerships with agencies and organizations that already have the necessary expertise to provide guidance, funding, and execution of these programs. Programmatic areas where bird conservation actions are likely to be focused are:

- Inventory
- Monitoring
- Habitat Restoration
- Threat Management (includes exotic species, air quality, water quality, etc.)
- Research
- Compliance
- Outreach
- Partnerships

To the extent appropriate, each of these program areas will be discussed separately and within each, specific opportunities identified that, when implemented, will enable to park to meet its mandates (current and expected) as well as integrate NABCI into its planning and operations. With emphasis added, the park is not expected to implement any of these recommendations or be obligated to pursue any opportunity other than those the park is required to do by law or NPS program or policy. In other words, participation in this effort is currently voluntary. However, participation in these efforts at some level could become mandatory with the completion of an MOU with the FWS regarding EO 13186, **Responsibilities of Federal Agencies to Protect Migratory Birds**. The MOU will establish a formal agreement between the FWS and the NPS to promote bird conservation within the agency by incorporating goals and strategies of existing bird conservation initiatives, plans, and goals into park planning and operations. Should the park decide to implement any of these projects, further consultation with bird conservation contacts is encouraged to obtain updated information on the relevance of these opportunities in regional bird conservation.

High priority projects are identified in **bold** print. Priorities that the park is encouraged to seek NPS funding for are marked with an asterisk (*). These projects are those that are critical to the stabilization or improvement of a bird population in the planning region.

Inventory: The park has identified the need to better characterize its bird fauna. Distribution, abundance, and demographic data are desired to fully understand the status of birds in the park so that conservation actions for birds can be implemented, especially for federally and territorially listed species. Status of high priority species as identified in the Puerto Rico/US Virgin Islands bird conservation plan and the USVI territorial watchlist is needed to effectively structure park management for the continued preservation and enhancement of the park's avifauna.

Abundance and distribution data are needed

- **for resident breeding birds in mangroves***
- **for resident breeding birds in the subtropical dry forests**
- **for birds that forage and roost in the park**
- **for wintering birds in the mangroves and subtropical dry forests, particularly migrant warblers**

Additionally, the park is encouraged to:

- **continue to coordinate area inventory efforts with VIPDNR DFW**
- **verify other avian observational data collected in the park and enter into the appropriate database (NPSpecies, eBird Monitoring Program of Cornell's Laboratory of Ornithology, Columbid Database, etc.)**
- **standardize inventory and monitoring methodology to conform to NPS and/or FWS recommended standards (Fancy and Sauer 2000, Hunter 2000).**

Monitoring: Efforts should be made to continue existing monitoring programs while developing other programs based on inventory results, striving to conform to established NPS or FWS surveys and monitoring protocols. Close coordination with VIDPNR bird conservation initiatives are needed to identify and implement high priority projects on park lands and to ensure that park efforts contribute to park or regional bird conservation rather than undertake an action or actions that are not needed or are better conducted in other areas. Specific recommendations are to:

- **continue to conduct existing monitoring programs (CBC, Least Tern, White-crowned Pigeon, colonial ardeids) and enter data into the**

appropriate database (DFW database, NPSpecies, eBird, or National Point Count Database (USGS 2001) (<http://www.mp2-pwrc.usgs.gov/point/>))

- **establish mangrove bird monitoring program throughout the park***
- **compare mangrove bird distribution and abundance to mangrove restoration efforts**
- **monitor resident and migrant birds at established forest point counts along ecologically distinct or vegetative/habitat types ***
- **establish monitoring programs based on results of inventory data for High Priority species and with potential for high conservation role for any of these species**
- **standardize inventory and monitoring methodology to conform to NPS and/or FWS recommended standards (Fancy and Sauer 2000, Hunter 2000)**
- **partner with USFWS staff to coordinate area monitoring efforts**

Habitat Restoration/Management: Recently, habitat restoration efforts have increased on NPS lands; NPS receiving restoration emphasis and guidance in the 2001 Management Policies (NPS 2001). Habitat restoration efforts that parks may undertake are wetland restoration, grassland restoration, woodland restoration, etc. utilizing a wide range of tools to accomplish the restoration. Some of these tools may be but not limited to forest management practices, exotic species management, public use and recreation management, infrastructure development management, and prescribed fire.

Due to the protected nature of SARI lands, and generally those in the national park system, the condition of habitats for bird use may be of higher quality than other natural, developed, agricultural, or forest lands under other management regimes. However, national park lands can be greatly improved for wildlife, and particularly bird use, by restoring processes important for habitat formation, succession, and structural development. Largely, these processes have not been managed historically in the national park system but current policy allows for active management of species, populations, and lands to provide for long-term conservation of park resources. Protection, restoration, and enhancement of habitats in SARI can greatly contribute to established habitat goals identified in the Puerto Rico/US Virgin Islands bird conservation plan.

Specific recommendations are to:

- **continue mangrove restoration in SARI and protect remaining mangroves throughout the park***

- **identify any inholdings of high value and work with landowner to acquire conservation easement or fee title to land***
- **avoid or minimize park developments**
- **restore and/or improve hydrological quality and processes where needed, especially where non-point source pollution may affect water quality and in marina where boat discharge may affect water quality**

Threat Management: Although largely unquantified, several threats exist in SARI that may affect bird conservation. Feral and wild animals such as cats, dogs, and mongoose may damage birds directly through predation or disturbance to nesting, foraging, and roosting opportunities. Additionally, human disturbances associated with vehicles, jet-skis, boats, and helicopters may disturb nesting, foraging, and roosting birds. The park is encouraged to:

- **protect water quality in SARI and marina waters through protection of upland habitats in watershed**
- **protect water quality in SARI and marina waters through implementation of best marina practices, such as elimination of boat sewage disposal, elimination of fuel spills, and elimination of other boat or business discharge into water**
- **protect Least Tern colony by reducing non-native predators and eliminating disturbance from vehicles**
- **develop aggressive reduction program for rats, cats, and mongoose**
- **assess disturbance from kayak touring and work with kayak tour operators to eliminate potential disturbances to birds**
- **work with adjacent landowners and neighbors, the local community, and public officials to curb unregulated and free roaming feral and domestic dogs and cats in the park***
- **assess potential impact from helicopter overflights**
- **assess potential impacts from human uses such as camping, harvesting of mangrove for firewood use, and crabbing**
- **remove derelict boats that may be discharging pollutants**
- **provide monofilament dispenser at marina**

- identify potential bird injury or mortality associated with fishing gear and fishing practices in the park and nearby waters, especially for Brown Pelican

If necessary, consult with regional Exotic Plant Management Team (EPMT) to identify and remove exotic plant species that may negatively affect habitats. Currently, no EPMT provides service the SARI area. Until an EPMT is established that can provide assistance to SARI, staff is directed to consult with the regional pest management specialist (see contacts).

Additionally, the park is encouraged to:

- **hire additional protection staff to better manage threats and implement projects identified in this plan***
- **develop close working relationship with VIDPNR Coastal Zone Management to promote protection of islands natural resources and the Salt River watershed**

Research:

- **list park needs and projects on Research Permit and Reporting System web site (RPRS)**
- **encourage and facilitate graduate research in the park**
- develop contact with South Florida/Caribbean Cooperative Ecosystem Studies Unit (CESU) at the University of Miami, Miami, FL

Compliance: Park compliance with the Migratory Bird Treaty Act and the Executive Order 13186, **Responsibilities of Federal Agencies to Protect Migratory Birds**, is necessary to assure that park activities incorporate bird conservation into park planning and operations. Further, to ensure that migratory birds are considered in all phases of park planning processes, especially during the National Environmental Policy Act (NEPA) and the Director's Order #12 Compliance processes, the park should consider adding specific language in project evaluations that requires consideration and implications of park projects on migratory birds. The MOU being developed between the NPS and the FWS will likely contain specific language requiring a park to consider implications of park projects on migratory birds. Additional considerations include:

- **continue specific consideration of migratory birds during park planning processes***
- encourage park staff to attend USFWS training on implementation of EO 13186 at the National Conservation Training Center (NCTC) (when available) or other training on migratory bird conservation in North America. NCTC has several

courses and training related to conservation of migratory birds (<http://training.fws.gov/courses.html>).

The USFWS NCTC offers and reserves two tuition free slots for National Park Service employees wishing to attend NCTC courses on a first come, first served basis. Additionally, discount lodging is also available while attending a NCTC course.

Outreach:

- **participate in International Migratory Bird Day (IMBD) events with a local partner (<http://birds.fws.gov/imbd.html>)***
- **update the bird checklist for public availability***
- **develop public outreach regarding efforts of the Salt River Marine Reserve and Wildlife Sanctuary**
- **continue to develop and implement outreach and educational programs to enhance visibility of bird conservation issues**
- **encourage volunteers (e.g. Virgin Islands Audubon Society) to participate in ongoing and new inventory and monitoring programs**
- **encourage accurate documentation and reporting of bird observations by visitors (see Cornell University's eBird monitoring program (Cornell Lab. Ornith. 2002 (<http://www.ebird.org/about/index.jsp>))**
- **work with adjacent landowners and neighbors, the local community, and public officials to reduce the number of free roaming feral and domestic dogs and cats in the park**
- park interpretation/education staff are encouraged to attend USFWS training on Migratory Bird Education at NCTC
- consider adding links to bird conservation information, data, etc. to the park's web site home page
- support bird conservation by serving shade-grown coffees at meetings, events, and the office buildings in the park (<http://www.americanbirding.org/programs/consbcof3.htm>)
- participate in bird conservation efforts of the Society for the Conservation and Study of Caribbean Birds (SCSCB), including subscribing to this organization's electronic information forum

- explore cultural affiliation of landscape to inhabitants, both historical and contemporary. Cultures are strongly tied to the landscape they inhabit and birds often play a role in a cultural tie to the landscape. When these connections are discovered and preserved, a greater appreciation for the landscape and its value to the culture can be achieved

Partners and Partnerships: Partnerships for land conservation and protection will perhaps have the greatest positive influence on bird conservation above all other landscape scale planning. Specific recommendations are to:

- **keep abreast of USVI territorial initiatives that could impact park resources, particularly with Coastal Zone Management**
- **continue to identify priority acquisition areas in cooperation with Salt River Commission to protect SARI from adjacent developments**
- **assist with implementation of the USVI Comprehensive Wildlife Conservation Plan**
- **continue to cooperate and develop protection measures with the Salt River Marine Reserve and Wildlife Sanctuary program**
- **become a contributing member of the Caribbean Columbidae Population Data Center, a cooperative effort of the Puerto Rico Department of Natural Resources, USFWS, and other Caribbean interests to assess populations status and implement conservation actions necessary for these species**
- **contact the nearest Joint Venture office (see Funding section for explanation of Joint Ventures) or BCR coordinator to develop partnerships and funding proposals tiered to priorities established by the park, this ACIP, and the Puerto Rico and US Virgin Islands Bird conservation plan**
- **encourage the USVI territorial government to become a member of the Atlantic Coast Joint Venture, increasing USVI partners chances to utilize NAWCA funds for bird and habitat conservation projects**

Funding Opportunities: Internal NPS funding is often an effective source to obtain funding; however, the project will have to be a fairly high priority among the park's natural resource program to successfully compete for the limited funding available in the NPS. Therefore, partnerships and outside funding programs are often more productive for securing bird conservation funding. Within this ACIP, identified priority projects that are considered to be high park priorities as well as NABCI priorities are marked with an asterisk (*). SARI is encouraged to enter all high priority projects into the NPS Performance Management Information System (PMIS) database.

Funding for conservation projects for Neotropical migrants is also available through the Park Flight program. Needed at SARI is:

- **increased base funding to implement basic protection and management needs for birds and their habitats (habitat based management not only benefits the birds but other wildlife as well)**

With the exception of the North American Waterfowl Management Plan (NAWMP and its associated funding legislation, the North American Wetland Conservation Act), funding opportunities for bird conservation programs, plans, and initiatives have been lacking. Only within the last decade have other appropriate and specific sources for bird conservation funding been created and used. The NAWMP has been supported for approximately 14 years by the North American Wetlands Conservation Act (NAWCA 1989). This program has provided \$487 million in appropriated funds matched with \$1.7 billion for wetland and bird conservation projects since its inception. In 2002 alone, over \$70 million US dollars were awarded to US and Canadian agencies and organizations to enhance waterfowl populations by improving, restoring, or protecting wetland habitats. To adequately evaluate projects and distribute these funds, partnerships called Joint Ventures were established. Nationally, 14 (11 US, 3 Canada) Joint Ventures have been established, several which are funded and staffed. Internet links to Joint Ventures are:

(<http://southwest.fws.gov/gulfcoastjv/ojvcontact.html>) and
(<http://northamerican.fws.gov/NAWMP/jv.htm>).

Funding through NAWCA is highly underutilized by the NPS and any park unit that has wetland, water, or bird conservation needs associated with wetland are encouraged to investigate using this funding source. Naturally, there are certain requirements to be eligible for all grants and park managers are encouraged to consult with the nearest Joint Venture, BCR, PIF Coordinator, to learn how this program might be applicable to implementation of this plan, and other park wetland issues. SARI is not within a region which has an operational Joint Venture, but contact with the Atlantic Coast Joint Venture will provide opportunity to investigate use of this funding source and developing proposals.

Internal FWS funding programs may be used to support projects, but no effective method of project proposal delivery to these sources is currently in place for the NPS. Current funding in these programs may result from FWS familiarity with NPS needs, or

NPS participation in one of the area FWS Ecosystem Teams, where a project has been identified and proposed to be funded through the Ecosystem Team.

One unexplored yet potentially fruitful funding source for national parks is the myriad of grants through the FWS State Programs, where grants are awarded to private individuals engaged in habitat conservation projects. No funding is directly available to national parks, but identified projects with important or critical adjacent landowners can

sometimes be funded through these sources. Similar programs are available if the adjacent landowner is a federally recognized American Indian tribe.

Specific congressional appropriations to protect migratory birds has recently been authorized under the Neotropical Migratory Bird Conservation Act (2000) (<http://www.nfwf.org/programs/nmbcapp.htm>). Appropriations through this Act are authorized up to \$5 million per year. However, in 2000, appropriation was approximately \$3.75 million and a majority of this funding was directed toward projects in Central and South America.

Many of the identified projects are eligible for funding under various grant programs of the National Fish and Wildlife Foundation (<http://www.nfwf.org/programs/programs.htm>).

Other prominent funding sources available to NPS managers for bird conservation are listed on this projects web site at:

<http://southeast.fws.gov/birds/NPSHighlits.htm>.

Funding opportunities for migratory bird conservation are available yet most natural resource agencies are not fully aware of and/or understanding of how to use these sources. Perhaps a consolidated migratory bird funding source catalog will become available to managers in the future; this is needed.

Contacts

Primary contacts within the region can be obtained by viewing the web site for the Southeastern Bird Conservation Initiative, National Park Service at <http://southeast.fws.gov/birds/npsbirds.htm>. This web site will provide contact information of the appropriate bird conservation coordinator in the region for park personnel. Park staff are encouraged to view the web site and obtain contact information. Contacts for SARI are:

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APPENDIX A

PUERTO RICO AND VIRGIN ISLANDS (BCR 69) BASED ON CONTINENTAL AND REGIONAL WATCH LIST AMONG ALL BIRDS WITHIN SOUTHEAST U.S., AND THE WEST INDIES*

(Action Levels: IM=Immediate Management; MA=Management Attention; PR=Long-Term Planning and Responsibility) (subspecies/populations of interest noted; all species breed or are resident unless otherwise indicated; ba=number of breeding adults)

Tier I. Continental Conservation Interest

a. Multiple Causes for concern across entire range

White-tailed Tropicbird	(500-600 pairs, 14-19% in West Indies)	IM
Red-billed Tropicbird	(375-450 pairs, 14-22% in West Indies)	IM
West Indian Whistling-Duck	(<100 ba, 1-5% globally)	IM
Black Rail	(Extirpated?)	IM
Snowy Plover	(Threatened Pacific Coast; West Indies subspecies)	IM
Piping Plover	(Endangered, winter)	IM
Plain Pigeon	(Endangered; <5,000 ba, <10% globally)	IM
Puerto Rican Parrot	(Endangered; <100 ba in the wild, 100% globally)	IM
Puerto Rican Nightjar	(Endangered; <2,000 ba, 100% globally)	IM
White-necked Crow	(Endangered/Extirpated from Puerto Rico)	IM
Bicknell's Thrush	(Possible rare winter in Puerto Rico)	PR
Golden-winged Warbler	(Rare winter)	PR
Elfin-Woods Warbler	(Candidate for Listing; <1,000 ba, 100% globally)	IM
Yellow-shouldered Blackbird	(Endangered; <500 ba, 100% globally)	IM

b. Moderately abundant or widespread with declines and/or high threats

Audubon's Shearwater	(~150 pairs, 2-4% in West Indies)	IM
Masked Booby	(300 pairs, 50% in West Indies)	IM
Red-footed Booby	(1,450-2,650 pairs, 15-33% in West Indies)	IM
Brown Booby	(2,075-2,300 pairs, 22-36% in West Indies)	MA
Little Blue Heron		MA
American Golden-Plover	(Rare southbound transient)	PR
Lesser Yellowlegs	(non-breeding)	MA
Solitary Sandpiper	(transient)	MA
Upland Sandpiper	(Rare transient)	PR
Whimbrel	(non-breeding)	MA
Sanderling	(non-breeding)	MA
Semipalmated Sandpiper	(non-breeding)	MA
Western Sandpiper	(non-breeding)	MA
Stilt Sandpiper	(non-breeding)	MA
Wilson's Snipe	(winter)	MA
Gull-billed Tern	(non-breeding?)	PR
Roseate Tern	(North Atl. Endangered, West Indies Threatened; 1,200-3,600 pairs, >25% in West Indies)	IM
Least Tern	(Calif. & interior subspecies Endangered; 300-450 pairs, 8-25% in West Indies)	IM
White-crowned Pigeon		MA
Mangrove Cuckoo		MA
Short-eared Owl	(Greater Antillean subspecies)	MA
Puerto Rican Vireo	(100 % globally)	MA
Prairie Warbler	(winter)	MA

Prothonotary Warbler	(winter)	MA
Worm-eating Warbler	(winter)	MA
Kentucky Warbler	(Rare winter)	PR
Greater Antillean Oriole	(10-20% globally)	MA

c. Restricted distributions and/or low population size

Magnificent Frigatebird	(700-900 pairs, 13-21% in West Indies)	IM
Reddish Egret	(Rare, non-breeding)	PR
Caribbean Coot	(1,000 ba, <50,000 West Indies)	IM
Wilson's Plover		MA
American Oystercatcher	(Eastern North American subspecies)	IM
Red Knot	(non-breeding; presumably Alaskan subspecies)	PR
Bridled Tern	(900-1,700 pairs, 15-40% in West Indies)	MA
Antillean Nighthawk		PR
Black Swift	(West Indian subspecies)	MA
Lesser Antillean Pewee	(Puerto Rican subspecies)	PR
Blue-winged Warbler	(Rare, winter)	PR
Adelaide's Warbler	(100% globally)	PR
Swainson's Warbler	(Rare, winter)	PR

Tier II. Regional Conservation Interest

a. High Concern

Brown Pelican	(West Indies, Endangered; 520-850 pairs, 25-40% in West Indies)	IM
Green Heron		MA
Yellow-crowned Night-Heron		PR
Black-bellied Plover	(non-breeding)	MA
Ruddy Turnstone	(non-breeding)	MA
Least Sandpiper	(non-breeding)	MA
Antillean Mango	(nearly extirpated on Virgin Islands)	MA
Black-whiskered Vireo		PR

b. High Threats

Pied-billed Grebe	(breeding populations only)	MA
Least Bittern		MA
Black-crowned Night-Heron		MA
Greater Flamingo	(Extirpated as a resident, may be recolonizing)	MA
White-cheeked Pintail	(Lesser subspecies; <5,000 ba Puerto Rico-Virgin Islands; ~60,000 ba in West Indies)	MA
Ruddy Duck	(West Indian subspecies; ~1,500 ba Puerto Rico; <<50,000 ba West Indies)	MA
Masked Duck	(West Indian populations; <100 ba Puerto Rico; <<50,000 ba West Indies)	MA
Sharp-shinned Hawk	(Puerto Rican subspecies, Endangered; <100 ba)	IM
Broad-winged Hawk	(Puerto Rican subspecies, Endangered; <100 ba)	IM
American Kestrel	(Eastern Caribbean subspecies)	MA
Clapper Rail		MA
Yellow-breasted Crake	(Hispaniolan-Puerto Rican subspecies)	MA
Purple Gallinule		MA
Limpkin	(Hispaniolan-Puerto Rican subspecies)	IM
Willet		MA

Key West Quail-Dove		MA
Bridled Quail-Dove		MA
Puerto Rican Screech-Owl	(Virgin Islands subspecies, extirpated except on Culebra?)	IM
Yellow Warbler	(West Indian "Golden" subspecies)	MA
Louisiana Waterthrush	(winter)	MA

c. High Responsibility

Tricolored Heron		PR
Black-necked Stilt		PR
Pectoral Sandpiper	(transient)	PR
Sooty Tern	(55,000-80,000 pairs, 20-40% in West Indies)	PR
Black Tern	(transient)	PR
Brown Noddy	(1,300-2,100 pairs, 7-18% in West Indies)	PR
Scaly-naped Pigeon		PR
Zenaida Dove		PR
Puerto Rican Lizard-Cuckoo	(100% global)	PR
Puerto Rican Screech-Owl	(Puerto Rican subspecies; 100% globally)	PR
Green Mango	(100% globally)	PR
Antillean Crested Hummingbird		PR
Puerto Rican Emerald	(100% globally)	PR
Puerto Rican Tody	(100% globally)	PR
Puerto Rican Woodpecker	(100% globally)	PR
Caribbean Elaenia		PR
Puerto Rican Flycatcher	(100% global, nearly extirpated Virgin Islands)	PR
Gray Kingbird		PR
Loggerhead Kingbird	(Puerto Rican-Vieques subspecies)	PR
Caribbean Martin		PR
Cave Swallow		PR
Red-legged Thrush	(Hispaniolan-Puerto Rican subspecies)	PR
Northern Parula	(winter)	PR
Cape May Warbler	(winter)	PR
Black-throated Blue Warbler	(winter)	PR
Puerto Rican Tanager		PR
Puerto Rican Spindalis		PR
Antillean Euphonia		PR
Puerto Rican Bullfinch	(Puerto Rican subspecies; 100% globally)	PR
Grasshopper Sparrow	(Puerto Rican subspecies)	PR

Tier III. Additional State, Territorial Listed Species (drawn from species in Tier IV)

Least Grebe		PR
Great Blue Heron		PR
Great Egret		PR
Snowy Egret		PR

Tier IV. Additional Local or Regional Interest Species (also Stewardship Species identified by Avifaunal Biome supporting vast majority of breeding population)

Glossy Ibis		PR
Northern Pintail	(winter)	MA
Blue-winged Teal	(winter)	MA
Lesser Scaup	(winter)	MA

Northern Harrier	(winter)	PR	
Osprey			PR
Merlin	(mostly transient)		PR
Peregrine Falcon	(mostly transient)		PR
Sora	(winter)		PR
Common Moorhen			PR
Semipalmated Plover	(non-breeding)		PR
Killdeer			PR
Greater Yellowlegs	(non-breeding)		PR
Spotted Sandpiper	(non-breeding)		PR
White-rumped Sandpiper	(transient)		PR
Royal Tern	(115-315 pairs, >25% in West Indies)		PR
Sandwich Tern	(800-3,600 pairs, 28-71% in West Indies)		PR
White-winged Dove			PR
Mourning Dove			PR
Yellow-billed Cuckoo			PR
Common Nighthawk			PR
Chuck-will's-widow	(Rare, winter)		PR
White-eyed Vireo	(Rare, winter)		PR
Yellow-throated Vireo	(Rare, winter)		PR
Magnolia Warbler	(Northern Forest Biome, winter)		PR
Yellow-throated Warbler	(winter)		PR
Palm Warbler	(Northern Forest Biome, winter)		PR
Blackpoll Warbler	(transient)		PR
Black-and-white Warbler	(winter)		PR
American Redstart	(winter)		PR
Ovenbird	(winter)		PR
Northern Waterthrush	(winter)		PR
Hooded Warbler	(Rare, winter)		PR
Indigo Bunting	(non-breeding)		PR
Bobolink	(transient)		PR
Baltimore Oriole	(transient)		PR

*

WL=WatchList score used for Continental Scoring (PIF Approach); species with WL SUBTOT combined scores of (1) 15 or more, (2) 14 with Tmax+PT \geq 5, or (3) with 13 with PT=5 are identified. using formula:

Combined Score = PT + PS + maximum of (BD or ND) + maximum of (TB or TN)

Tier=

- I. Continental Conservation Interest (Continental WatchList): (a) Species with multiple causes for concern across their entire range; (b) Moderately abundant or widespread species with declines or high threats, and (c) Species with restricted distributions or low population size.

Species with multiple causes for concern across their entire range: These species are considered by many to be of highest continental concern and of highest priority for conservation actions at national and international scales. A majority of these are legally listed as Endangered or Threatened in either the U.S. or Canada, and as such have recovery plans in place. Notable in this group, however, are several species without legal status, including Bicknell's Thrush and Saltmarsh Sharp-tailed Sparrow.

Moderately abundant or widespread species with declines or high threats: These species are on the Watch List primarily because they are declining and/or threatened throughout their range, though still fairly

widespread or with moderately large populations. Many of these species still number in the millions (e.g. Dickcissel, Wood Thrush), but are threatened with serious reductions in population or geographic range in the future. Several other species (e.g. Swallow-tailed Kite, Mangrove Cuckoo, Elegant Trogon) are fairly widespread outside the U.S. and Canada, but are threatened in the U.S. portion of their range. Five species are afforded U.S. federal legal status in part of their range or for a particular recognized subspecies. This group also includes four resident game bird species with seriously declining populations.

Species with restricted distributions or low population size: These species are on the Watch List because they are restricted to a small range or have small global populations (often both). Many of these species are not known to be declining or seriously threatened at present, but many others are, (e.g. Spotted Owl, Montezuma Quail, Bendire's Thrasher, Rufous-winged Sparrow, Audubon's Oriole). We recognize that these species with small populations and restricted range are particularly vulnerable to relatively minor changes from current conditions, whether or not their populations are currently in decline.

- II. Regional Conservation Interest (non-WatchList; $TOT \geq 19$): (a) high regional concern ($AI+PT \geq 8$); (b) high regional threats ($TB+TN \geq 7$, or TB or $TN=5$) and includes taxa (subspecies and populations) of regional conservation interest not otherwise included in categories above; (c) high regional responsibility (as measured by percent of global, continental, or regional populations).
- III Additional Federally and/or State listed.
- IV Local or regional concern or interest, including Stewardship Species as defined in the Continental PIF Plan for North America:

Stewardship Species: Stewardship Species, whether on the Watch List or not, are of continental importance because they represent all the large biogeographic regions in North America. They are broadly distributed across Canada and the U.S. during the breeding seasons, in a pattern that mirrors the richness of all landbird species. Winter Stewardship Species are much more heavily concentrated in the southern U.S., particularly the southwest and into Mexico, and along the U.S. west coast. Stewardship actions that preserve healthy populations of these species will address the PIF goal of 'keeping common birds common.' These species, which are both of high overall concern and also largely dependent on a single biogeographic region, merit special attention for conservation action within their core range.

Component Scores to determine Continental WatchList (minus AI) and Regional Scores (and all smaller geographical units, Bird Conservation Regions, Physiographic Areas, States, Provinces, Territories, etc.) are defined as follows:

PT=Population Trend based on a combination of data sources, principally BBS tempered by local and state datasets for breeding species. For non-breeding species usually best professional judgment often based in part on continental trends shown in BBS and/or CBC.

- 5=Definite decrease
- 4=Possible decrease
- 3=Trend uncertain, No data
- 2=Possible increase, stable
- 1=Definite increase

Some guidelines based on BBS data, but for waterbirds trends are often dramatic and not linear so an inspection of trend graphs often is required to make a judgment as to trend score, again tempered by local and state data sets if they exist.

Significant increase (BBS trend $\geq 1.36\%/yr$, $P \leq 0.10$, $df > 13$)	1
Possible increase (≥ 0.47 to $1.36\%/yr$, $P \leq 0.35$, w/any df)	2a
Possible increase ($\geq 1.36\%/yr$, $0.1 < P \leq 0.35$, $df > 13$)	2a
Possible increase ($\geq 1.36\%/yr$, $P \leq 0.10$, $df < 13$)	2a

Stable (> -0.54 to $< +0.47\%/yr$, and $UCI < 0.47$ OR $LCI > -0.54$)	2b
- except when trend is negative and $P \leq 0.10$ and $LCI < -0.54$, then Possible decrease	4
Trend uncertain ($\leq -0.54\%/yr$ or $\geq 0.47\%/yr$ and $P > 0.35$)	3
Trend uncertain ($> -0.54\%/yr$ and $< 0.47\%/yr$ and $UCI > 0.47$ AND $LCI < -0.54$)	3
No data	3
Possible decrease (either of next 3 options, but based on 6-13 degrees of freedom)	4
Possible decrease (≤ -0.54 to $-2.27\%/yr$, $P = 0.0-0.35$)	4
Possible decrease ($\leq -2.27\%/yr$, $0.1 < P \leq 0.35$)	4
Significant decrease ($\leq -2.27\%/yr$ and $P \leq 0.10$)	5

PS=Population Size based on best population estimates globally

- 5=Rare (<50 thousand breeding individuals globally)
- 4=Uncommon (50-500 thousand breeding individuals globally)
- 3=Fairly Common (500 thousand-5 million breeding individuals globally)
- 2=Common (5 million to 50 million breeding individuals globally)
- 1=Abundant (50 million + breeding individuals globally)

TB and TN=Threats Breeding and Threats Non-breeding

- 5=Extreme deterioration in the future suitability of breeding/non-breeding conditions is expected; species is in danger of regional extirpation or major range contraction, or has already been extirpated
- 4=Severe deterioration in the future suitability of breeding/non-breeding conditions is expected
- 3=Slight to moderate decline in the future suitability of breeding/non-breeding conditions is expected
- 2=Expected future conditions for breeding/non-breeding populations are expected to remain stable; no known threats
- 1=Expected future conditions for breeding/non-breeding populations are enhanced by human activities or land-uses; potentially a 'problem' species

BD and ND=Breeding Distribution and Non-breeding Distribution

- 5=Very Local Distribution (<500,000 km², or very restricted coastal areas or interior uplands)
- 4=Local Distribution (>500,000 and <1,000,000 km², or <1,600 km of coast)
- 3=Moderate Distribution (>1,000,000 and <2,000,000 km², or >1,600 to <5,000 km of coast)
- 2=Widespread (>2,000,000 and <4,000,000 km², or >5,000 to <8,000 km of coast)
- 1=Very Widespread (>4,000,000 km², or >8,000 km of coast)

SUBTOT=Subtotal of six scores (absent AI) used to calculate Combined Score for Continental WatchList

AI=Area Importance, "relative" relative abundance for the species for each area within range scaled against its maximum relative abundance (i.e., the BCR or physiographic area supporting the highest relative abundance)

- 5=Very High relative abundance (~50+% of maximum relative abundance)
- 4=High relative abundance (~25-49% of maximum relative abundance)
- 3=Moderate relative abundance (~10-24% of maximum relative abundance)
- 2=Low relative abundance (~1-9% of maximum relative abundance)
- 1=Peripheral, scattered occurrences.

TOT=Total Score of all seven factors used for identifying Tiers for which species best fits for conservation planning at Planning Region/Bird Conservation Region/Physiographic Area.

Act. Level=Action Level at present based on expert opinion, but ultimately rules based on scores would be preferable.

IM=Immediate management needed to reverse or stabilize significant, long-term population declines in species with small populations, or to protect species with the smallest populations for which trends are poorly known. Lack of action may lead to extirpations or extinction.

MA=Management or other on-the-ground conservation actions needed to reverse or stabilize significant, long-term population declines in species that are still relatively abundant.

PR=Long-term Planning and Responsibility needed for species to ensure that sustainable populations are maintained for species for which a region has high responsibility for that species.

PC=Population Control/Suppression needed for species that are otherwise secure and increasing that may come into conflict with other species of higher conservation concern or other resources of interest.

APPENDIX B

Bird-Habitat Relationships for Puerto Rico and Virgin Islands, West Indies.

Conservation Tier	Limestone and montane forests	Mangrove and coastal woodlands	Shrub-scrub	Grassland/Open lands	Landbird Transients	Marshes/long-legged waders	Open water	Mudflats	Beach front and salt ponds	Nesting seabirds
I a. Multiple concerns continentally	Plain Pigeon	West Indian Whistling-Duck	Yellow-shouldered Blackbird			West Indian Whistling-Duck	West Indian Whistling-Duck		Snowy Plover	White-tailed Tropicbird
	Puerto Rican Parrot	Yellow-shouldered Blackbird				Black Rail			Piping Plover*	Red-billed Tropicbird
	Puerto Rican Nightjar									
	White-necked Crow									
	Bicknell's Thrush*									
	Golden-winged Warbler*									
	Elfin-woods Warbler									
I b. High continental threats and/or declining	Mangrove Cuckoo**	White-crowned Pigeon**	Prairie Warbler*	American Golden-Plover*		Little Blue Heron*		Lesser Yellowlegs*	Sanderling*	Audubon's Shearwater
	Puerto Rican Vireo	Mangrove Cuckoo**		Upland Sandpiper*		Wilson's Snipe		Solitary Sandpiper*	Gull-billed Tern	Masked Booby
	Worm-eating Warbler*	Prothonotary Warbler*		Short-eared Owl				Whimbrel*		Red-footed Booby

Conservation Tier	Limestone and montane forests	Mangrove and coastal woodlands	Shrub-scrub	Grassland/ Open lands	Landbird Transients	Marshes/long-legged waders	Open water	Mudflats	Beach front and salt ponds	Nesting seabirds
	Kentucky Warbler*							Semipalmated Sandpiper*		Brown Booby
	Greater Antillean Oriole							Western Sandpiper*		Roseate Tern
								Stilt Sandpiper*		Least Tern
								Short-billed Dowitcher*		
I c. Local and/or rare continentally	Black Swift**	Lesser Antillean Pewee	Lesser Antillean Pewee	Antillean Nighthawk**		Caribbean Coot	Caribbean Coot		Reddish Egret	Magnificent Frigatebird
	Lesser Antillean Pewee		Adelaide's Warbler						Wilson's Plover*	Bridled Tern
	Blue-winged Warbler*								American Oystercatcher*	
	Adelaide's Warbler								Red Knot*	
	Swainson's Warbler*									
II a. High concern regionally	Black-whiskered Vireo**	Green Heron*	Antillean Mango			Green Heron*		Black-bellied Plover*	Ruddy Turnstone*	Brown Pelican
		Yellow-crowned Night Heron*				Yellow-crowned Night Heron*		Least Sandpiper*		

Conservation Tier	Limestone and montane forests	Mangrove and coastal woodlands	Shrub-scrub	Grassland/ Open lands	Landbird Transients	Marshes/long-legged waders	Open water	Mudflats	Beach front and salt ponds	Nesting seabirds
II b. High threats regionally	Sharp-shinned Hawk	Clapper Rail	American Kestrel	American Kestrel (w/nest trees)		Pied-billed Grebe	Pied-billed Grebe	Greater Flamingo	Willet*	
	Broad-winged Hawk	Yellow "Golden" Warbler	Key West Quail-Dove			Least Bittern*	White-cheeked Pintail			
	Limpkin					Black-crowned Night-Heron*	Ruddy Duck			
	Bridled Quail-Dove					White-cheeked Pintail	Masked Duck			
	Puerto Rican Screech- Owl (VI)					Ruddy Duck				
	Louisiana Waterthrush*					Masked Duck				
						Yellow-breasted Crake				
						Purple Gallinule*				
II c. High responsibility regionally	Scaly-naped Pigeon	Puerto Rican Flycatcher	Antillean Crested Hummingbird	Zenaida Dove		Tricolored Heron*		Black-necked Stilt*	Black-necked Stilt*	Sooty Tern
	Puerto Rican Lizard-Cuckoo	Northern Parula*	Caribbean Elaenia	Gray Kingbird**				Pectoral Sandpiper*	Black Tern*	Brown Noddy
	Puerto Rican Screech-Owl (PR subsp.)	Cape May Warbler*	Puerto Rican Flycatcher	Caribbean Martin**						
	Green Mango		Gray Kingbird**	Cave Swallow						
	Puerto Rican Emerald		Northern Parula*	Grasshopper Sparrow						

Conservation Tier	Limestone and montane forests	Mangrove and coastal woodlands	Shrub-scrub	Grassland/ Open lands	Landbird Transients	Marshes/long-legged waders	Open water	Mudflats	Beach front and salt ponds	Nesting seabirds
	Puerto Rican Tody		Puerto Rican Bullfinch							
	Puerto Rican Woodpecker									
	Puerto Rican Flycatcher									
	Loggerhead Kingbird									
	Red-legged Thrush									
	Northern Parula*									
	Cape May Warbler*									
	Black-throated Blue Warbler*									
	Puerto Rican Tanager									
	Puerto Rican Spindalis									
	Antillean Euphonia									
	Puerto Rican Bullfinch									

Conservation Tier	Limestone and montane forests	Mangrove and coastal woodlands	Shrub-scrub	Grassland/ Open lands	Landbird Transients	Marshes/long-legged waders	Open water	Mudflats	Beach front and salt ponds	Nesting seabirds
III. Additional State Listed						Least Grebe (USVI)	Least Grebe (USVI)			
						Great Blue Heron (USVI)				
						Great Egret* (USVI)				
						Snowy Egret* (USVI)				
IV. Local or regional interest	Chuck-will's-widow*	White-winged Dove	White-winged Dove	Northern Harrier	Merlin*	Glossy Ibis	Northern Pintail	Semipalmated Plover*		Royal Tern
	Yellow-throated Vireo*	Yellow-billed Cuckoo*	Yellow-billed Cuckoo*	Killdeer	Peregrine Falcon*	Sora	Blue-winged Teal*	Greater Yellowlegs*		Sandwich Tern
	Magnolia Warbler*	Yellow-throated Warbler*	White-eyed Vireo*	Mourning Dove	Common Nighthawk*	Common Moorhen*	Lesser Scaup	Spotted Sandpiper*		
	Blackpoll Warbler*	Palm Warbler*	Indigo Bunting*	Indigo Bunting*	Bobolink*		Osprey*	White-rumped Sandpiper*		
	Black-and-white Warbler*	Blackpoll Warbler*			Baltimore Oriole*					
	American Redstart*	Black-and-white Warbler*								
	Ovenbird*	American Redstart*								
	Hooded Warbler*	Northern Waterthrush*								

Conservation Tier	Limestone and montane forests	Mangrove and coastal woodlands	Shrub-scrub	Grassland/ Open lands	Landbird Transients	Marshes/long-legged waders	Open water	Mudflats	Beach front and salt ponds	Nesting seabirds
		Hooded Warbler*								

*Nearctic-Neotropical Migrant species, those species with populations principally breeding in temperate North American areas that winter principally in tropical North American and/or South America areas.

**Intratropical Migrants species, those species breeding in the northern tropical areas of North America that winter principally further south in tropical North America and/or South America areas.

APPENDIX C

USFWS Species of Conservation Concern (2002) in the Caribbean Islands–Puerto Rico and U.S. Virgin Islands only (BCR 69)

Audubon's Shearwater
White-tailed Tropicbird
Red-billed Tropicbird
Masked Booby
Brown Booby
Red-footed Booby
Magnificent Frigatebird
West Indian Whistling-Duck
White-cheeked Pintail
Masked Duck
Ruddy Duck (resident *jamaicensis* ssp. only)
Peregrine Falcon
Black Rail
Yellow-breasted Crake
Caribbean Coot
Limpkin
Snowy Plover
Wilson's Plover
American Oystercatcher
Semipalmated Sandpiper
Stilt Sandpiper
Least Tern
White-crowned Pigeon
Key West Quail-Dove
Bridled Quail-Dove
Short-eared Owl
Black Swift
Lesser Antillean Pewee
Puerto Rican Flycatcher
Puerto Rican Vireo
Bicknell's Thrush
Yellow Warbler (resident *cruciana* ssp. only)
Black-throated Blue Warbler
Adelaide's Warbler
Prairie Warbler
Elfin-woods Warbler
Worm-eating Warbler
Northern Waterthrush
Louisiana Waterthrush
Grasshopper Sparrow
Greater Antillean Oriole