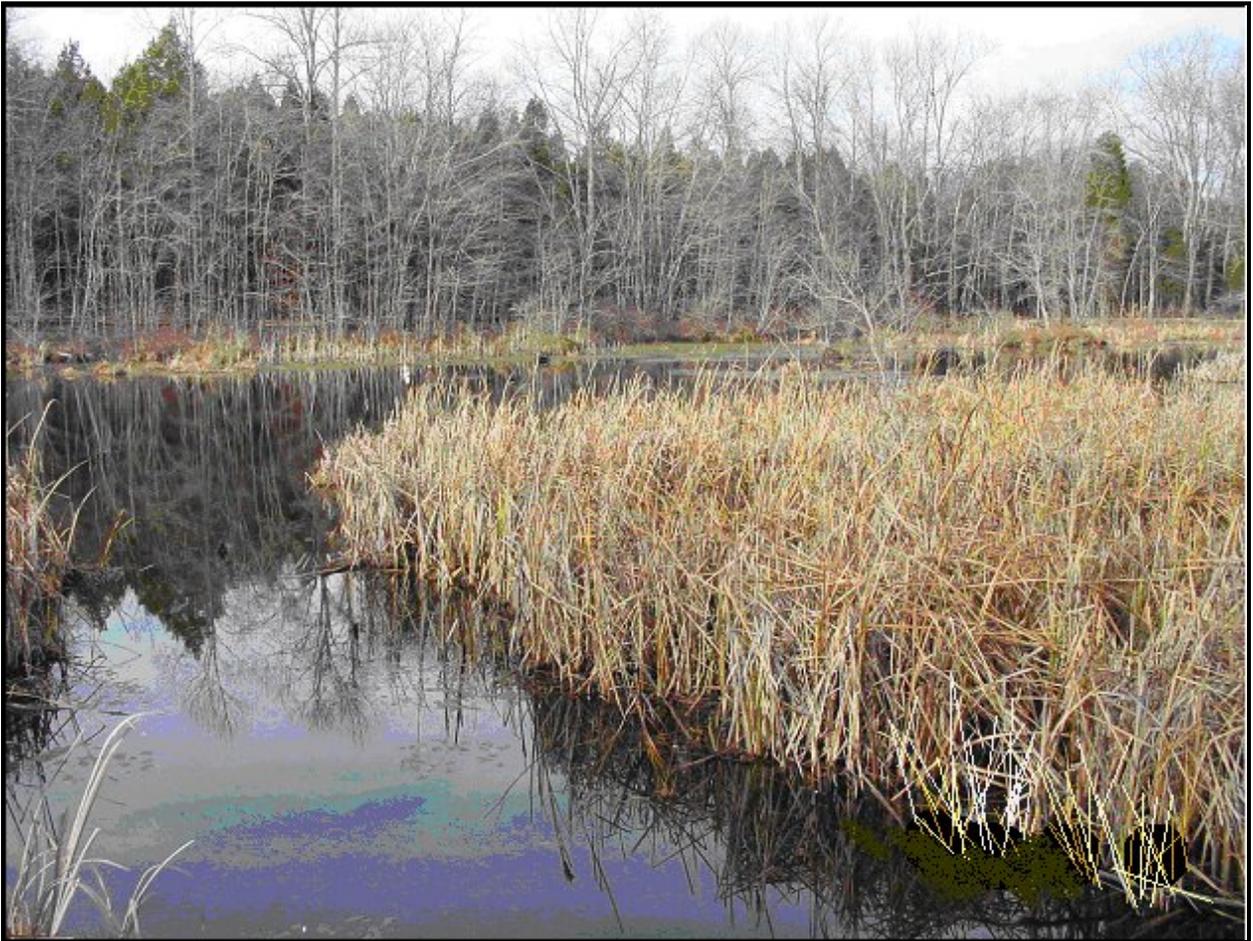


**FINAL DRAFT**

**Avian Conservation Implementation Plan  
Mammoth Cave National Park**

**National Park Service  
Southeast Region**



Compiled by J. Keith Watson  
U.S. Fish and Wildlife Service  
In cooperation with

MACA Resource Management Staff, National Park Service  
And Bird Conservation Partners  
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## Introduction

This Avian Conservation Implementation Plan (ACIP) is provided to the staff at Mammoth Cave National Park (MACA) to help identify and prioritize bird conservation opportunities, and to provide information and guidance for the successful implementation of needed conservation activities. This plan may identify goals, strategies, partnerships, and perhaps specific projects allowing 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 Interior Low Plateaus, including MACA, 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 most of the parks in the Interior Low Plateaus are located in and are primarily upland forested landscapes, recommendations will be provided in the ACIP for landbird and habitat conservation and will be derived from the appropriate PIF bird conservation plans, PIF being largely a landbird conservation initiative. However, all high priority bird conservation issues for MACA will be discussed and integrated as appropriate.

Information and data presented in the ACIP have been obtained from several sources: 1) interviews with MACA staff 2) MACA bird conservation partners 3) the PIF Interior Low Plateaus Bird Conservation Plan, Version 1.0 (Ford et al. 2000), 4) NPS databases, 5) peer reviewed bird conservation and management literature, and 6) personal communications with bird conservation specialists throughout North America, especially in the southeastern United States. This plan has been reviewed by MACA resource management staff and managers, Cumberland/Piedmont Inventory and Monitoring Network (CUPN I&M) staff, and bird conservation partners and approved by MACA management. Optimally, this plan will be incorporated into the park's Resource Management Plan (RMP) and updated annually to reflect completed projects, newly identified needs, and shifts in bird conservation priorities in the region.

**MACA is not obligated to undertake any of the proposed actions in this plan. The plan is provided to offer guidance to MACA to voluntarily support important park, regional, and perhaps national and international bird conservation projects for which MACA 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, economic, 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 non-governmental 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). 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 among 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,
- 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 MACA 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 (US Government 2000), 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, a visionary document developed and signed by the Southeast Natural Resource Leaders Advisory Group (SENRLAG 2000), 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 Polices (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](http://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), 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 global 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 (USDI 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**

MACA has the longest recorded cave system in the world with more than 538 km explored and mapped. Geologists estimate that there could be as many as 960 km of yet undiscovered passageways. The cave ecosystem is considered one of the world's most diverse, but the Park also contains tremendous above-ground diversity. Rivers, bluffs, sinkholes, cave entrances, and ridgetops all are habitats in which are found many distinct plant and animal communities. The Green River, the main watercourse through the Park, is known as one of the most diverse rivers in North America, containing 82 fish species and providing habitat for federally endangered freshwater mussels. Mammoth Cave was authorized as a National Park in 1941, designated as a World Heritage Site in 1981, and as an International Biosphere Reserve in 1990. The Park is 21,380 ha in size.

MACA features mostly second-growth forests and small areas of old growth. American beech trees dominate mesic hollows, joined by tulip poplar and sugar maple on lower and middle slopes. White and black oaks, along with three species of hickory, occupy upland mesic sites and slopes. Old fields cover approximately 45% of the Park. These sites are largely dominated by eastern red cedar and/or Virginia pine mixed with deciduous trees along their outer margins.

## **Avian Resources of Interior Low Plateaus**

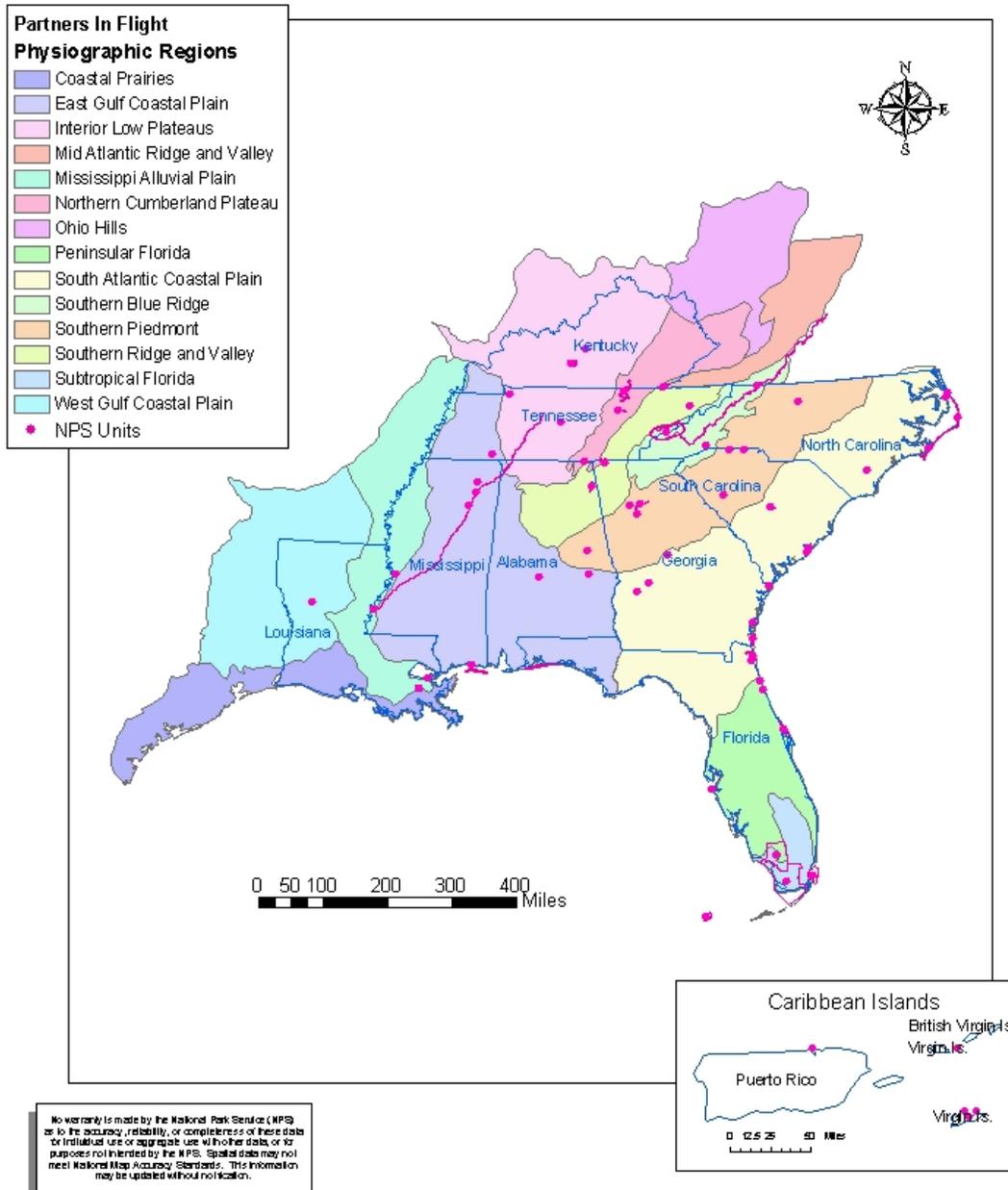
The Interior Low Plateaus physiographic area occupies almost 18,000,000 ha (44,000,000 acres) across portions of Illinois, Indiana, Ohio, Kentucky, Tennessee, and Alabama (see PIF and NPS Locations Maps below). Subdivisions distinguish the Interior Low Plateaus and include the Western Highland Rim, Pennyroyal Plateau, Eastern Highland Rim, Tennessee Valley (or Southern Highland Rim), Central Basin, Shawnee Hills, Bluegrass, and Kentucky Knobs. Topography is generally hilly and rolling, but also includes swampy alluvial valleys, deeply entrenched rivers and streams, and karst plains. The area's major waterways are the Ohio, Cumberland, Tennessee, Kentucky, Wabash, and Licking Rivers. Elevations range from 100 m to 320 m (325 feet to 1,050 feet) above sea level. Caves, glades and barrens are among the most biologically important natural characteristics of the physiographic area. The area's diverse landscape captures plant community diversity from both the mid-western and eastern United States; important bird habitats include upland hardwoods such as western mesophytic, oak-hickory, and beech-maple forests, forested wetlands, grasslands, tallgrass prairies, oak savannas, barrens and glades, and short-rotation pine. Oak-hickory forests occur on 31% of the physiographic area, while another 10% is occupied by other forest cover types. Corn, soybean, and other row crops occupy about 40% of the landscape, while pasture and mixed croplands occupy about 14% of the area. Other land uses include irrigated agriculture, prairies, water, and urban areas (Ford et al. 2000).

In the Interior Low Plateaus, the primary bird conservation goals are to stabilize or increase populations of high priority bird species and to provide adequate habitats for

# Partners in Flight (PIF) Regions

Southeast Region (SER)

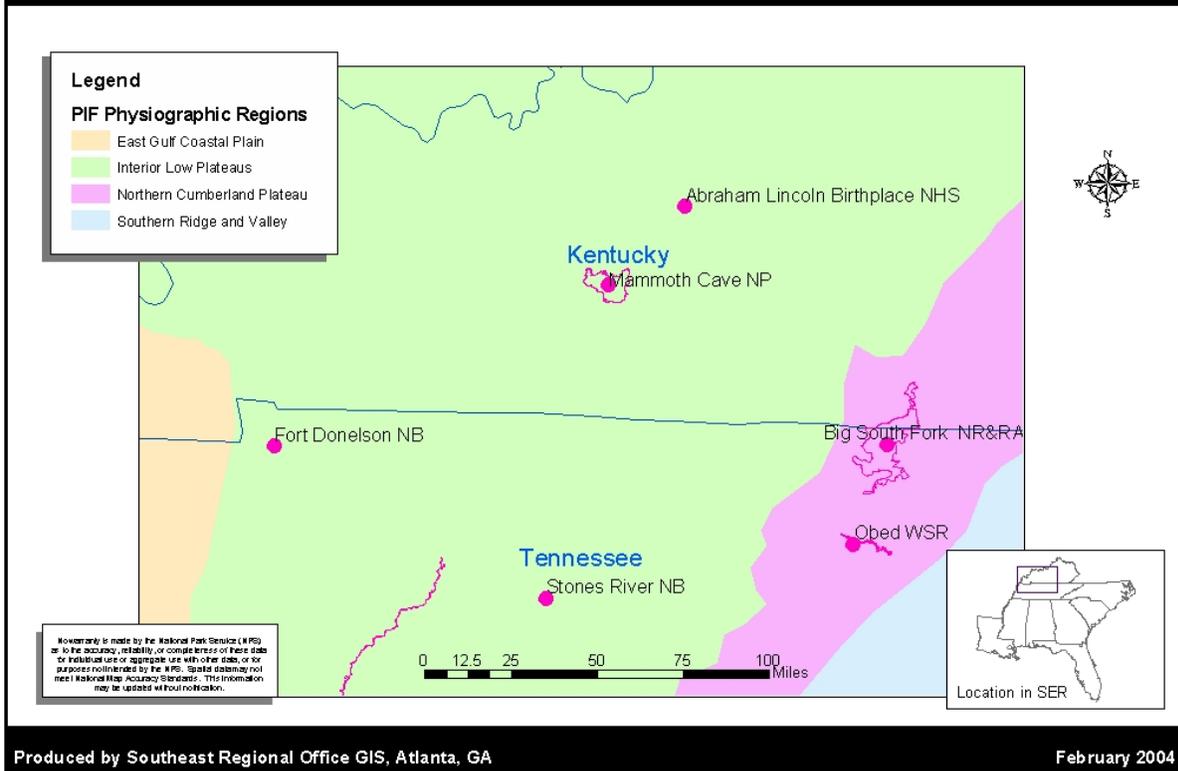
National Park Service  
U.S. Department of the Interior



## Partners in Flight (PIF) Regions and NPS Locations

Southeast Region (SER)

National Park Service  
U.S. Department of the Interior



two extirpated species, greater prairie chicken and swallow-tailed kite. In order to reach these goals, habitat objectives proposed in this plan include the following items:

1. sustain the existing acreage of forest (about 7,300,00 ha), with about 80% (5,820,560 ha) in hardwood forest and about 20% (1,455,140 ha) in short rotation pine management,
2. of the hardwood forest, manage approximately 400,000 ha in long rotation, sawtimber forest patches of about 4,000 ha each,
3. consolidate and manage an additional 90,000 ha of forested wetlands,
4. restore an additional 40,000 ha of native warm season grass and oak savanna habitats, and

5. continue active participation of bird conservation planning in ongoing barrens and glades management and restoration projects.

Over 150 bird species nest regularly in the Interior Low Plateaus physiographic area. Breeding Bird Atlas results from Indiana, Ohio, Kentucky, Tennessee, and northern Alabama indicate that Indigo Bunting, Carolina Chickadee, American Robin, Northern Cardinal, and Mourning Dove are among the most common and widely distributed species across the Interior Low Plateaus. Approximately 39% of all species nest in early successional or semi-open lands habitats. Specifically, these habitats include grasslands, oak savanna, old fields, barrens, glades, early succession forest (natural or managed regeneration), and edge habitats. Typical species include Indigo Bunting, Yellow-breasted Chat, Field Sparrow, and Prairie Warbler.

Approximately 34% nest in mid to late succession forest habitats, which may range from small woodlots to extensive forested tracts. In small woodlots, typical species may include at least 4 woodpecker species, Eastern Wood-pewee, and Red-eyed Vireo. Larger forested tracts may include Acadian Flycatcher, Wood Thrush, Cerulean Warbler, and Kentucky Warbler. Approximately 19% of the species are dependent on water and wetland habitats. Typical species include Great Blue Heron, Wood Duck, and Belted Kingfisher. An additional 8% require forested wetlands. Species in these habitats include Swainson's warbler and Prothonotary Warbler.

## **Avian Conservation in MACA**

**Avian Biodiversity:** MACA has baseline inventory of its avifauna and is in the process of updating this information. Public checklists are available and indicate over 210 species in the park, including several species of high priority conservation need.

Verified records of birds in MACA 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.

**Park Priorities:** Park staff and consultants have not identified any species of particular management concern or high priority for conservation. Rather, the park is concerned with protecting and enhancing all birds and their habitats in the park.

**Inventory:** Bird inventory data provide important information for park management, particularly when inventories are conducted within the framework of the NPS I&M Program. MACA is one of several parks in the NPS Cumberland/Piedmont I&M Network for which a plan to conduct high priority inventory projects has been prepared (Nichols et al. 2000). Inventory effort began in summer of 2003 and will conclude in summer 2005. A Breeding Bird Atlas project is currently underway to complete the park's inventory.

**Threatened and Endangered Species:** No Federally listed threatened or endangered avian species are known to nest in MACA. However, Bald Eagles winter in the park. Historical records indicate non-breeding Red-cockaded Woodpeckers occurred in the park.

Several Kentucky listed species occur in the park, (Appendix C), and most of these are rare transient, migrant species, winter residents. Only the Lark Sparrow (Kentucky threatened) is known to breed in the park. Other high priority Kentucky Species of Special Concern in the MACA are Great Blue Heron, Sharp-shinned Hawk, Bewick's Wren, Bobolink, and Bank Swallow as breeders and Henslow's Sparrow and Savannah Sparrow as winter residents.

Several high priority PIF species for the Interior Low Plateaus occur in MACA (see below and Appendixes A and B). Prominent among these species are: Bewick's Wren, Cerulean Warbler, Blue-winged Warbler, Prairie Warbler, Worm-eating Warbler, Louisiana Waterthrush, Whip-poor-will, Bell's Vireo, Dickcissel, Wood Thrush, Prothonotary Warbler, Kentucky Warbler, Yellow Billed Cuckoo, Chimney Swift, Eastern Wood-pewee, Field Sparrow, and Red-headed Woodpecker as breeders and the Henslow's Sparrow as a winter resident.

**Monitoring:** Current monitoring efforts at MACA include

- Breeding Bird Survey conducted by Kentucky Ornithological Society
- Two point count routes (each with twelve count stations)

**Research:** Scientific research is permitted within the park and ongoing projects are:

- Cowbird brood parasitism on Wood Thrush
- Long Term Ecological Monitoring

**Outreach:** Currently, a Birds of Prey program is offered to local school children

## **Park Identified Needs for Avian Conservation**

MACA has identified several projects that would enable park management to evaluate habitat restoration programs and enhancement of the park's bird populations.

**Monitoring:** MACA would like to undertake additional monitoring, including:

- Establishment of avian monitoring methodology in Big Woods and restored grasslands
- Establishment of Monitoring Avian Productivity and Survivorship (MAPS) stations in mature forest and grassland habitats
- Establish post-prescribed fire bird monitoring

## Coordination with Regional Conservation Initiatives

**The 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, MACA is within the NABCI Central Hardwoods BCR that extends over a large portion of the lower Midwest (see BCR Map below) and encompasses several PIF physiographic areas (the planning unit for PIF)(compare to PIF and NPS Location Maps).

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 Central Hardwoods BCR has a designated coordinator (see contacts below) and can provide valuable assistance to MACA 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).

**Partners In Flight:** Goals and strategies for the Interior Low Plateaus can be found in the draft bird conservation plan, previously submitted to the park. The current plan identifies priority bird and habitat conservation goals that must be implemented in order to achieve bird conservation success in this region. MACA being largely a landbird park will utilize this plan more than any other plan to participate in NABCI implementation.

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 Commonwealth of Kentucky has a state ornithologist who will be instrumental in assisting MACA to implement recommendations identified in this ACIP and projects important to bird conservation relative to Tennessee's role in implementation of the Interior Low Plateaus PIF plan.

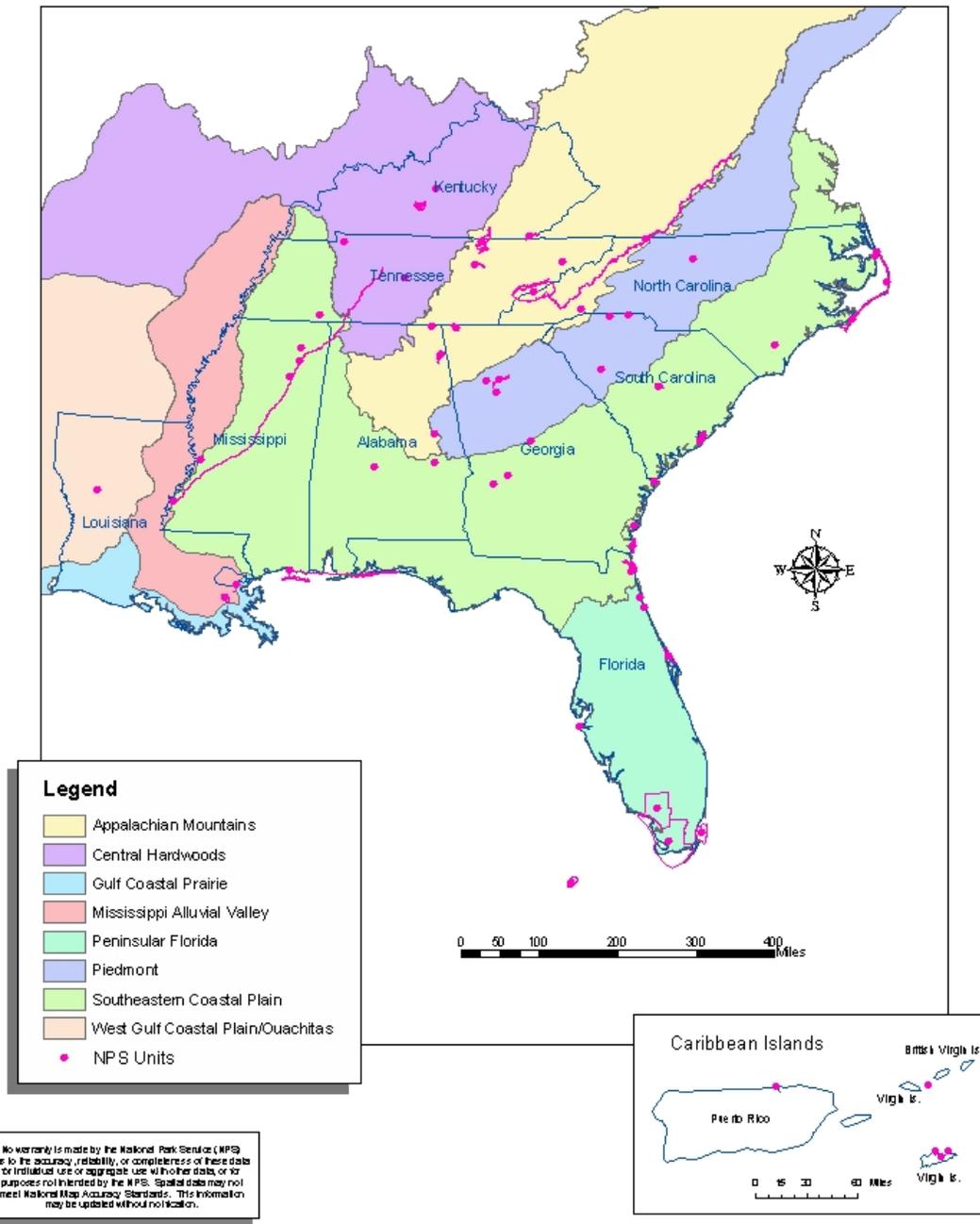
**United States Shorebird Conservation Plan (USSCP):** The USSCP has been completed and is available on the World Wide Web (<http://shorebirdplan.fws.gov/>). A regional step down plan is in preparation by FWS personnel and should be available in 2004. Since MACA has little habitat of regional importance to shorebird conservation, recommendations for shorebird conservation are not presented.

**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

# Bird Conservation Regions

Southeast Region (SER)

National Park Service  
U.S. Department of the Interior



(<http://www.waterbirdconservation.org/>). Few waterbird conservation priorities exist on the Interior Low Plateaus and none are presented here for MACA.

## **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 the 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, implementation of EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (US Government 2000), will require NPS to incorporate a wide range of bird conservation programs into planning and operations. The development of the MOU between the FWS and the NPS will establish a formal agreement 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 is in the final phase of completing the avian inventory. Once complete, no additional inventory effort is planned. However, additional abundance and distribution data will be needed to fully understand the status of birds in the park so that conservation actions for birds can be implemented (Murdock letter 2003, Nichols et al. 2000). Information regarding the status of high priority species (as identified in the Interior Low Plateaus bird conservation plan, the Kentucky's Endangered, Threatened, Special Concern, and Historical Biota and the USFWS Species of Conservation Concern) is needed to effectively structure park management for the continued preservation and enhancement of the park's avifauna.

Additional inventory needs may be identified following the completion of the ongoing inventory. However, it is important that:

- **abundance and distributional data be gathered for high priority forest, grassland, and open woodland species\***

Additionally, MACA is encouraged to:

- **verify other avian observational data collected in the park and enter into the appropriate database (NPSpecies, National Point Count Database, Kentucky Department of Fish Wildlife Resources (KDFWR)), eBird (Cornell University 2002))**
- **standardize inventory and monitoring methodology to conform to NPS and/or FWS recommended standards (Fancy and Sauer 2000; Hunter 2000).**

**Monitoring:** MACA has almost completed the inventory and has identified several programs in addition to ongoing monitoring that would be beneficial to protection and management of the park's birds and their habitats. Efforts should be made to identify additional monitoring programs for high priority species and habitats at the conclusion of the inventory. Close coordination with Central Hardwoods BCR coordinator and the Kentucky ornithologist is 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. The park is encouraged to consider establishing permanent monitoring stations in main habitat types to systematically collect data on the distribution and relative abundances of priority species. This information will be useful for documented potential changes in park avifauna resulting from habitat change or management activities. Links to literature detailing inventory and monitoring methodologies for various avian groups (e.g. songbirds, shorebirds, raptors, etc.) can be found at: <http://biology.dbs.umt.edu/landbird/mbcg/groups.htm>. Specific recommendations are to:

- **continue ongoing monitoring programs and sharing data with KDFWR**
- **determine status of high priority birds (Federal T&E, Kentucky listed, PIF, and USFWS Species of Concern) by establishing**
  - **avian monitoring programs throughout the forest in differing ecological zones during breeding, migration and winter\***
  - **avian monitoring programs in restored grasslands during breeding, migration, and winter (Project Prairie Protocol)\***
  - **establish Monitoring Avian Productivity and Survivorship (MAPS) stations in mature forest and grassland habitats\***
- **establish pre- and post-prescribed fire bird monitoring program to measure response to prescribed fire\***
- **establish a Christmas Bird Count (CBC) centered in the park (<http://www.audubon.org/bird/cbc/>)\***

Additionally, the park is encouraged to:

- **standardize monitoring methodology to conform to NPS and/or FWS recommended standards (Fancy and Sauer 2000, Hunter 2000)**

**Habitat Restoration:** Landscape conditions in the Southeastern US have changed dramatically since early European explorers began documenting the area, its habitats, and its inhabitants. Historic landscapes were influenced by Native American burning, wildfire, bison, beaver, and elk, as well as by insect outbreaks and weather events (Hunter et al. 2001, Williams 2002), thus resulting in a landscape mosaic that supported a rich and diverse bird fauna in the Southeast (Barden 1997; Brawn et al. 2001). The arrival of Europeans and the subsequent change in landscape has dramatically effected bird habitat and bird populations. Bird conservationists have long recognized that habitat restoration is critical to restoration of bird populations, stabilizing or reversing bird declines, and removing birds from both State and Federal Threatened and Endangered Species lists.

Recently, habitat restoration efforts have increased on NPS lands due to the increased restoration emphasis of the Management Policies (USDI NPS 2001). Parks may use a wide range of management tools to restore wetland, grassland, woodland, and other habitats. Restoration tools include, but are not limited to, forest management practices (e.g. silviculture), prescribed fire, exotic species management, and public use and recreation management. In addition, parks can coordinate infrastructure development (e.g. roads and buildings) with restoration activities to mitigate potential adverse impacts.

Due to the protected nature of MACA 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 MACA can greatly contribute to established habitat goals identified in the Interior Low Plateaus bird conservation plan.

The park is mostly second-growth forests and small areas of old growth. American beech trees dominate mesic hollows, joined by tulip poplar and sugar maple on lower and middle slopes. White and black oaks, along with three species of hickory, occupy upland mesic sites and slopes. Old fields cover approximately 45% of the Park. These sites are largely dominated by eastern red cedar and/or Virginia pine mixed with deciduous trees along their outer margins. Much of the habitat provide suitable area and vegetative cover for nesting landbirds, but could be improved through use of habitat restoration and management practices to restore the structural and spatial complexity of the landscape in MACA that are required for many of the high priority bird species that occur there. Of particular interest is the large amount of old field habitat that occurs in the park (45%). Proper management of these areas could lead to a distribution of forest, grassland, and shrub-scrub habitats that is ideal for conservation of most high priority species in the Interior Low Plateaus. Specific recommendations are to:

- **restore native warm season grasses to approximate historic proportions (to the extent feasible)\***
- **maintain or restore an appropriate percentage of barrens/glades/old field habitats as early successional habitat\***
- **restore wetlands and riparian zones\***
- **use prescribed fire as appropriate for habitat restoration and maintenance\***
- **manage remaining forests toward old growth conditions**
- **permit beaver colonization and creation of wetlands**
- **continue with reintroduction of American Chestnut**
- **protect existing snag trees, where not identified as a safety hazard, as important to cavity nesting birds**

- **assess historic landscape cover and determine feasibility of restoring landscape within the context of the park’s enabling legislation**
- **document all major habitat management activities, including the location (e.g. UTM coordinates) and a description of methods and of pre- and post-management habitat conditions. This information, when coupled with bird distribution and abundance data, is useful for assessing and replicating conservation actions**

**Threat Management:** Threats and potential threats to birds and their habitats at MACA are diverse. The largest general threat occurs with many forces acting on habitat and habitat parameters to reduce the quality of the habitats. Acid deposition, ozone pollutions, nitrogen loading, mercury accumulation, lock and dam system, exotic vegetation, deer browse, etc. all act individually as well as in combination to negatively impact the quality of habitats in MACA. Many of these threats will require regional or national planning to implement solutions. MACA is encouraged to:

- **continue to document impacts of acid deposition on natural resources of the park**
- **assess degree of mercury accumulation in park environment\***
- **partner with the local Natural Resources Conservation Service (NRCS)\*, adjacent landowners and other land interests to explore potential to protect adjacent private lands through various private landowner incentive programs; these programs can improve quality of adjacent lands by**
  - **reducing application of pesticides on adjacent agricultural lands**
  - **providing for wetland and riparian/streambank restoration to improve water quality in the region and park**
  - **converting adjacent habitats to be more compatible or desirable to park goals**
  - **minimizing habitat fragmentation and potentially restore habitats beneficial to wildlife and bird species of the region**
- **work with adjacent landowners and neighbors, the local community, and public officials to curb unregulated and free roaming feral and domestic dogs cats in the park\***
- **reduce pesticide use in the park\***

Cape Hatteras National Seashore has recently completed a feral cat reduction campaign that could be used as a model in MACA (Altman 2002, Harrison 2002).

- **continue to eliminate exotic plant species\***
- **assess degree of cowbird parasitism and take actions to reduce unacceptable impacts (habitat improvement and cowbird reduction)**
- **use prescribed fire as a resource management tool to achieve natural resource objectives**
- cooperate with airport commission to develop strategy to address impacts of airport on park resources

**Research:** Several avian research needs have been identified for MACA that will contribute to enhancement of birds and their habitat. They are:

- **develop a research control area for Cerulean Warbler\***
- **assess feasibility of Ruffed Grouse reintroduction\***
- **assess degree of mercury accumulation in park environment\***
- **assess degree of Brown-headed Cowbird brood parasitism\***

Additionally, MACA is encouraged to:

- **list future identified park needs and projects on Research Permit and Reporting System web site (RPRS)**
- **develop contact with Southern Appalachian Cooperative Ecosystem Studies Unit (CESU) at the University of Tennessee, Knoxville, TN**

**Compliance:** Park compliance with the Migratory Bird Treaty Act and the Executive Order 13186 (US Government 2000) 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 are to encourage:

- **park staff to begin specific consideration of migratory birds during park planning processes**
- **park staff to attend USFWS training on implementation of EO 13186 (US Government 2000) 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**

- **update the checklist for public availability**
- **participate in International Migratory Bird Day (IMBD) events with a local partner (<http://birds.fws.gov/imbd.html>) such as the Mammoth Cave Chapter of the Kentucky Ornithological Society (KOS) (<http://kentucky.sierraclub.org/groups/mammoth/mammoth.htm>)**
- **nominate CUGA as an Important Bird Area (<http://www.abcbirds.org/iba/nominstr.htm>)**
- **collaborate with KDFWR and Central Hardwoods BCR to coordinate and implement recommendations of this plan**
- **partner with NRCS to implement private landowner land and resource protection programs**
- **develop partnership with Kentucky Ornithological Society ((<http://kentucky.sierraclub.org/groups/mammoth/mammoth.htm>)) to assist with implementation of various aspects of this plan**
- **encourage development of outreach and educational programs to enhance visibility of bird conservation issues, which may include organized bird walks, owl prowls, etc. with the public**
- **encourage accurate documentation and reporting from recreational outings by visitors and bird groups (see Cornell University's eBird monitoring program (Cornell Lab. Ornith. 2002 (<http://www.ebird.org/about/index.jsp>))**

- **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>)
- 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
- 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
- subscribe to **Kentucky Birds** listserv, an electronic forum for listing bird sightings and publications in Kentucky (subscribe by sending message to [majordom0@acs.eku.edu](mailto:majordom0@acs.eku.edu) with the message subscribe birdky)
- 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 Barren, Hart, and Edmonson County's initiatives that could impact park resources**
- **contact US Fish and Wildlife Service and NRCS private lands biologists to discuss private landowner initiatives applicable to protection and enhancement of values of adjacent lands**
- **participate in the Cerulean Warbler Technical Working Group**
- **develop partnership with KDFWR for coordination and implementation of this plan**
- **contact the nearest Joint Venture office (see Funding section for explanation of Joint Ventures) or BCR coordinator to develop partnerships and funding proposals tied to priorities established by the park, this ACIP, and the Interior Low Plateaus bird conservation plan**

- **contact and partner with the local chapter of the KOS who can potentially be active partners in MACA's bird conservation program)**
- evaluate local or regional land use data and plan potential for habitat protection across organizational boundaries
- develop land use agreements with local landowners through state, FWS programs, and especially with protect important habitats and landscapes

**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. MACA 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. Suggestions include:

- **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, or PIF Coordinator to learn how this program might be applicable to

implementation of this plan, and other park wetland issues. MACA is not within a region which has an operational Joint Venture, but contact with the Central Hardwoods BCR coordinator and Tennessee state ornithologist 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. MACA is

- **encouraged to become a member of the USFWS Ohio River Valley 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/NPSHighlights.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. Primary contacts for MACA are:

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## APPENDIX A

### HIGH PRIORITY SPECIES IN THE INTERIOR LOW PLATEAUS BIRD CONSERVATION REGION (from Table 2, Ford et al. 2000)

Priority breeding landbird species pool generated for the Interior Low Plateaus. Total scores and regional scores were developed from Partners in Flight criteria.

Category	Species	Total score	% of pop.	AI	PT Status <sup>1</sup>	Local
1a	Highest overall priority					
	Bewick's wren	28	26.6	3	5	D
	Cerulean warbler	28	7.8	3	5	B
1b	High overall priority					
	Henslow's sparrow	27	4.4	3	4	E
	Swainson's warbler	26	-	4	3	E
	Bachman's sparrow	25	-	2	3	E
	Blue-winged warbler	24	7.8	3	5	B
	Prairie warbler	24	12.2	4	5	B
	Worm-eating warbler	24	7.9	3	3	B
	Louisiana waterthrush	23	9.1	4	3	B
	Whip-poor-will	23	12.9	4	5	B
	Bell's vireo	23	1.2	2	3	E
	Dickcissel	23	1.0	3	5	B
	Wood thrush	22	5.1	3	3	B
	Prothonotary warbler	22	2.4	3	3	B
	Kentucky warbler	22	12.6	4	2	B
	Yellow-billed cuckoo	22	7.8	5	5	B
	Chimney swift	22	10.1	5	5	B
	Eastern wood-pewee	22	9.4	5	5	B
	Field Sparrow	22	13.9	5	5	B
	Red-headed woodpecker	22	3.3	4	5	D
	11a	Physiographic area priority species				
Northern bobwhite		21	6.1	4	5	R
White-eyed vireo		21	6.5	3	5	B
Yellow-breasted chat		21	11.2	5	5	B
Loggerhead shrike		20	-	3	5	R
Black-and-white warbler		20	-	3	5	B
Grasshopper sparrow		20	-	3	5	B
Ruby-throated hummingbird		19	6.9	5	3	B

Category	Species	Total score	% of pop.	AI	PT	Local Status <sup>1</sup>
	Eastern towhee	19	9.4	4	5	R
	Eastern meadowlark	19	7.7	5	5	R
<hr/>						
IIb	Additional species: responsibilities for monitoring (> 10% BBS)					
	Acadian flycatcher	21	10.9	4	2	B
	Orchard oriole	19	10.4	4	2	B
	Eastern bluebird	16	11.9	5	2	R
<hr/>						
III	Additional species: global priority					
	Chuck-will's-widow	21	3.1	3	4	B
	Bobolink	19	-	2	3	B
<hr/>						
IV	Federally listed species					
	Bald eagle	17	-	2	3	D
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V	Local, state, or regional interest species					
	Mississippi kite	20	-	2	3	B
	Chestnut-sided warbler	18	-	2	3	B
	Lark sparrow	17	-	2	4	E

1 – Local status refers to migratory status and is adapted from Texas Partners in Flight. In this category, B refers to birds that breed in the area and winter exclusively in the tropics, D refers to birds that breed and winter in the region but may involve different populations, E refers to species which are reaching distributional limits in the area, and R refers to resident, non-migratory birds.

## APPENDIX B

### HIGH PRIORITY HABITAT-SPECIES ASSEMBLAGES IN THE INTERIOR LOW PLATEAUS BIRD CONSERVATION REGION (from Table 2, Ford et al. 2000)

Table 3. Priority habitat-species suites generated for the Interior Low Plateaus, with habitat scores and action level.

Habitat Species	Habitat score <sup>1</sup>	TB	AI	PT	Action level <sup>2</sup>
Western mesophytic, oak-hickory, beech-maple forests					
Yellow-billed cuckoo	13	3	5	5	III
Eastern wood-pewee	13	3	5	5	VI
Whip-poor-will	12	3	4	5	III
Downy woodpecker	12	2	5	5	VI
Northern flicker	12	3	5	4	VI
Cerulean warbler	12	4	3	5	II
Black-and-white warbler	11	3	3	5	IV
Louisiana waterthrush	11	4	4	3	III
Ruby-throated hummingbird	10	2	5	3	IV
Wood thrush	10	2	5	3	IV
Worm-eating warbler	10	4	3	3	III
Kentucky warbler	10	4	4	2	III
Forested wetlands					
Yellow-billed cuckoo	13	3	5	5	III
Eastern wood-pewee	13	3	5	5	IV
Downy woodpecker	12	2	5	5	VI
Northern flicker	12	3	5	4	VI
Cerulean warbler	12	4	3	5	III
Black-and-white warbler	11	3	3	5	III
Louisiana waterthrush	11	4	4	3	III
Ruby-throated hummingbird	10	2	5	3	III
Wood thrush	10	4	3	3	III
Prothonotary warbler	10	4	3	3	III
Kentucky warbler	10	4	4	2	III
Acadian flycatcher	9	3	4	2	III
Swainson's warbler	9	4	2	3	II
Bald eagle	8	3	2	3	VI

Habitat Species	Habitat score <sup>1</sup>	TB	AI	PT	Action level <sup>2</sup>
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Riparian

Yellow-billed cuckoo	13	3	5	5	III
Eastern wood-pewee	13	3	5	5	VI
Downy woodpecker	12	2	5	5	VI
Northern flicker	12	3	5	4	VI
White-eyed vireo	12	4	3	5	III
Cerulean warbler	12	4	3	5	II
Eastern towhee	12	3	4	5	III
Black-and-white warbler	11	3	3	5	III
Louisiana waterthrush	11	4	4	3	III
Indigo bunting	11	1	5	5	VI
Ruby-throated hummingbird	10	2	5	3	IV
Wood thrush	10	2	5	3	IV
Prothonotary warbler	10	4	3	3	III
Kentucky warbler	10	4	4	2	III
Acadian flycatcher	9	3	4	2	III
Swainson's warbler	9	4	2	3	III

Grassland

Eastern meadowlark	13	3	5	5	VI
Field sparrow	13	3	5	5	VI
Northern bobwhite	12	3	4	5	III
Loggerhead shrike	12	4	3	5	II
Eastern towhee	12	3	4	5	VI
Grasshopper sparrow	12	4	3	5	III
Dickcissel	12	4	3	5	III
Henslow's sparrow	10	4	3	3	II
Bobolink	9	4	2	3	VI

Oak Savanna

Bewick's wren	13	4	4	5	I
Prairie warbler	13	4	4	5	IV
Eastern wood-pewee	13	3	5	5	VI
Downy woodpecker	12	2	5	5	VI
Northern flicker	12	3	5	4	VI
Orchard oriole	10	3	5	2	VI
Eastern bluebird	9	2	5	2	VI
Bachman's sparrow	9	4	2	3	VI
Red-headed woodpecker	7	3	3	1	VI

Habitat Species	Habitat score <sup>1</sup>	TB	AI	PT	Action level <sup>2</sup>
<b>Barrens/Glades/Old Fields</b>					
Bewick's wren	13	4	4	5	I
Prairie warbler	13	4	4	5	IV
Yellow-breasted chat	13	3	5	5	IV
Field sparrow	13	3	5	5	IV
Eastern meadowlark	13	3	5	5	VI
Northern bobwhite	12	3	4	5	III
Whip-poor-will	12	3	4	5	III
Loggerhead shrike	12	4	3	5	II
White-eyed vireo	12	4	3	5	IV
Blue-winged warbler	12	4	3	5	IV
Eastern towhee	12	3	4	5	VI
Indigo bunting	11	1	5	5	VI
Eastern bluebird	9	2	5	2	VI
Bachman's sparrow	9	4	2	3	VI
Lark sparrow	9	3	2	4	IV

**Short Rotation Pine**

Bewick's wren	13	4	4	5	I
Prairie warbler	13	4	4	5	IV
Yellow-breasted chat	13	3	5	5	IV
Field sparrow	13	3	5	5	IV
Northern bobwhite	12	3	4	5	III
Northern flicker	12	3	5	4	VI
Blue-winged warbler	12	4	3	5	IV
Eastern towhee	12	3	4	5	IV
Black-and-white warbler	11	3	5	3	IV
Indigo bunting	11	1	5	5	VI
Wood thrush	10	4	3	3	IV
Eastern bluebird	9	2	5	2	VI
Bachman's sparrow	9	4	2	3	IV
Chestnut-sided warbler	7	2	2	3	VI

1 – Habitat scores are derived from TB (threats breeding), AI (area importance), and PT (population trend) scores, which are determined from CBO prioritization database.

2 - Action level refer to I – crisis recovery needed, II – immediate management or policy needed rangewide, III – management to reverse or stabilize populations, IV – long term planning is needed, V – investigations are needed to better define threats, VI – monitor population changes only.

## APPENDIX C

### ENDANGERED, THREATENED, SPECIAL CONCERN, AND HISTORICAL BIOTA OF KENTUCKY, 2000 Kentucky State Nature Preserves Commission (KSNPC)

Scientific Name	Common Name	Status	
		KSNPC	US
<i>Accipiter striatus</i>	Sharp-shinned hawk	S	
<i>Actitis macularia</i>	Spotted sandpiper	E	
<i>Aimophila aestivalis</i>	Bachman's sparrow	E	
<i>Ammodramus henslowii</i>	Henslow's sparrow	S	
<i>Anas clypeata</i>	Northern shoveler	E	
<i>Anas discors</i>	Blue-winged teal	T	
<i>Ardea alba</i>	Great egret	E	
<i>Ardea herodias</i>	Great blue heron	S	
<i>Asio flammeus</i>	Short-eared owl	E	
<i>Asio otus</i>	Long-eared owl	E	
<i>Bartramia longicauda</i>	Upland sandpiper	H	
<i>Botaurus lentiginosus</i>	American bittern	H	
<i>Bubulcus ibis</i>	Cattle egret	S	
<i>Certhia americana</i>	Brown creeper	E	
<i>Chondestes grammacus</i>	Lark sparrow	T	
<i>Circus cyaneus</i>	Northern harrier	T	
<i>Cistothorus platensis</i>	Sedge wren	S	
<i>Corvus corax</i>	Common raven	E	
<i>Corvus ossifragus</i>	Fish crow	S	
<i>Dendroica fusca</i>	Blackburnian warbler	T	
<i>Dolichonyx oryzivorus</i>	Bobolink	S	
<i>Egretta caerulea</i>	Little blue heron	E	
<i>Empidonax minimus</i>	Least flycatcher	E	
<i>Falco peregrinus</i>	Peregrine falcon	E	
<i>Fulica americana</i>	American coot	H	
<i>Gallinula chloropus</i>	Common moorhen	T	
<i>Haliaeetus leucocephalus</i>	Bald eagle	E	T

Scientific Name	Common Name	Status	
		KSNPC	US
<i>Ictinia mississippiensis</i>	Mississippi kite	S	
<i>Ixobrychus exilis</i>	Least bittern	T	
<i>Junco hyemalis</i>	Dark-eyed junco	S	
<i>Lophodytes cucullatus</i>	Hooded merganser	T	
<i>Nyctanassa violacea</i>	Yellow-crowned night-heron	T	
<i>Nycticorax nycticorax</i>	Black-crowned night-heron	T	
<i>Pandion haliaetus</i>	Osprey	T	
<i>Passerculus sandwichensis</i>	Savannah sparrow	S	
<i>Phalacrocorax auritus</i>	Double-crested cormorant	H	
<i>Pheucticus ludovicianus</i>	Rose-breasted grosbeak	S	
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	E
<i>Podilymbus podiceps</i>	Pied-billed grebe	E	
<i>Pooecetes gramineus</i>	Vesper sparrow	E	
<i>Rallus elegans</i>	King rail	E	
<i>Riparia riparia</i>	Bank swallow	S	
<i>Sitta canadensis</i>	Red-breasted nuthatch	E	
<i>Sterna antillarum</i>	Least tern	E	E
<i>Thryomanes bewickii</i>	Bewick's wren	S	
<i>Tyto alba</i>	Barn owl	S	
<i>Vermivora chrysoptera</i>	Golden-winged warbler	T	
<i>Vireo bellii</i>	Bell's vireo	S	
<i>Wilsonia canadensis</i>	Canada warbler	S	

**E: Endangered.** A taxon in danger of extirpation and/or extinction throughout all or a significant part of its range in Kentucky.

**T: Threatened.** A taxon likely to become endangered within the foreseeable future throughout all or a significant part of its range in Kentucky.

**S: Special Concern.** A taxon that should be monitored because (1) it exists in a limited geographic area in Kentucky, (2) it may become threatened or endangered due to modification or destruction of habitat, (3) certain characteristics or requirements make it especially vulnerable to specific pressures, (4) experienced researchers have identified other factors that may jeopardize it, or (5) it is thought to be rare or declining in Kentucky but insufficient information exists for assignment to the threatened or endangered status categories.

**H: Historic.** A taxon documented from Kentucky but not observed reliably since 1980 but is not considered extinct or extirpated.

## APPENDIX D

### US FISH AND WILDLIFE SERVICE, SPECIES OF CONSERVATION CONCERN (2002) in the CENTRAL HARDWOODS (BCR 24)

*Peregrine Falcon*  
Stilt Sandpiper  
Buff-breasted Sandpiper  
Short-eared Owl  
Whip-poor-will  
Red-headed Woodpecker  
Bell's Vireo  
Bewick's Wren  
Wood Thrush  
Blue-winged Warbler  
Prairie Warbler  
Cerulean Warbler  
Worm-eating Warbler  
Swainson's Warbler  
Louisiana Waterthrush  
Bachman's Sparrow  
Henslow's Sparrow  
Le Conte's Sparrow  
Smith's Longspur  
Rusty Blackbird