East Gulf Coastal Plain
JOINT VENTURE

a regional, landscape-scale approach to bird conservation

strategic

progressive

collaborative

Implementation Plan, Version 1
March 2008

East Gulf Coastal Plain
JOINT VENTURE

Longleaf pine forest *©John Kush*

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The East Gulf Coastal Plain Joint Venture thanks the many partners whose insight, input, and review were critical to this plan's completion. We would specifically like to acknowledge those who contributed text:

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SUGGESTED CITATION

East Gulf Coastal Plain Joint Venture. March, 2008. *Implementation Plan, Version 1*. East Gulf Coastal Plain Joint Venture, Auburn, AL.

COVER PHOTOGRAPHS

Clockwise: Piping Plover, John Lowe courtesy of the U.S. Forest Service (USFS); Henslow's Sparrow, Berlin Heck courtesy of the USFS; King Rail and American Black Duck, courtesy U.S. Fish & Wildlife Service.

Unless otherwise noted, photos on subsequent pages are courtesy of the U.S. Fish & Wildlife Service.

East Gulf Coastal Plain JOINT VENTURE

December 27, 2007

We, the Management Board of the East Gulf Coastal Plain Joint Venture, commit to advance bird conservation throughout the East Gulf Coastal Plain according to the strategy articulated in this Implementation Plan. We, and the organizations we represent, endorse the mission and vision of the East Gulf Coastal Plain Joint Venture and affirm our commitment to this partnership.

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East Gulf Coastal Plain Joint Venture Management Board Partners

State Partners

Federal Partners

Private Partners

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Executive Summary

The East Gulf Coastal Plain Joint Venture (EGCP JV) is a voluntary public-private partnership that seeks to strategically advance the conservation of birds and bird habitats in the East Gulf Coastal Plain. The long-term objective of the partnership is to ensure the sustainability of priority bird populations, and the habitats and ecological communities of which they are an integral part. Under the EGCP JV umbrella, Federal, State, and private conservation organizations are united in their commitment to support the goals and vision of the North American Bird Conservation Initiative, as well as the conservation objectives of the North American Waterfowl Management Plan, the Partners in Flight North American Landbird Conservation Plan, the U.S. Shorebird Conservation Plan, the Waterbird Conservation for the Americas Plan, and the Northern Bobwhite Conservation Initiative. In supporting these conservation initiatives, the EGCP JV will align and adapt its priorities and objectives in response to salient regional opportunities and threats in the East Gulf Coastal Plain, as well as to the specific needs of its partner organizations and the broader regional conservation community.

The long-term objective of the EGCP JV partnership is to ensure the sustainability of priority bird populations and the ecological communities of which they are a part.

Following an ecoregional approach to conservation, rather than one defined by political boundaries, the EGCP JV brings together stakeholders to address bird conservation at scales that are more relevant and ecologically appropriate with respect to bird population and habitat sustainability.

The ecoregion of emphasis is the East Gulf Coastal Plain, an area corresponding to the western portion of the Southeastern Coastal Plain Bird Conservation Region (BCR 27). This area lies west of the Georgia-Alabama state line and includes the Florida panhandle, the majority of Alabama and Mississippi, portions of west Tennessee and Kentucky, and eastern Louisiana.

Discussions regarding the formation of a Joint Venture in the East Gulf Coastal Plain were initiated in 2002. By May 2006, using pooled financial resources of partner organizations, a Coordinator was hired to facilitate the organization and growth of the developing partnership. Soon after, a Management Board and Technical Committee were recruited and convened to address various administrative, organizational, and technical responsibilities. This Implementation Plan articulates the strategic approach to conservation agreed upon by the Management Board, Technical Committee, and partner organizations. Based on the EGCP JV's activities to-date, this plan also details key elements resulting from initial biological planning and conservation design activities. Namely, it articulates priority habitats and avian communities of the region, and illustrates the EGCP JV's progress in developing and defining a strategic approach to conservation in longleaf and other open-pine habitats.

The mission of the EGCP JV is protect and restore bird populations of the East Gulf Coastal Plain by coordinating the effective conservation of key habitats.

Mallards and Wood Ducks in a cypress-tupelo forested wetland.

By strategically integrating the conservation actions of our partners, the EGCP JV can most effectively secure a sustainable future for birds and the habitats upon which they rely. Communication and collaboration among the partners, as well as coordination of all JV activities, are facilitated by the EGCP JV Coordinator. Over time, it is envisioned that staff for the JV will include additional positions that serve similarly in coordinating and conducting specific conservation functions in pursuit of the EGCP JV vision. The efforts of the EGCP JV are rooted in science, implemented at the landscape scale, and aim to maximize both conservation benefits and the efficient use of human and financial resources.

A principal tenet of the EGCP JV's work is that strategic increases in the availability, condition, and configuration of avian habitats will be most effective in achieving desired increases in the stability, resilience, and/or size of avian populations. The EGCP JV has devoted a large portion of its initial energy to the assessment, improvement, and expansion of a biological foundation that will serve as a basis for subsequent planning, delivery and other activities in support of bird conservation in the region. To the extent possible and pragmatic, the EGCP JV intends to define quantitative, spatially explicit habitat objectives derived from biological planning and conservation design processes in order to prioritize specific areas of the landscape according to their potential to contribute to bird conservation. Effective conservation delivery necessitates the development and maintenance of a diverse and engaged EGCP JV partnership, because it is the partner organizations, working individually and collaboratively, who are chiefly responsible for the delivery of habitat through projects.


Loggerhead Shrike.

The efforts of the EGCP JV are rooted in science, implemented at the landscape scale, and aim to maximize both conservation benefit and the efficient use of human and financial resources.

Ultimately, success will hinge on whether bird populations respond as predicted to improvements in habitat availability and condition. Hence, success will need to be evaluated not only in terms of tracking gains and losses in bird habitat quantity and quality, but also in terms of bird population responses to conservation actions.

The EGCP JV's strategic conservation framework consists of planning, design, delivery, and evaluation of conservation actions, and represents an iterative process. This plan represents the initial attempt of the EGCP JV to articulate the elements of this process. Many future iterations are expected, and the general concepts and specific details are likely to evolve through time based on lessons learned. Consequently, this Implementation Plan describes the foundation upon which the EGCP JV will grow, both organizationally and programmatically, in pursuit of its mission. The task at hand for the EGCP JV is to transform the ideas and objectives set out in this Implementation Plan from concept to reality. The EGCP JV is eager to embrace the many challenges ahead and is poised to assume a prominent role in strategically advancing the protection, restoration, and management of bird populations in the East Gulf Coastal Plain.

The task at hand for the EGCP JV is to transform the ideas and objectives set out in this Implementation Plan from concept to reality.

I. Organization and Purpose of the East Gulf Coastal Plain Joint Venture

Introduction

A Joint Venture Partnership in the East Gulf Coastal Plain

Partners of the EGCP JV are bound by a conviction that they can achieve greater success working collaboratively towards mutual conservation objectives than working individually as independent entities. Guided by a shared vision, partners of the EGCP JV have committed to following a strategic, iterative framework designed to improve how partners approach decision making and resultant actions in support of bird and habitat conservation objectives (Fig 1.). In addition, by addressing bird conservation within a large region delineated by ecological similarities rather than political boundaries, the EGCP JV can better address habitat conservation at scales and in contexts that are most relevant to bird populations.

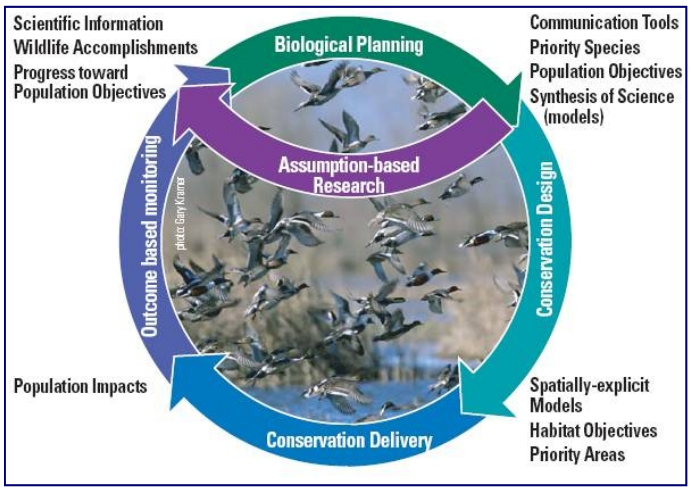

Figure 1. Elements of a Strategic Habitat Conservation framework (courtesy USFWS).

In its evolution from concept to reality, the EGCP JV has defined its niche and charted its course in full awareness of its responsibility to bridge bird conservation across several relevant scales. One scale is represented by the national and international bird conservation arena. The EGCP JV is committed to fulfilling its vision in a manner that supports the North American Waterfowl Management Plan, Partners in Flight, the U.S. Shorebird Conservation Plan, Waterbird Conservation for the Americas, the Northern Bobwhite Conservation Initiative, and the umbrella partnership, the North American Bird Conservation Initiative (NABCI).

A second scale relates to the conservation context unique to the East Gulf Coastal Plain (EGCP). The EGCP JV commits to align and adapt its priorities in response to salient ecoregional opportunities and threats inherent to the EGCP, as well as the needs of its partner organizations and the broader conservation community of the region. The EGCP JV seeks to provide an ecoregional context for coordination and increasing the capacity and effectiveness of conservation projects. We intend to align and direct, not compete with or duplicate, the work of partner organizations. The elements of this Implementation Plan have evolved from a central ambition to successfully bridge these scales and link them to local delivery programs in ways that most effectively support bird conservation across all relevant spatial contexts.

Conservation in the East Gulf Coastal Plain

Geographically, the EGCP is a critical link for continental-scale bird conservation and management. The region provides important breeding, migratory, and wintering habitats for myriad species of conservation concern, with over 300 bird species using the region during some portion of their annual cycles. Over 180 species are known to breed in the EGCP (Woodrey et al., 1998). The region supports the highest acreages of longleaf pine and maritime communities on the Gulf Coast, as well as extensive bottomland hardwood forests. These habitat and community types are among the highest priorities for conservation attention in the United States. Bird community richness and abundance rivals other continentally important regions with established and well-funded Joint Ventures in place.

The need for swift, yet strategic conservation action in the EGCP is clear. Noss et al. (2005) classified four EGCP ecosystems as "endangered." These include longleaf pine forests and savannas; eastern grasslands, savannas, and barrens; old growth eastern deciduous forest; and southern forested wetlands. The EGCP JV will approach conservation of these systems based on defining the availability, condition, and configurations of habitats needed to support bird populations at prescribed levels. However, in order to best position itself to serve the broadest conservation needs of the region, the EGCP JV must maximize opportunities for promoting bird conservation while also recognizing the need to integrate the habitat needs of other wildlife when designing and delivering habitat conservation activities. In addition, in some cases, the EGCP JV may have to assess and reconcile tradeoffs inherent in habitat conservation that may promise benefits for some species, but losses for others.

Recent delisting of our national symbol necessitates renewed emphasis to ensure continued protection and conservation of eagles.

Among the most prominent bird conservation threats of the region is the projected population growth and the resultant urban and suburban development that follows. The bulk of the EGCP landscape is in private ownership, with 50% of landowners owning less than 500 acres (Boyce et al., 2002). The increasing divestiture of corporate-owned timberland to individual landowners will only augment this trend. Many of these divestitures represent inherent changes in how land will be managed, and whether these lands are suitable for supporting birds and other wildlife. To address bird conservation in the region effectively, the EGCP JV must partner closely with organizations that strive to retain and promote habitat conservation on private lands.

Global changes in climate represent an overarching threat that will likely have profound and cascading impacts on the natural communities of the EGCP. The potential implications of climate change must be acknowledged and factored into any long-term conservation strategies for the EGCP. Sea level rise, shifts in the distributions and migration patterns of wildlife, and increasing frequency and intensity of Gulf hurricanes represent several more widely recognized implications of a rapidly shifting climate. In addition, climate change will undoubtedly result in dramatic alterations in land use as humans respond to changing resource availability, rising sea levels, and increased societal pressures to develop alternative energy. Such land use changes will pose certain threats to bird populations and natural communities and will be very difficult to predict, assess, and address.

While grassland habitat conservation will benefit breeding Dickcissels in the EGCP, they are increasingly vulnerable in South American wintering areas where they are viewed and treated as agricultural pests.

Despite the threats, much of the EGCP remains in natural habitats and ample opportunity exists for the EGCP JV to improve the management and restoration of these habitats strategically. Many of the 300 bird species occurring in the region are variously recognized as species of conservation need in the corresponding State Wildlife Action Plans (SWAPs) for the EGCP (Florida Fish and Wildlife Conservation Commission, 2005; Kentucky Department of Fish and Wildlife Resources, 2005; Lester et al., 2005; Mississippi Museum of Natural Science, 2005; Tennessee Wildlife Resources Agency, 2005; Wildlife and Freshwater Fisheries Division Alabama Department of Conservation and Natural Resources, 2005; Woodrey et al., 1998). By promoting close coordination among state wildlife agency partners from Florida, Alabama, Tennessee, Kentucky, Mississippi, and Louisiana, the EGCP JV will serve as a forum that will allow state bird conservation priorities to be integrated appropriated into regional conservation planning.

Purpose of the Implementation Plan

This Implementation Plan broadly defines the concepts and approaches that the EGCP JV will employ in attempting to advance its bird conservation mission. The EGCP JV will operate within a strategic conservation framework that represents an iterative, adaptive process (see Section II). Thus, this plan represents the EGCP JV's initial attempt to articulate how it will begin approaching bird conservation. We fully anticipate future versions of this plan to incorporate iterative refinements in the concepts and approaches of the partnership. The Management Board and Technical Committees of the EGCP JV will use this plan and consequent work plans that set forth specific goals to frame and direct their activities. Based on some of the EGCP JV's initial planning, this plan also presents an overview of key habitats and avian communities of the region. It closes by presenting a case study of the EGCP JV's initial work in longleaf pine habitats to illustrate a potential application of the EGCP JV's strategic conservation framework.

EGCP JV Mission

A mission statement serves to provide clear boundaries to EGCP JV staff and partner organizations about the purpose of the EGCP JV, the means by which the partnership achieves that purpose, and who will benefit from the EGCP JV's accomplishments.

THE EGCP JV MISSION

The East Gulf Coastal Plain Joint Venture protects and restores bird populations of the East Gulf Coastal Plain by coordinating the effective conservation of key habitats.

The East Gulf Coastal Plain Joint Venture office supports the partnership by facilitating communication among partners and leading the development and pursuit of a shared conservation vision. Our planning efforts are rooted in science, implemented at the landscape scale, and aim to maximize conservation benefits.

By strategically integrating the conservation actions of our partners, we can effectively secure a sustainable future for birds and the habitats on which they rely.

A Vision for the EGCP JV

The following vision statement articulates the EGCP JV's long-term expectations regarding underlying values, conservation impacts, partnership organization, and public image. While meant to be ambitious and inspiring, the vision also serves as a set of benchmarks for coarsely evaluating the character, composition, roles, and accomplishments of the EGCP JV.

THE EGCP JV VISION

VALUES

- ***The EGCP JV achieves greater success through the synergy of partnership than as individual agencies and organizations.***
- ***The EGCP JV pursues bird conservation through improvements in the quality and quantity of habitat and is guided by a science-based strategy that is implemented at the landscape scale.***

IMPACT

- ***Habitats of the EGCP are well-managed, fully-functioning ecosystems capable of maintaining regional avian diversity.***
- ***EGCP JV partner organizations implement on-the-ground habitat conservation that makes significant progress towards shared, regional goals.***
- ***The EGCP JV leads the development of spatially-explicit decision support tools to guide conservation design and delivery towards projects of highest ecological value.***
- ***Monitoring and targeted research are used to quantify the impact of EGCP JV conservation actions on birds and their habitats as well as to continually refine EGCP JV priorities.***

ORGANIZATION

- ***A diverse, dedicated, and engaged Management Board leads the EGCP JV supported by a fully-staffed Joint Venture Office .***

IMAGE

- ***The EGCP JV plays a pivotal role in habitat conservation at the landscape scale and is recognized as the hub of a bird conservation community that works in concert to achieve shared regional, science-based goals for habitat conservation and management.***

Administrative and Planning Boundaries

Like several existing habitat-based Joint Ventures, the administrative boundaries of the EGCP JV are aligned as closely as possible with the Bird Conservation Regions (BCRs) established under NABCI. Bird Conservation Regions represent a common geospatial framework for delineating broad areas of the North American landscape sharing similarities in avian communities, habitats, and resource issues. However, because the EGCP JV is one of the last Joint Ventures to become established in the Southeastern U.S., its geographic focus is also influenced by the administrative boundaries of the five existing Joint Ventures that adjoin it. Nonetheless, by focusing its attention on broad landscapes of ecological similarity, the EGCP JV will transcend state and other geopolitical boundaries. This will help the EGCP JV address the threats and other factors affecting bird populations at the most ecologically relevant scales.

Presently, the EGCP JV boundaries roughly correspond to the EGCP physiographic region as defined by Partners in Flight. This region represents that portion of the Southeastern Coastal Plain BCR (BCR 27) lying west of the Georgia-Alabama state line, and including the Florida panhandle, much of central Alabama and Mississippi, portions of west Tennessee and Kentucky, and eastern Louisiana (Fig. 2) (Bonney et al., 1999).

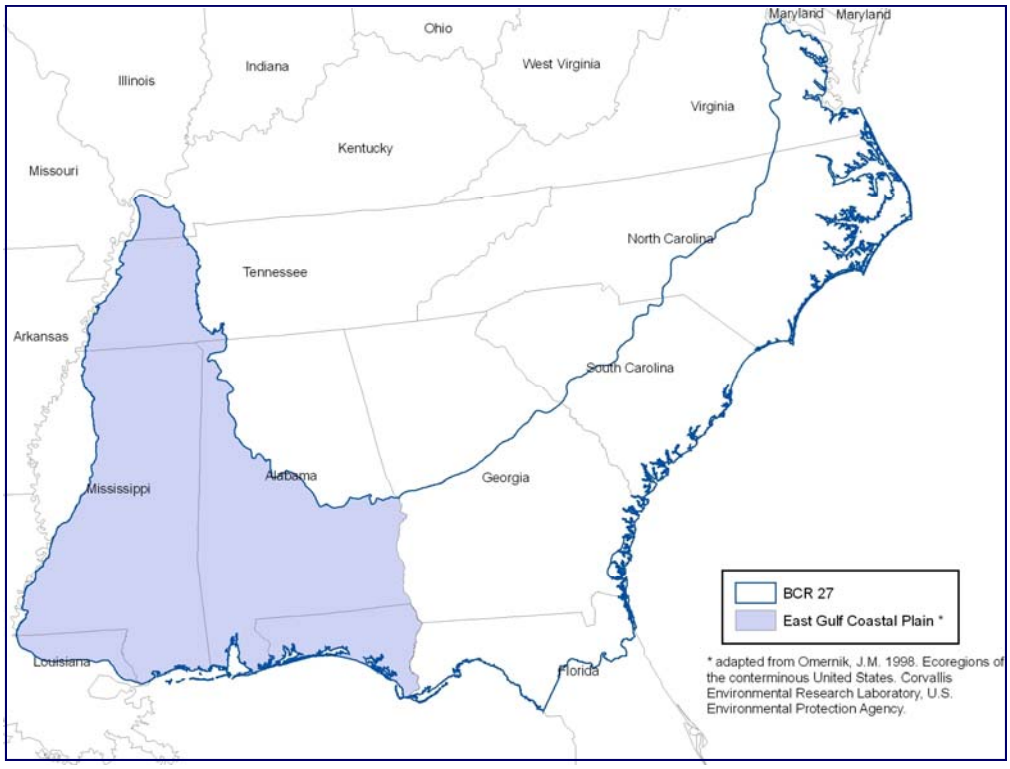

Figure 2. The East Gulf Coastal Plain ecoregion relative to Bird Conservation Region 27.

Prior to the formation of the EGCP JV, the administrative boundaries of the Lower Mississippi Valley, Gulf Coast, and Atlantic Coast Joint Ventures overlapped parts of the EGCP ecoregion. Through consultation with staffs and Management Boards of the affected Joint Ventures, in particular with affected state partners attempting to manage involvement in multiple Joint Ventures, consensus was reached regarding areas of overlap and each Joint Venture agreed to modify its administrative boundaries accordingly. This resulted in the current delineation of the EGCP JV administrative boundary (Fig. 3).

The EGCP JV is committed to working with neighboring Joint Ventures to ensure that biological planning and conservation design efforts are integrated as seamlessly as possible across Joint Venture boundaries. In many cases, this will also require close collaboration regarding habitat delivery, and perhaps even research, monitoring, and evaluation. Regardless of the need, the EGCP JV welcomes opportunities to collaborate with other existing partnerships in the conservation of priority bird habitats across the Southeastern U.S.

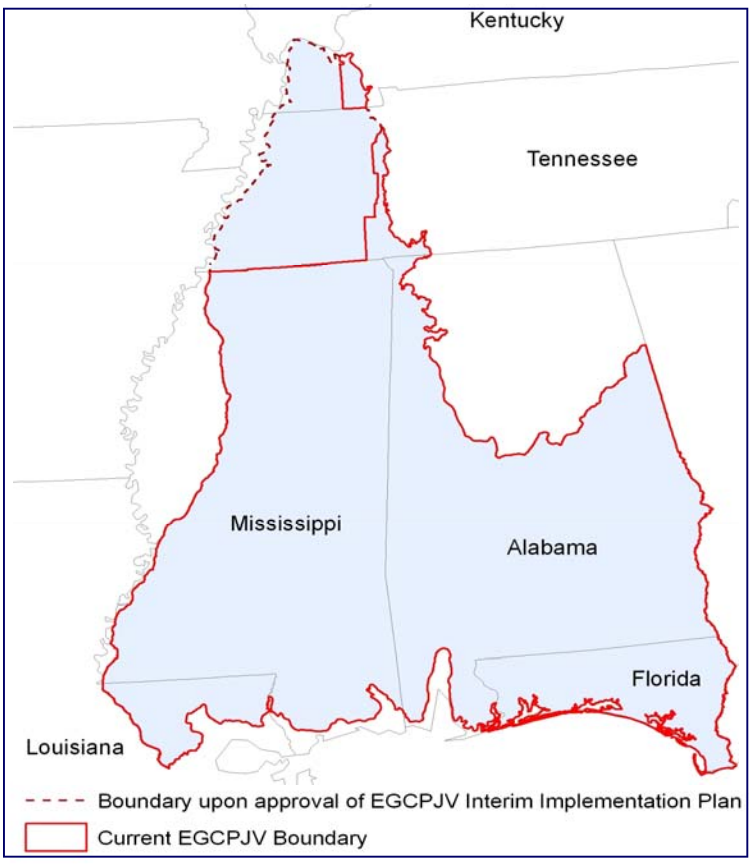

Figure 3. Current and proposed administrative boundaries for the EGCP JV

The East Gulf Coastal Plain Joint Venture administrative boundaries are defined as follows:

- ***Boundary shared with the Gulf Coast Joint Venture***. This boundary is defined by Omernik's (1998) Level 3 ecoregional boundary between the Southeastern Plains and the Southern Coastal Plain.
- ***Boundary shared with the Atlantic Coast Joint Venture.*** This boundary is defined by the Apalachicola River in Florida and, moving northward, the Alabama-Georgia border up to the southern extent of Omernik's (1998) Level 3 Ridge and Valley ecoregion.
- ***Boundary shared with the Lower Mississippi Valley Joint Venture.*** Pending approval of this Implementation Plan by the U.S. Fish and Wildlife Service (USFWS) Division of Bird Habitat Conservation, this boundary will correspond with the eastern edge of the Mississippi Alluvial Valley BCR (BCR 26) in Louisiana, Mississippi, Tennessee, and Kentucky.
- ***Boundary shared with the Central Hardwoods Joint Venture.*** This boundary corresponds to the delineation of the Central Hardwoods BCR (BCR 24) in western Kentucky, western Tennessee, and northern Alabama.
- ***Boundary shared with the Appalachian Mountain Joint Venture.*** This boundary is defined in northeastern and east-central Alabama by Omernik's (1998) Level-3 ecoregional boundary between the Southeastern Plains and the Ridge and Valley, Southwestern Appalachian, and Piedmont ecoregions.

History of the EGCP JV Partnership and Organizational Overview

The EGCP JV partnership has formalized itself as an organization in preparation for an enduring presence as a member of the Southeastern U.S. conservation community. This organizational structure reflects the belief that form should follow function, thus the structure of the EGCP JV exists to support and implement the core function of the EGCP JV, sound conservation decision-making and corresponding action.

Sandhill Crane. Mississippi Sandhill Cranes area a high priority subspecies resident in the EGCP.

Discussions regarding the formation of a Joint Venture in the EGCP first began among the USFWS and several state agencies and non-profit conservation organizations in 2002. Soon after, interested individuals came together as a steering committee, working to move the partnership from concept to reality. Commitments of time, energy, and initial funding were made by ten partners. Additional partners joined in time, and under the auspices of the EGCP JV, all committed to the notion of a landscape-oriented partnership that would strategically deliver 'all-bird' conservation throughout the region.

To ensure continued progress, partners agreed that it would be beneficial to establish an office and hire an initial staff consisting of a Joint Venture Coordinator. Partners chose to headquarter the EGCP JV office within the U.S. Geological Survey's (USGS) Alabama Cooperative Fish and Wildlife Unit (ALCFWU) at the School of Forestry and Wildlife Sciences at Auburn University in Auburn, Alabama. The ALCFWU is also home to the Alabama Gap Analysis Project (AL-GAP) Lab, a GIS and Remote Sensing lab responsible for land cover mapping for the EGCP portion of the Southeast Gap Analysis Project (SE-GAP). Both USGS and Auburn University are actively involved in administrative and technical activities of the EGCP JV. The co-location of the EGCP JV with a USGS research station and an academic institution has promoted innovative collaboration that supports the missions of all these partners.

The following is a brief description of the composition and organizational structure of the EGCP JV. For greater detail, please refer to Appendix A, Operational Procedures for the EGCP JV and Appendix B, Roles and Responsibilities.

Organization & Administration of the EGCP JV Partnership

Partners

Any organization that actively participates in furthering the EGCP JV's mission will be openly welcomed as a recognized partner of the EGCP JV. There is no limit to the number of potential partners who wish to engage in the activities of the EGCP JV, but partner organizations are expected to continually aid in the implementation of the EGCP JV's conservation planning, action, and evaluation activities.

EGCP JV Management Board

The Management Board is comprised of a subset of EGCP JV partners that volunteer time and commitment to oversee and lead the partnership. The Management Board consists of representatives from multiple partner organizations. Eight Management Board members represent state and federal natural resource agencies, and additional members represent private conservation organizations, business and industry, and other groups. At present there are 13 organizations serving on the Management Board (see inset).

Organizations offering representatives to serve on the Management Board commit to engage in the governance of the EGCP JV and in the development of its organizational and conservation strategy by attending Management Board meetings and participating in conference calls, working groups, or other such responsibilities as they arise. Organizations represented on the Management Board are asked to contribute financially to the EGCP JV to the extent budgets and other resource constraints allow.

Management Board Partner Organizations

Alabama Department of Conservation & Natural Resources
American Bird Conservancy
Auburn University
Florida Fish & Wildlife Conservation Commission
Kentucky Department of Fish & Wildlife Resources
Louisiana Department of Wildlife & Fisheries
Mississippi Department of Wildlife Fisheries & Parks
National Audubon Society
National Wild Turkey Federation
Tennessee Wildlife Resources Agency
U.S. Fish & Wildlife Service
U.S. Forest Service
Wildlife Management Institute

EGCP JV Technical Committee

The Technical Committee serves as the forum for coordination and communication on technical issues among EGCP JV partners (see inset). The Technical Committee addresses topics and develops products as directed by the Management Board with support from EGCP JV office staff. Members of the Technical Committee include scientists and technical staff from partner organizations as well as other regional avian experts.

Technical Committee Partner Organizations

Alabama Department of Conservation & Natural Resources
Auburn University
Florida Fish & Wildlife Conservation Commission
Kentucky Department of Fish & Wildlife Resources
Louisiana Department of Wildlife & Fisheries
Mississippi Department of Wildlife Fisheries & Parks
Mississippi State University
National Wild Turkey Federation
Tennessee Wildlife Resources Agency
U.S. Fish & Wildlife Service
U.S. Forest Service
U.S Geological Survey

Individuals serving on the Technical Committee commit to engage in the progressive refinement of EGCP JV conservation goals by attending Technical Committee meetings and participating in conference calls, working groups, etc. The Technical Committee's membership and agenda are largely determined by the current set of specific technical tasks and products that are actively being addressed by the Joint Venture. On an ad hoc basis, the Technical Committee may convene small teams of experts to work on very discrete tasks, such as development of information or products related to a specific habitat or avian community. It is anticipated that technical committee structure, membership, and activity will evolve to address the changing technical demands of the EGCP JV most effectively. Such focused work by teams of experts will aid in the development of a strong biological foundation, critically conceived decision support tools, and priority research and evaluation projects that all contribute to continual refinement in the ability of the EGCP JV to deliver habitat conservation.

EGCP JV Staff

Pledges of financial support from 11 EGCP JV partner organizations currently fund the EGCP JV Coordinator position. Beginning in January 2008, Partner organizations will also fund a graduate research assistantship at Auburn University that will provide technical assistance for a variety of EGCP JV conservation planning projects. The student's dissertation research will address assumptions made during the development of a decision support tool to guide the restoration of longleaf pine and other open pine habitats in the EGCP. Administrative needs of the EGCP JV are met by part-time administrative support provided in-kind by the USFWS. The USGS and SE-GAP program support a short-term Geographic Information System (GIS) analyst position assigned to assist with EGCP JV conservation design and other projects.

In anticipation of increased administrative funding through the USFWS, the EGCP JV partners have outlined the minimum staff and programmatic growth necessary for the EGCP JV to become more fully functional in advancing its mission. Figure 4 and Table 1 depict the EGCP JV's organizational structure and minimum staffing plans, respectively.

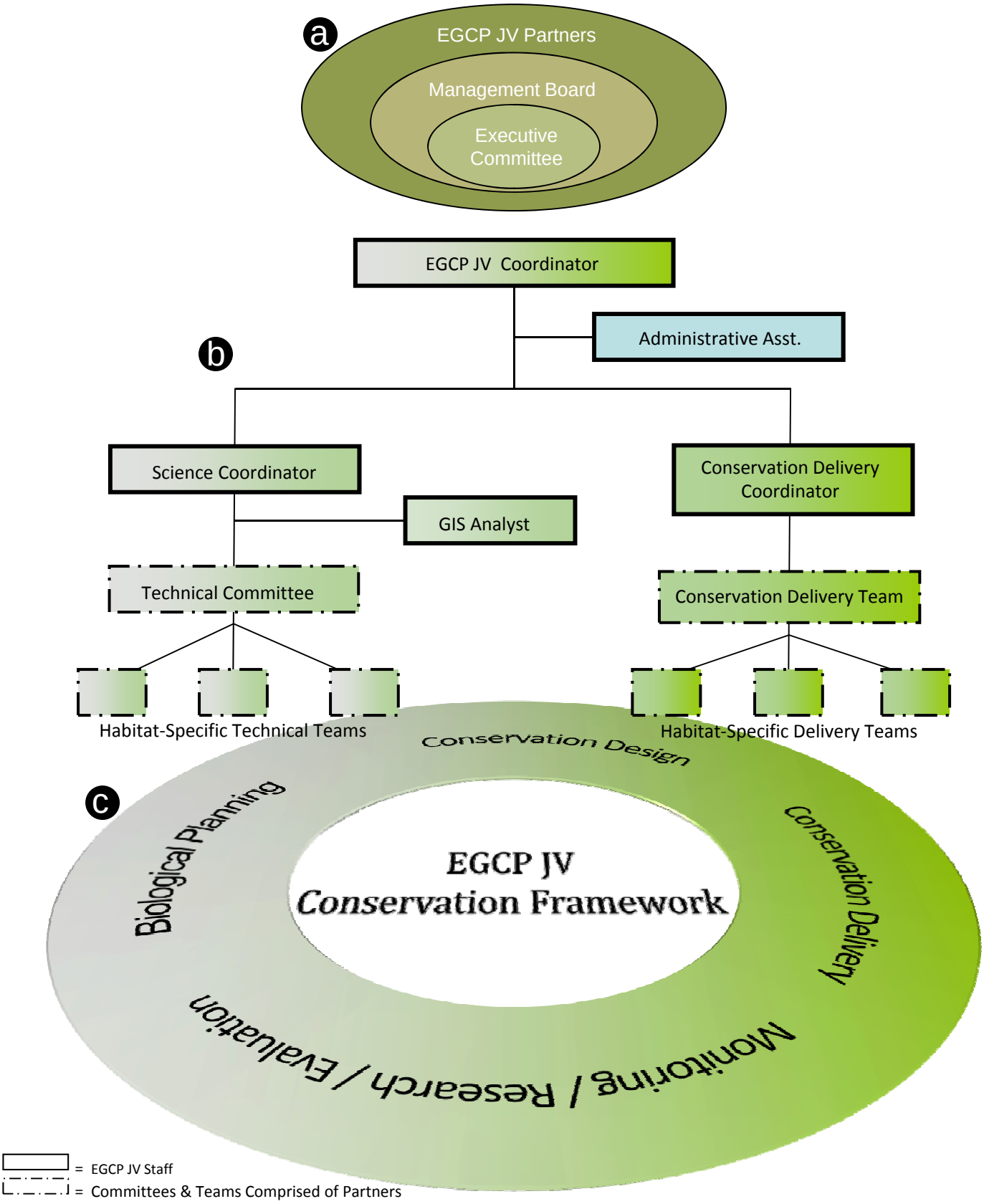

Figure 4. (a) Organizational relationships within the EGCP JV; (b)and the planned organization structure of the EGCP JV as it relates to (c) the underlying iterative conservation framework.

Table 1. Tentative budget describing how the EGCP JV plans to invest Joint Venture administrative funding (1234 funds) that may be provided through the U.S. Fish and Wildlife Service.

Goal	Need	Purpose	Estimated Cost* (salaries + benefits)	Desired Timeframe
Grow and strengthen the EGCP JV partnership, its shared vision for science-based, landscape-scale bird conservation and programs to achieve that vision	Retain JV Coordinator	Provide leadership and direct the operation of the EGCP JV and maintain primary responsibility for its programmatic, organizational, and financial management.	$90- 102 K/yr	YR 1-5
Create capacity for development and integration of biological planning and conservation design	Science Coordinator	Facilitate groups of avian experts in the development of biological planning and work with the GIS Analyst to incorporate these elements into GIS-based conservation design and habitat tracking tools.	$76 - $83 K/yr	YR 2-5
	GIS Technician/ Analyst	Translate biological planning into conservation design tools utilizing ecological modeling, GIS, and remote sensing.	$52 - $59K/yr	YR 1-5
	Computer hardware and software	Capacity for conservation design	$10K	YR 2
Assist JV Partners in the application of conservation planning and design tools to enable effective conservation delivery	EGCP JV Conservation Delivery Coordinator	Communicates JV priorities to Partner Organizations and facilitates the use of EGCP JV conservation design tools; Coordinates inter-agency implementation teams in priority geographic areas.	$76 - $83 K/yr	YR 3-5
	Outreach Support	Support for communications tools (including meeting costs) to faciliate use of EGCP JV conservation planning products	$5K/yr	YR 1-5
Promote assumption-driven research and monitoring to refine EGCP JV biological models	EGCP JV - sponsored graduate student(s)	Pursue graduate-level projects at Universities in the EGCP that are directly related to EGCP JV priority research needs.	$20K-$60K/yr (@$20K/student/yr)	YR 1-5
	Science Support	Support for research to test assumption-driven hypotheses derived from biological planning and conservation design processes.	$25 K/yr	YR 1-5
Promote and grow the EGCP JV partnership	Travel support	Staff attendance at regional & national meetings	$16-25K/yr	YR 1-5
Maintain EGCP JV office	Office costs and supplies	Conference call and meeting costs; supplies	$3-5K/yr	YR 1-5
Total Cost FY 09 **Total Cost FY 10** **Total Cost FY 11** **Total Cost FY 12** **Total Cost FY 13**			**$211,796** **$302,562** **$404,863** **$416,691** **$446,519**	

* Estimated costs calculated using federal pay and benefit scales and GS grades currently assigned to analogous positions within established Joint Ventures. These positions will not necessarily be federa positions and may be housed by EGCP JV Partner Organizations

Tracking Programmatic and Organizational Performance

Broadly stated, the three hallmarks of success of an organization are to deliver superior performance, make a distinctive impact, and achieve a lasting endurance. These apply to the EGCP JV, and yet, like analogous enterprises in the social sector, it is a challenge to assess progress towards these measures of success objectively. In the business sector, financial resources are both inputs and outputs and performance is often measured by monetary gain. However, in the case of organizations whose primary purpose is not profit making, financial resources are only inputs and performance is assessed relative to less tangible outcomes that represent the mission. Thus the process of tracking accomplishments for the EGCP JV is more complex than merely assessing financial gain, and the more relevant questions that must be pursued relate to the effectiveness with which the EGCP JV delivers its mission (Collins, 2005).

While some components of the EGCP JV mission, such as gains in high-quality habitat and avian populations, can be quantified, albeit with some difficulty, some can only be tracked by assembling a body of qualitative evidence. As the objectives of the EGCP JV's work plan are articulated and subsequently reviewed, the gathering of evidence to consistently and intelligently assess performance will remain a priority. Below are examples of attributes of the partnership for which the EGCP JV intends to develop and implement metrics to monitor. As the EGCP JV's programmatic complexity evolves, so too must the measures of success. The EGCP JV intends to use the metrics listed below to gauge its progress towards the following goals:

Goal 1. Deliver Superior Performance

- Achievement of desired regional avian diversity and population levels
- Well-managed, fully-functioning habitats that target quality and quantity
- Biologically and ecologically-based shared vision for EGCP habitat conservation and management

Goal 2. Make a Distinctive Impact

- Innovative and relevant conservation design tools
- Conservation delivery executed as part of regional, landscape-scale strategies
- Regional collaboration to maximize effective conservation delivery

Goal 3. Achieve Lasting Endurance

- Strength and breadth of partnership
- Sustained commitment of partner organizations
- Regional visibility and leadership
- Public appreciation for and support of bird habitat conservation
- Adequate funding to achieve programmatic goals

II. A Strategic Approach to Habitat Conservation

The EGCP JV Management Board and Technical Committee have agreed to utilize a framework (Fig. 1) to guide their conservation activities based upon the findings of the National Ecological Assessment Team (2006) regarding Strategic Habitat Conservation. The adoption of this framework reflects the EGCP JV's desire to avoid opportunity-driven approaches to conservation. Instead, guided by science, the EGCP JV aims to coordinate and direct partner resources in the most ecologically appropriate and effective ways.

American White Pelican.

The EGCP JV conservation framework defines a set of discrete functional elements (biological planning, conservation design, conservation delivery, and applied monitoring and research) and links them into a singular approach to conservation. By organizing its work within this framework, the EGCP JV can better assess the contribution and relevance of individual initiatives or projects to the EGCP JV conservation agenda as a whole. Furthermore, the framework provides a consistent vocabulary that enables partners to articulate and identify their roles and capacities to participate in the partnership. Using the framework as a guide, the EGCP JV Management Board and Technical Committee will identify and prioritize specific activities according to the needs and opportunities for accomplishing the ECGP JV mission.

The following sections outline how the EGCP JV intends to address the main functional elements of this framework or, where applicable, depict progress to date.

Biological Planning

Although the technical process of conservation is cyclical and iterative, biological planning is often viewed as an integral 'first' step upon which subsequent conservation activities are rooted. Thus, the EGCP JV has devoted a large portion of its initial energy to the assessment, improvement, and expansion of a biological foundation that will serve as a basis for consequent planning, implementation, and evaluation activities.

Blackbelt Prairie.©Kevin Kleiner

Conceptually, biological planning consists of three primary elements:

- Defining the ecological context of a particular region of interest, including major threats and limiting factors
- Prioritizing birds and habitat types
- Articulating population objectives and species-habitat relationships

Defining the Ecological Context of the East Gulf Coastal Plain

The main tenet behind the EGCP JV's conservation activities is that an increase in the availability of suitable avian habitat (both quantity and quality) will result in corresponding increases in avian populations. This tenet underscores the importance of developing a full understanding of the current status of avian habitat in the EGCP as a basis for developing a rigorous biological foundation that informs latter decisions regarding conservation design and ultimately delivery.

The EGCP JV Technical Committee developed and approved a bird-habitat framework that will be relevant to our conservation planning (see right). This categorization of habitat types is derived from an informal bird-habitat framework developed more generally for the Eastern U.S., and that was the basis of earlier bird conservation planning efforts (e.g. Partners in Flight). This framework is intentionally designed to be crosswalked easily to the 101 habitat classes of the EGCP as mapped by SE-GAP. The idea behind the framework was to develop a 'classification' of habitats appropriate for describing and capturing distinct avifaunal communities in the EGCP that can be readily portrayed using available spatial mapping products. Each habitat of the EGCP is distinct in the suite of bird species it supports as well as in the challenges to conservation (Table 2). Detailed descriptions of each habitat type, specific conservation challenges, and associated avian fauna can be found in Appendix D.

EGCP JV Habitat Framework

Eastern Interior Grassland Communities

- **Meadows and Prairies (e.g., Blackbelt & Jackson prairies)**
- **Agricultural and Cropland**
- **Pasture**
- **Rank Herbaceous/Grasses**

Freshwater Wetland Communities

- **Freshwater Non-forested Wetlands**
  - Freshwater Emergent Marsh
  - Bogs/Seepage Slopes/Ephemeral Wetlands
  - Freshwater Shrub-Scrub
  - Mudflats/Sandbars/Shoals
- **Freshwater Forested Wetlands**
  - Bottomland Hardwood
  - Cypress-Tupelo
  - Bay Swamps & Depressional Wetlands
  - Shrub-scrub Swamp (e.g., Buttonbush, Alder)
  - Beaver Ponds/Meadows
- **Riparian**
  - Riparian Woodland
  - Riparian Scrub/Edge
- **Open Water**

Eastern Shrub-Scrub Communities

- **Early-successional Hardwood/Pine**
- **Manmade/Disturbed (e.g. hedgerows, Rights-of-Way)**

Coastal Communities

- **Maritime Shrub-Scrub**
- **Maritime Forest & Hammock**
- **Estuarine Emergent Marsh**
- **Beaches and Dunes**
- **Tidal Mudflats**
- **Near-shore Open Waters**

Pine-Dominated Communities

- **Pine Flatwoods/Mesic Pine (open/Savanna)**
- **Pine Uplands & Sandhills (open/Savanna)**
- **Pine Plantations**
- **Other Pine Forest (e.g., fire-suppressed pine forests, etc)**

Upland Hardwood & Pine-Hardwood Communities

- **Mixed Hardwoods**
  - Loess Bluffs
  - Tennessee Plateau
- **Pine-Hardwood**
- **Hardwood Plantations**

Habitat Type	Extent			Conservation Challenges	Select Priority Bird Species
	Acres	% of EGCP JV area	% protected		
Coastal Communities	138,548	0.23%	4.1%	Urban development Anthropogenic disturbance Shoreline hardening and beach nourishment Water quality degradation, pollution	Snowy Plover Red Knot seaside sparrows long-distance migrants
Freshwater Wetland Communities	8,506,309	14.22%	1.8%	Hydrologic alteration & fragmentation Nonpoint-source pollution, sedimentation, and disturbance Surface & groundwater withdrawal Incompatible land use (those that significantly alter forest composition and structure)	Little Blue Heron Swallow-tailed Kite Piping Plover American Woodcock Prothonotary Warbler Cerulean Warbler Swainson's Warbler Rusty Blackbird
Upland- and Pine-Hardwood Communities	12,437,417	20.80%	1.0%	Transportation corridors Urban development Unsustainable forestry practices (e.g., high-grading, conversion to pine plantations)	Yellow-billed Cuckoo Cerulean Warbler long-distance migrants
Pine-dominated Communities	15,690,865	26.24%	0.5%	Alteration/ cessation of natural fire regimes Conversion to off-site pine Ecologically inappropriate stocking densities Increasing urban and ex-urbanization	Northern Bobwhite Red-cockaded Bachman's Sparrow
Eastern Interior Grassland Communities	12,969,552	21.69%	0.2%	Little remaining acreage Conversion to agriculture Agricultural pesticides	Henslow's Sparrow Loggerhead Shrike Northern Bobwhite

Table 2. Major habitat types within the East Gulf Coastal Plain, their extent, major habitat threats, and select priority bird species.

Climate Change

As the potentially significant influences of global climate change will likely impact all habitats of the EGCP, biological planning and conservation activities of the EGCP JV will increasingly be developed in the context of the impending changes. A biological foundation that defines and quantifies specific relationships between bird populations and their habitats must include a consideration of how these relationships may be altered by predicted shifts in temperatures, sea levels, hydrologic regimes, and corresponding impacts on habitat. Furthermore, potential climate change impacts should be integrated into the determination of where on-the-ground habitat restoration and conservation work will have the greatest long-term conservation benefit. Monitoring activities of the EGCP JV must also be designed to detect changes caused or exacerbated by the myriad manifestations of a changing climate.

Examples of the types of questions related to climate change that the EGCP JV will begin to evaluate in its conservation planning include:

- Are accretion and sedimentation rates sufficient to maintain or promote marsh habitats in areas that may be impacted by sea level rise?
- Do existing conservation lands provide appropriate corridors capable of supporting geographic shifts in vegetative communities, habitats, and corresponding bird communities?
- How might shifts in migration chronology in response to warming relate to possible changes in the timing and availability of certain foods and foraging habitats?
- How will climate change impact the ability to manage for quality habitats at critical times of year (e.g. water level manipulations for shorebirds and waterfowl)?
- How might species distribution and abundance change in response to shifting climate, and how will development of comprehensive inventory and monitoring programs need to track such changes?
- How might climate change impact habitats outside the EGCP that priority birds of the EGCP JV depend on?
- How can habitat conservation and restoration programs and projects be strategically merged with mitigation and sequestration of greenhouse gas emissions?

At present, the bird conservation community is constrained by a limited understanding of the precise implications of climate change on birds, especially changes in climate variables that may most limit species' ranges (e.g., moisture or ambient temperature). In regard to changing habitat conditions, modeling exercises will grow more complex in order to understand predicted changes to vegetation patterns, hydrology, and sea level as they relate to bird populations, habitat availability, and condition. The EGCP JV plans to work in concert with other Joint Ventures to assess and design landscape conservation in light of climate change and other emerging threats to bird habitats.

Prioritizing Habitats and Birds

Habitats

As a means to jump-start activities, the EGCP JV has identified several priority habitats to serve as a focus for initial conservation planning and implementation activities. In prioritizing which habitats will first receive attention by the EGCP JV, the Technical Committee and Management Board considered the degree of conservation concern associated with the avifauna in each habitat type, the value-based importance of each habitat to partner organizations, and the importance of the EGCP with respect to each habitat's total geographic extent.

The EGCP JV has selected the following ecological communities and habitat types for attention in the near term. They are listed in order of priority:

- Pine-dominated Communities (with an emphasis on open longleaf pine uplands and savannas)
- Eastern Interior Grassland Communities (with an emphasis on native warm season grasses, prairies, and meadows)
- Freshwater Wetland Communities (with an emphasis on bottomland hardwood habitats)

Birds

Although the priority habitats will broadly define the initial focus of the EGCP JV, the identification of priority bird species will further refine biological planning within those habitats. The Technical Committee evaluated all of the breeding, wintering, and resident birds of the EGCP to assess their relative conservation status or socioeconomic importance, and subsequently determine which taxa should be considered priorities for conservation attention. Priority in this case means that each bird species is of concern because of its conservation status and/or its socioeconomic importance in the EGCP.

Assessment data and determination of priorities were based on information contained in planning documents from four national bird initiatives (East Gulf Coastal Plain Partners in Flight Bird Conservation Plan, Southeast U.S. Waterbird Plan, Southeastern Coastal Plain and Caribbean Region Shorebird Conservation Plan, and the North American Waterfowl Management Plan), six state wildlife action plans (Alabama, Mississippi, Louisiana, Kentucky, Tennessee, and Florida), and expert opinion where applicable. Current priorities listed in Appendix C represent an interim product. Future planning will refine this list through annotations that document the rationale for each species' inclusion as a priority as well as the relative urgency of conservation attention warranted. The EGCP JV also intends to identify species for which populations levels, trends, and other data are insufficient and that should be addressed by further research and monitoring.

Forested wetlands of the EGCP are important breeding habitats for Prothonotary Warblers and many of other species of Neotropical migrant landbirds.

Population Objectives and Species-Habitat Relationships

From its list of priority bird species, the EGCP JV Technical Committee has or will select a suite of umbrella species for each major habitat type in the EGCP (Appendix D). Umbrella species will represent the habitat needs of a broader suite of birds that together comprise the full range of avian habitat niches within a particular ecosystem. The EGCP JV will use these species to set population goals, define habitat relationships, and further inform the conservation design process for individual habitats. The EGCP JV uses the following definition in its selection of umbrella species (Roberge and Angelstam, 2004):

> "An umbrella species is defined as a species whose conservation is expected to confer protection to a large number of naturally co-occurring species….This concept has been proposed as a tool for determining the minimum size for conservation areas, selecting sites to be included in the reserve networks, and setting minimum standards for the composition, structure, and processes of ecosystems. What qualities should a 'dream team' of focal species possess to be a dependable tool of biodiversity assessment and conservation planning?.... For each landscape type, the most sensitive group of species in terms of resources, area requirements, connectivity, and natural processes (e.g. fire and flooding regimes) should be selected."

Population objectives for each umbrella species will be set at an ecoregional scale by 'stepping down' population goals set in relevant national plans, in conjunction with information on relative distribution within the range (density), and the proportion of the range encompassed by the EGCP JV planning boundary.

Population objectives are only relevant to habitat conservation if the relationships between a species and its habitat are understood and quantified. The EGCP JV will attempt to quantitatively describe the links between a given species and its habitat and apply that relationship spatially to better understand where on the landscape adequate habitat exists or where habitat conservation efforts should be targeted to achieve desired bird population responses. To this end, ongoing work by the Lower Mississippi Valley and Central Hardwoods Joint Ventures to monitor and predict changes in the sustainability of priority bird populations through evaluation of forest structure attributes in the West Gulf Coastal Plain and Central Hardwoods BCRs will have important applicability to the EGCP.

Black-crowned Night-Heron.

Conservation Design

Conservation design connotes the process of defining the amount, configuration, and condition of habitat needed to support bird populations at prescribed levels, and where on the landscape these habitats should occur to best support objectives. Numeric habitat objectives can be calculated from population objectives specific to the EGCP region coupled with an understanding of the explicit habitat requirements of umbrella species for each priority habitat. Utilizing GIS, numeric habitat objectives can be spatially defined and specific areas of the landscape prioritized according to their conservation potential. Throughout this process, assumptions and uncertainties inherent to each data layer and the resultant model are articulated and recorded for future validation.

Section III provides a detailed description of the EGCP JV's development of a decision support tool to guide the restoration of longleaf pine habitats in the EGCP.

Current Land Cover

Estimates of the current extent of habitat types as defined in the EGCP JV habitat framework were derived from the SE-GAP land cover map. This map was created using LandSat Enhanced Thematic Mapper Plus imagery collected between 1999 and 2001 and a supervised approach to image classification. The habitat classes mapped by SE-GAP consist of a combination of NatureServe Ecological Systems, and several anthropogenic land cover classes that are not part of NatureServe classification. Known localities of land cover types were related to spectral signatures from the available imagery through a variety of methods including decision trees, logistic regression, and spatial overlays with other datasets. The resulting SE-GAP map for the EGCP JV contains 101 land cover classes depicted at 30 meter pixel resolution (Fig. 4) (McKerrow et al., forthcoming.).

The 101 classes of the SE-GAP land cover map were then crosswalked to the eight communities and 32 habitats identified in the EGCP JV habitat framework. Although the classifications are similar and the crosswalk straightforward, several SE-GAP land cover classes, primarily those corresponding to unvegetated areas and cliffs, lacked a corresponding habitat or community type on the EGCP JV Habitat Framework. However, these were less than 0.1% of the total EGCP area.

According to the results of the SE-GAP land cover classification, there are almost 12.9 million acres of grasslands (including pasture and row crop) which is 22% of the total EGCP area. Freshwater wetland communities comprise 8.5 million acres (14%), shrub-scrub habitats (almost exclusively successional) account for 6.4 million acres (11%), and urban areas comprise 3.6 million acres (6%). The two dominant forest types, pine and mixed hardwood, comprise 15.7 million (26%) and 12.4 million (21%) acres, respectively. Coastal communities account for only 139,000 acres (0.2%) (Table 2 and Fig. 4).

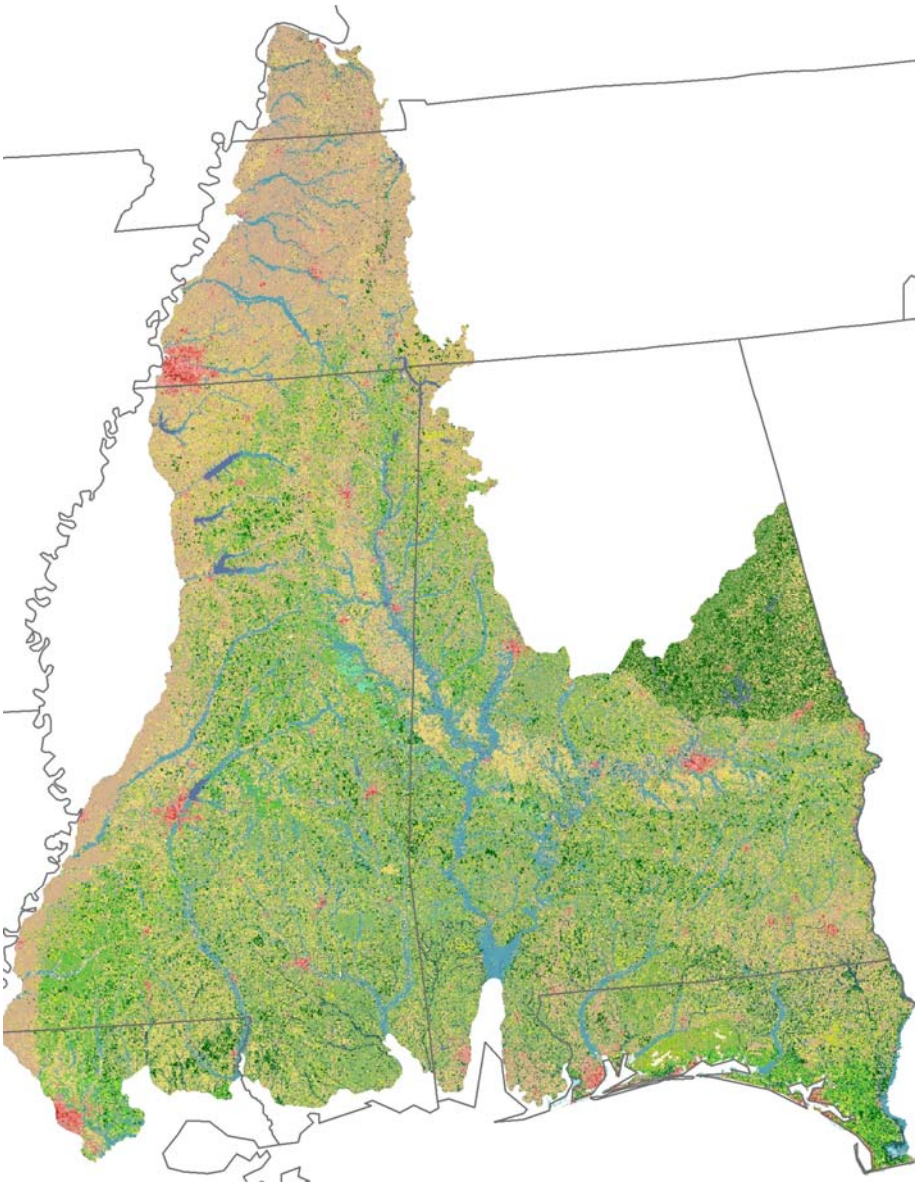

Figure 4. SE-GAP land cover map for the East Gulf Coastal Plain created using LandSat Enhanced Thematic Mapper Plus imagery collected between 1999 and 2001 (McKerrow et al., forthcoming).

Existing Conservation Estate

In planning bird conservation at a landscape scale, it is important to know what conservation potential exists in those lands currently owned or managed for natural resource stewardship. The SE-GAP project developed a geo-database and land stewardship layer that depicts parcel boundaries of federal, state, and municipal conservation lands and includes many private lands also managed for conservation. Each parcel of public land is assigned to a management status category which indicates the extent to which the land is actively managed for long-term biodiversity conservation (Silvano et al., 2007). These numerical categories do not indicate a ranking or value of the categories but are descriptive in nature. Category 1 indicates a level of protection for lands that are permanently managed for biodiversity conservation and only natural disturbance is allowed. Category 2 consists of lands protected from conversion of natural land cover with the goal of maintaining a primarily natural state. Category 3 identifies areas which are ideally maintained to ensure natural land cover but which allow extractive uses (logging, mining, grazing, etc.) and Category 4 is assigned if there is no known intent for conservation management (Silvano et al., 2007). Just over 420,000 acres (0.07%) within the EGCP JV administrative boundary are currently managed under the definitions of Categories 1 and 2 (Table 2). This geo-database will help the EGCP JV to evaluate protected lands and address such conservation issues as patch size and connectivity.

Habitat Restoration Potential

In order to gauge the feasibility of delivering the quantitative habitat objectives developed as part of the biological planning process, the EGCP JV must assess the potential acreage within the EGCP landscape capable of being restored or conserved. For each habitat of interest, the EGCP JV will also assess the historic extent of that habitat type and what portion of that extent is capable of being restored (e.g., not permanently in an alternative land use). See Section III for a discussion of the process the EGCP JV will use to assess conservation design issues related to the restoration of longleaf pine habitats in the EGCP.

Conservation Delivery

Conservation delivery, or the action of restoring, conserving, or enhancing habitat, is the keystone of any successful conservation initiative. The best-designed landscape will not sustain desired bird population levels unless implemented via tangible habitat improvements. Conservation delivery necessitates the development and maintenance of a diverse and engaged EGCP JV partnership. It is the EGCP JV partner organizations, working both as individuals and collaboratively, who are chiefly responsible for the delivery of on-the-ground habitat conservation projects. The EGCP JV will serve as a forum that fosters cooperation and collaboration among partners regarding conservation delivery projects that address high priority regional needs. The EGCP JV will support the conservation delivery programs of its partners by fulfilling four key functions:

- Actively engage partners to apply conservation planning tools in ways that effectively guide and maximize the conservation potential programs.
- Facilitate the development and funding of conservation delivery that encompasses the interests and span administrative jurisdictions of partners.
- Apprise partners about policy issues (e.g. prescribed fire) that directly impact conservation delivery and advise partners on recommended actions.
- Utilize conservation planning products to leverage additional funding for high priority habitat conservation projects.

First, the EGCP JV must communicate the results and relevance of the biological planning and conservation design processes to all EGCP JV partners. Eventually, a Conservation Delivery Coordinator will be hired for this purpose and will serve as a liaison between EGCP JV staff and partners. Effective communication will target staff of EGCP JV partners at both the management and technical levels and include a range of products such as policy-level summaries of EGCP JV priorities, individual GIS data layers, and workshops designed to transfer results of planning efforts to partner delivery programs.

Scrubby maritime and near-coast habitats in the EGCP can be extremely important for migrant landbirds, such as this Common Yellowthroat, arriving to the mainland U.S. in spring after long trans-Gulf flights.

It will also be important to identify new partners who are active in conservation delivery, but not yet engaged in the EGCP JV's biological planning and conservation design activities. Communication efforts will be framed by a 'delivery strategy' developed for each habitat conservation planning initiative. Each strategy will identify expected conservation actions, the partners or programs expected to deliver the conservation actions, and habitat objectives for each type of conservation action. Section III articulates an example delivery strategy developed for the conservation of open pine habitats in the EGCP.

The EGCP JV will assist individual partners in coordinating projects that involve conservation delivery at a scale which surpasses the boundaries or jurisdiction of an individual partner. These might include projects that qualify for funding from the North American Wetlands Conservation Act (NAWCA), Neotropical Migratory Bird Conservation Act (NMBCA), or the Association of Fish and Wildlife Agencies' Multistate Conservation grant programs. As part of this coordination, the EGCP JV Management Board will solicit and review NAWCA grant applications, with particular emphasis on projects that are well-aligned with EGCP JV priorities. This role may expand to include other funding programs including NMBCA. If and when policy decisions or legislation directly impact the ability of EGCP JV partners to efficiently deliver on-the-ground conservation projects, the EGCP JV office will inform partners of the issue and its relevance to EGCP JV effectiveness. The EGCP JV staff will not directly engage in advocating specific policy positions or legislative language. Instead, EGCP JV staff may make recommendations or advise partners as to possible courses of action.

Prescribed fire is an integral part of maintaining high-quality open pine habitat in the EGCP.

The EGCP JV will identify relevant funding opportunities and disseminate that information to partners. Using the products from biological planning and conservation design will arm EGCP JV partners with transparent and defensible reasoning for targeting specific management action. This strategic approach to conservation will allow EGCP JV partners to compete for limited financial resources.

Monitoring, Research, and Evaluation

Although these are separate concepts in conservation science, they are so closely related to each other in the context of Joint Venture conservation efforts that they are treated here in a single section. Monitoring and research both contribute to the evaluation necessary for maintenance of a healthy and effective conservation process.

Monitoring is the process of assessing the status of populations, habitats, and other variables and tracking changes in those variables over time in an attempt to attribute observed changes to specific causes or processes. Monitoring can lead to an evaluation of the effectiveness of on-the-ground conservation projects. Evaluation of the effectiveness of conservation programs informs future conservation decisions. Monitoring, therefore, promotes improved efficiency and effectiveness of conservation actions (Nichols and Williams, 2006). Integrating this evaluation process into biological planning and decision making for management or conservation is central to the success of the EGCP JV.

Prairie Warbler.

Assumption-driven research involves measuring parameters of interest in the form of testable hypotheses related to critical assumptions in the decision making process. As with monitoring, results from assumption-driven research contribute to program evaluation and influence decisions upon which future conservation programs are based. Targeted research can address uncertainties or assumptions related to any stage of the EGCP JV's adaptive conservation framework (e.g., biological planning, conservation design, conservation delivery, or monitoring). Uncertainties and assumptions that strongly influence decisions about how, where, how much, and what types of habitat to conserve, restore, and manage should be the principal research emphases.

Monitoring Bird Populations

The goals of EGCP JV monitoring programs fall within several broad categories: tracking long-term population trends to assess conservation status; determining causes of population changes; measuring the response of bird populations to specific conservation actions; assessing particular vital rates indicative of reproductive success and survivorship; and determining status and changes in habitat quantity and quality. Meeting the broad monitoring goals reflected in these categories has been recognized as an important element to advance bird conservation effectively (Dunn et al., 2005; U.S. North American Bird Conservation Initiative Monitoring Subcommittee, 2007).

Improvement of monitoring performance in the EGCP involves analysis of, coordination among, and improvements to existing programs as well as instigation of new projects to address critical gaps or other information needs central to the partnership's conservation activities.

The anticipated roles of the EGCP JV are consistent with the findings of the NABCI Monitoring Subcommittee (2007), which recognized that the structure and function of Joint Ventures are well-suited to meet the growing challenge of improving upon the numerous avian monitoring programs that typically exist within a given landscape.

The EGCP JV seeks to improve upon the contributions of existing monitoring programs by encouraging design improvements and careful development of objectives. Another role of the partnership will be to provide monitoring coordination in order to increase efficiency and reduce redundancy. Additionally, the EGCP JV can help contribute toward improved management and analysis of data and the dissemination of pertinent results.

As a first step, information on planned or ongoing monitoring programs relevant to the EGCP will be compiled. Ideally, this will be done in the context of national and regional programs that are attempting to synthesize monitoring program information. This will allow EGCP JV partners to assess and clarify the purpose and contributions of specific programs, identify opportunities for integration, encourage reallocation or redistribution of programs where appropriate, share information, minimize redundancy, and maximize coordination. Emphasis will be placed on increasing the applicability of monitoring programs to the EGCP JV's conservation planning and management decisions. As this knowledge develops, the EGCP JV will conduct a monitoring needs assessment to articulate and prioritize activities by partner organizations and outline the coordination roles that the EGCP JV can fill.

A central role for the EGCP JV will be to assist in the development of coordinated monitoring to leverage capacity in informing regional and national conservation decisions.

The EGCP JV will work alongside other conservation entities in the Southeastern U.S., particularly the Lower Mississippi Valley, Gulf Coast, and Atlantic Coast Joint Ventures, to identify and address broader regional priorities for improved collaboration and efficiency. An overarching priority for the EGCP JV will be to integrate monitoring programs to address management and conservation questions across multiple spatial scales.

Tracking Habitat Change

To accurately depict the success of the EGCP JV to improve overall sustainability of bird populations in the region, the EGCP JV must develop the capacity to assess net changes in the availability and condition of avian habitat. Land use in the region is dynamic, and habitat conservation successes of the JV need to be considered in the context of region-wide land use changes.

Assessing gains attributable to conservation delivery projects in the EGCP will require site, program, and landscape-level tracking. Several template geo-databases are successfully used by existing Joint Ventures, and the EGCP JV plans to develop similar tools specific to EGCP JV needs or integrate as appropriate with geo-databases currently in use. The EGCP JV's close collaboration with SE-GAP creates an opportunity to develop a working understanding of net changes in land cover in the region and their significance to bird conservation activities.

An additional challenge will be to accurately account for improvements in habitat quality that are not evident from tracking changes in habitat acreages alone. As the EGCP JV intends to implement management and restoration actions reflecting the core principles of conservation biology (e.g. increased connectivity, decreased edge, and improved ecosystem function), metrics to track these improvements to existing habitat on the landscape must also be developed.

Addressing Assumptions and Uncertainties Through Research

Partners in the EGCP JV recognize the critical nature of continually refining the information on which conservation and management decisions are based. Biological planning and conservation design efforts will be limited by the availability of sufficient scientific information. Likewise, conservation delivery and monitoring strategies may be limited, for example, by an inadequate understanding of how habitats respond to management, or how detectability issues can bias survey data. Gaps in information will require assumptions describing the relationships, processes, or responses of interest. These uncertainties can be used to frame testable hypotheses that relate directly to elements of the EGCP JV's adaptive conservation framework. These assumptions and hypotheses will form the context within which the EGCP JV will develop, promote and coordinate research programs that help refine its planning, design, delivery and evaluation activities.

Specifically, the EGCP JV will develop a prioritized list of research topics and a priori hypotheses generated from the development of decision support tools focusing on priority habitats in the region. The EGCP JV office will assist partners in identifying and securing funding and other resources needed to conduct this research. Additionally, the EGCP JV will sponsor research assistantships for graduate students to pursue research topics guided by these priorities.

As with monitoring, the EGCP JV can assist in coordinating effort and pooling resources in the design and implementation of research projects that would otherwise be unfeasible due to their large resource requirements, logistical complexity, or broad geographic scope. Similarly, the EGCP JV can serve as a continuing forum in which scientists, biologists, and managers can discuss and prioritize research to best meet mutual needs and interests.

III. Strategic Habitat Conservation: A Case Study in Longleaf Pine

This section illustrates the EGCP JV's use of an iterative conservation framework to guide activities related to restoring a high priority ecosystem in the EGCP. The status of the work detailed in this section represents initial approaches and activities that will be continually refined and updated in subsequent iterations.

When EGCP JV partner organizations first met, they agreed that in addition to formalizing themselves as a Joint Venture partnership, they also wanted to quickly initiate conservation activity targeted at a high priority ecosystem for bird conservation. In October of 2006, the EGCP JV unanimously identified open-pine forest habitats, with an emphasis on the restoration of longleaf pine system as a foremost priority.

Longleaf pine flatwoods and uplands once covered nearly 90 million acres in the Southeastern U.S. The EGCP was home to a significant portion (27%) of the historic range of longleaf pine (Fig. 5) (Little et al., 1971). Yet this signature habitat of the EGCP has undergone drastic declines. Alteration of natural fire regimes and widespread conversion to systems dominated by loblolly and slash pine have drastically altered much of the original longleaf pine habitats across the EGCP. Today, pine woodlands in a 'natural' condition account for a mere 13.9 % of all pine-dominated forests in the EGCP (McKerrow et al., in forthcoming). This is in stark contrast to a landscape that was once dominated by open, low-density stands of longleaf pine. Despite these changes, the EGCP is home to some of the largest remaining stands of longleaf pine habitat (Prasad and Iverson, 2003). These open-pine ecosystems support a suite of bird species of high conservation concern for the EGCP JV. A detailed description of pine-dominated habitats and the birds that inhabit them can be found in Appendix D.

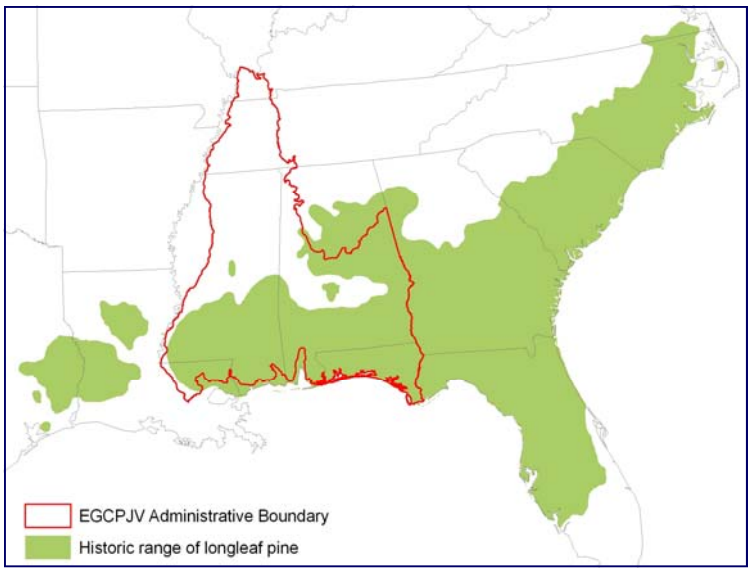

Figure 5: The EGCP JV administrative boundary overlaid with the historic range of longleaf pine as depicted by Little et al., 1971.

While the EGCP JV's interest in conserving longleaf pine systems stems from a mission rooted in bird conservation, the decline of open-pine habitats, particularly longleaf-pine flatwoods and uplands, has sparked widespread interest in conserving all aspects of biodiversity associated with these critically endangered habitats. The EGCP JV has partnered with a large and diverse group of agencies and organizations that each recognize the ecological importance and critical conservation needs associated with this ecosystem. Despite the widespread recognition and support, conservation of longleaf pine systems has largely been opportunistic due to limited capacity to determine where conservation might best be directed in support of specific conservation objectives. However, recent improvements in remote sensing, GIS, and spatial modeling now enable strategic conservation planning that better incorporates explicit spatial components.

Developing a Decision Support Tool for the Restoration of Open-Pine Habitats

The EGCP JV is developing a series of tools that will enable increasingly strategic conservation of open-pine habitats. This tool is intended to guide decisions about where, when, how, and why conservation actions should be undertaken based upon a comprehensive landscape analysis and the application of key conservation biology principles to maximize conservation benefits for birds and other wildlife. Additionally, the fundamental elements of this tool have applicability beyond the EGCP. This tool is stimulating additional collaboration with neighboring Joint Ventures whose planning boundaries and bird conservation priorities are intrinsically linked to conservation of longleaf pine systems.

EGCP JV habitat conservation strategies are rooted in the basic assumption that habitat availability, condition, and configuration are principal factors limiting the abundance of birds in the EGCP. Thus, through widespread restoration of pine habitats to more 'natural' open conditions, the EGCP JV assumes a corresponding increase in numbers of birds associated with open-pine ecosystems.

There is significant financial and human resource potential that can be applied to the conservation of longleaf and other open-pine systems. The EGCP JV is improving the collective capacity of existing programs by providing tools to enable decision-making that emphasizes priorities and maximizes conservation benefit. In addition, these tools will help build compelling arguments for additional resources by identifying where current capacity is insufficient to deliver the conservation effort necessary to achieve objectives.

To this end, components of the decision support tool address three important questions:

1. Where on the landscape do stands of high-quality, open-pine habitat currently exist ?
2. Where on the landscape have recent restoration efforts established newly-planted longleaf pine?
3. What habitat objectives (amount and condition) for open-pine systems are necessary to support bird populations at prescribed levels ?

Question 1 – Where on the landscape do stands of high-quality, open-pine habitat currently exist?

Development of a decision support tool for the conservation of longleaf pine habitats requires the ability to model and map the current distribution of open-pine habitats. Open-pine habitats are generally defined as those that exhibit characteristics in tree density, fire frequency, understory structure, and other conditions similar to what would be expected absent significant human disturbance.

The initial map for depicting the current distribution of open-pine habitats was generated from a predictive model developed by AL-GAP. AL-GAP collected data (e.g., overstory composition, relative density) at over 1500 field points. In combination with Landsat ETM+ satellite imagery (circa 2000) they then developed a predictive logistic regression model relating spectral reflectance to the likelihood that a site is dominated by longleaf pine. This model enables probabilistic mapping of open-pine habitat (Hogland, 2005). In collaboration with the U.S. Forest Service Forest Inventory and Analysis program and the Mississippi Institute for Forest Inventory program, additional forest structure data is presently being analyzed and incorporated into the existing model to improve its predictive capability.

Question 2 – Where on the landscape has recent restoration established newly-planted longleaf pine ?

The location of young stands of recently afforested longleaf pine are integral to a comprehensive understanding of where mature open-pine habitats, assuming continued proper management, are anticipated to occur in the future. This information is particularly important as it influences which areas of the landscape should be identified as having high priority conservation value. However, young longleaf pine trees (≤ 15 years) are spectrally similar to shrub-scrub and other grassland habitats. This includes longleaf that has been planted as part of multiple restoration programs across the EGCP. Thus, remote sensing technologies cannot currently be used to obtain this information. Instead, the data must be obtained from the individual programs and partners who have either funded or facilitated restoration of longleaf in the past 15 years.

The accumulation of this information into a spatially-explicit database is an effort that could ultimately evolve into a tracking database to monitor where longleaf is restored on the EGCP landscape and beyond. This information will support the iterative refinement of the decision support tool over time. Without a complete understanding of recent restoration accomplishments, this decision support tool could mistakenly identify areas as high priority for conservation that have already been recently restored. The EGCP JV is pursuing a potential collaboration with the Longleaf Alliance to develop this database.

Question 3 – What habitat objectives (amount and condition) for open-pine systems are necessary to support bird populations at prescribed levels ?

Through targeted conservation of open-pine ecosystems, the EGCP JV intends to ensure the sustainability of all priority birds that are dependent on these systems. However, the specific habitat requirements of all species cannot be comprehensively incorporated into a decision support tool. Thus, a subset of species determined to appropriately represent the full range of avian habitat niches within open-pine systems were selected as umbrella species (Roberge and Angelstam, 2004). Explicit population-habitat models were then developed that translated population objectives for each umbrella species into specific objectives tied to habitat quality and quantity.

Recently-planted longleaf pine during a prescribed burn.

Initial population objectives for the EGCP were established for each umbrella species by 'stepping down' continental objectives derived by Partners in Flight (Rich et al., 2004). For each species, information such as the relative density within the EGCP, and the presumed proportion of the population encompassed by the EGCP JV planning boundary were considered in the step-down process. To further refine EGCP population objectives, trends derived from Breeding Bird Survey data in combination with population viability analyses were used to determine minimum self-sustaining subpopulation size for each species. These subpopulation sizes comprise the basis for linking population-based objectives to habitat-based objectives using information such as habitat quality and minimum patch size requirements for each umbrella species.

In the end, the open pine decision support tool will ultimately guide EGCP JV partners in decisions related to:

1. where on the landscape conservation actions directed at open pine habitats should be targeted to most effectively support bird population objectives; and
2. where on the landscape restoration and afforestation could specifically target longleaf pine.

Where on the landscape should conservation actions directed at open-pine habitats be targeted to most effectively support bird population objectives?

Simply put, the purpose of the decision support tool is to help guide decisions about where pine habitats should be conserved to optimize bird population responses and maximize conservation benefits. To do so, the decision support tool will incorporate the following attributes to assess the relative potential of each landscape 'unit' in contributing to EGCP JV conservation objectives:

Bachman's Sparrow.

- Likelihood of being managed with fire at regular intervals
- Proximity to land managed for long term conservation
- Proximity to land in public ownership
- Proximity to patches of habitat that meet assumed requirements for supporting a sustainable subpopulation of priority birds
- Proximity to areas that are not currently open-pine habitat but are classified as a land cover type with the potential for restoration of longleaf pine

These attributes are in addition to the three primary components discussed in the preceding section (i.e., current status of open-pine habitats, location of newly-planted longleaf pine, and amount and condition of habitat necessary to support bird population objectives), and are important because they help define an explicit spatial context (i.e., configuration and location). This method makes extensive use of density estimators with kernel sizes based upon ecological and management considerations to produce a high-resolution map of priority areas for conservation of birds associated with open-pine habitats.

Where on the landscape could restoration and afforestation specifically target longleaf pine?

For the purpose of bird conservation, it is principally habitat structure rather than composition that dictates the suitability of open-pine habitats for birds. Nonetheless, the ecological and social importance of restoring longleaf pine ecosystems is significant so that, wherever practical, the EGCP JV encourages will promote the conservation of open-pine systems dominated by longleaf. Landform, land cover, and soil survey data layers will be used in combination to identify areas of the EGCP landscape that are most ecologically suitable for longleaf pine restoration and afforestation projects.

Landform is derived from a digital elevation model and incorporates both slope and relative landscape position. In the EGCP, an understanding of landform is useful for separating riparian corridors, which were not historically longleaf, from upland sites where longleaf pine was prevalent. Land cover information is used to identify areas unlikely to be restored, such as high density urban areas and large water bodies, and removes them from consideration as potential conservation sites. The Soil Survey Geographic Database (SSURGO) will be used to identify areas with soils suitable to support longleaf pine. The SSURGO database, a product of the Natural Resource Conservation Service, was recently completed for all counties in the EGCP and will provide digital geospatial versions of each County soil map. Each soil type has been ranked for its longleaf suitability by expert review.

Incorporation of this data will enable the decision support model to identify only sites where longleaf pine occurred historically as high priority areas. This will ensure that restoration and conservation efforts for longleaf pine are conducted in areas that are ecologically appropriate. Furthermore, less effort will be required to maintain and manage stands of longleaf pine if it is restored in areas where it was naturally dominant.

Conservation Decision-Making Using the Decision Support Tool

The target audiences for the open pine decision support tool are programs of agencies and non-governmental organizations that either directly fund or deliver on-the-ground restoration programs in pine forests of the EGCP. Table 3 identifies potential conservation strategies and the organizations and programs who use those strategies in open pine habitats. Because different conservation strategies will be applied to different types of existing land cover, a final component of the decision support tool will involve masking the priority map to only include land cover classes which are relevant to a particular organization and the conservation strategies they intend to pursue.

As a new member of the conservation community in the Southeastern U.S., the EGCP JV will rely on extensive outreach to existing and potential partners to advertise the existence and utility of this and future decision support tools. The EGCP JV does not assume that it will meet the specific needs of all organizations and programs engaged in conservation delivery in pine habitats of the EGCP. The intention is to build a core product based on key principles of conservation biology that can be modified to meet the specific conservation objectives of individual partners.

Red-cockaded Woodpecker.

Conservation Strategy	Delivery Mechanism (organization, program, or funding source)	Target Land Cover Class
Afforestation of agricultural lands	Natural Resource Conservation Service	row crop
	State agency private lands programs	pasture and row crop
	Southern Company/ National Fish and Wildlife Foundation Longleaf Legacy Program	pasture and row crop
Improve quality of existing, high-density, closed-canopy pine	USFWS Partners for Fish & Wildlife Program	closed pine
	Department of Defense	closed pine
	U.S. Forest Service	closed pine
	Southern Company/ National Fish and Wildlife Foundation Longleaf Legacy Program	closed pine
	Natural Resource Conservation Service	closed pine
	State agency private lands programs	closed pine
Convert existing offsite pine to open longleaf pine	U.S. Forest Service	closed pine
Preserve existing, high-quality open-pine habitat	State agency acquisition programs	open pine
	Department of Defense	open pine
	Private land trusts	open pine
	The Nature Conservancy	open pine
	USFWS acquisition (for listed spp. only)	open pine
Afforestation of hurricane-impacted coastal lands	Federal Emergency Management Association	coastal urban/suburban

Table 3: Potential conservation strategies and programs in open pine habitats in the EGCP.

Next Steps

Throughout the development of the decision support tool, assumptions and uncertainties associated with each data layer are clearly articulated and recorded. EGCP JV staff will work to cultivate relationships with the academic research community in the EGCP and the Southeastern U.S. to test these assumptions and clarify the uncertainties over time.

Development of these tools to guide restoration of pine forests in the EGCP will be a continually evolving process. The EGCP JV anticipates advances in the understanding of bird- habitat relationships and a growing capability to incorporate emerging landscape changes such as urban growth and climate change. As modeling techniques are improved and assumptions are tested, the decision support tool will be updated to reflect the most current information.

As a complement to the guidance developed in this decision support tool at the landscape scale, the EGCP JV has articulated the key attributes (e.g., low percentage of canopy cover, a highly diverse and herbaceous understory, etc.) of open-pine habitats that serve as high-quality habitat for birds. By quantitatively defining these key attributes, the EGCP JV can better communicate desired habitat conditions for birds and other wildlife at the site scale. The EGCP JV intends to pursue the development of a more detailed document analogous to the model provided by the Lower Mississippi Valley Joint Venture (see LMVJV Forest Resource Conservation Working Group, 2007) in bottomland hardwood habitats.

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Appendix A: Operational Procedures for the EGCP JV

Approved by the EGCP JV Management Board 6/20/07 and revised on 11/17/2009

East Gulf Coastal Plain Joint Venture Partnership

The East Gulf Coastal Plain Joint Venture (EGCP JV) is a federal, state, and private self-directed partnership dedicated to the conservation of priority birds and their habitats. The activities and priorities of the EGCP JV are generated and implemented by Partner organizations dedicated to furthering the mission of the EGCP JV. The EGCP JV Office serves to support the partnership by maintaining day-to-day responsibility for furthering the mission and purpose of the EGCP JV.

Partners

Any agency or organization that plays a role in furthering the EGCP JV's mission is welcomed as a Partner organization. The number of Partner organizations is unlimited, but Partner organizations are expected to continually aid in furthering the EGCP JV mission. A subset of these Partner organizations, identified as Voting Partners, serves as the EGCP JV's Management Board; they lead the EGCP JV with input from all Partner organizations. The EGCP JV Management Board includes representatives from Partner organizations, decided upon as follows:

Management Board

The Management Board will include eight State and Federal Voting Partners and additional At-Large Voting Partners, unlimited in number. Organizations serving as Voting Partners on the Management Board commit to actively engage in the governance of the EGCP JV and in the development of its organizational and conservation strategy by attending Management Board meetings and participating in conference calls, working groups, or other such responsibilities as they arise. Organizations with Voting Partner status are expected to contribute financially to the EGCP JV to the best of their abilities. The Voting Partners will provide oversight and guidance to the EGCP JV Coordinator and Office through active participation on the Management Board.

The total number of Voting Partners serving at one time will not be limited by number but will be determined at the discretion of the Management Board.

Fixed Voting Partners include representatives from:

<u>Federal Agencies</u>
U.S. Fish and Wildlife Service
U.S. Forest Service

<u>State Wildlife Agencies</u>
Alabama Department of Conservation and Natural Resources
Florida Fish and Wildlife Conservation Commission
Kentucky Department of Fisheries and Wildlife Resources
Louisiana Department of Wildlife and Fisheries
Mississippi Department of Wildlife, Fisheries, and Parks
Tennessee Wildlife Resources Agency

The remaining seats on the Management Board are considered At-Large seats to be filled by private organizations approved by the State and Federal Voting Partners on the Management Board.

At-large Voting Partners

Voting Partnership is also open to conservation organizations, members of the business and industry community, and other groups who commit to further the mission and purpose of the EGCP JV and who commit to sharing in the responsibility for bird conservation throughout the East Gulf Coastal Plain.

At-Large Voting Partners will serve three year terms on the Management Board, with no term limits.

Selection of At-Large Partners

The EGCP JV Coordinator will distribute a notice from the EGCP JV Management Board Chair, via email, to conservation organizations, industry representatives, and other groups involved in some capacity with the EGCP JV announcing the opportunity to serve as leaders on the EGCP JV Management Board as an At-Large Voting Partner.

Requests from organizations wishing to serve as At-Large Voting Partner will be considered by the Management Board upon receipt of a written request (electronic format preferred) that expresses the organization's interest in and capacity to participate as a Voting Partner. The request should also describe any of the organization's programs or initiatives that are relevant to EGCP JV activities. The individual who would represent the organization on the Management Board should be identified. If that individual leaves the Voting Partner organization or for other circumstances will no longer serve on the Management Board, the Voting Partner may select a new representative to serve on the Management Board for the rest of the Voting Partner's term.

All requests will be distributed to Management Board representatives from each State and Federal Voting Partner. Applicants will be judged on previous commitment to the EGCP JV and the breadth, depth, and diversity of the applicant's potential contribution to the EGCP JV Management Board.

Applicants will be notified in writing by the EGCP JV Management Board Chair of the State and Federal Voting Partners' decisions. Terms for the At-Large Voting Partners will commence at the first EGCP JV Management Board meeting held after their selection as an At-Large Voting Partner.

Management Board Leadership

Officers

The EGCP JV Management Board will elect a Chairperson and Vice-chairperson to serve in leadership capacities. The Management Board will elect both officers to serve 2-year terms with no term limit. The Chairperson will assist the Joint Venture Coordinator in setting meeting agendas and will preside over Management Board meetings. The Vice-chairperson will preside in the absence of the Chairperson.

Executive Committee

The EGCP JV Management Board will elect four or five Voting Partners, including the Chairperson, to serve on the Management Board's Executive Committee. The Executive Committee will be a liaison among the Management Board, Coordinator, and technical working group in the interim between meetings of the full Management Board. With the exception of the Management Board Chairperson, Executive Committee Members will serve a one to three year term, with two Members rotating out each year and replaced by other Voting Partners.

Meetings and Attendance

The EGCP JV Management Board will meet at least twice annually. Efforts will be made to hold at least one meeting every two years in conjunction with the Southeastern Association of Wildlife Agencies (SEAFWA) or the Association of Fish and Wildlife Agencies (AFWA) Annual Meetings. All other meeting dates and locations will be set by the Management Board but will rotate among the state Voting Partners.

Voting Partners will be given at least 30 days notice of each Management Board meeting.

Meetings of the EGCP JV Management Board are open to all Partners and interested individuals. A closed Executive Session may be called by the Management Board Chair. Registration fees will be collected to defray the meeting costs and will be paid by all Voting Partners in attendance. Registration fees may be waived or altered for specific meetings at the discretion of the Management Board.

Voting

Votes will be taken when a motion is made by one Management Board member and the motion receives a second from a different Management Board member. Following adequate discussion, the Management Board Chairperson may call for and take a vote.

Each Voting Partner may cast one vote. Votes will only be taken if a quorum consisting of a simple majority is present. Motions will pass with the majority of the quorum.

Votes shall normally be taken at Management Board meetings. For votes taken during Management Board meetings, a Voting Partner may send an alternative representative to cast a vote but may not vote by proxy. Between Management Board meetings, votes may be conducted by electronic mail or telephone during a conference call. Votes taken by email or telephone will be conducted no less than one week after all Management Board members have been notified about the vote by email or telephone.

Resignation and Termination of Voting Partners

Resignation of a Voting Partner from the Management Board must be in writing and received by the Chairperson. A Voting Partner will be removed from the Board if their representative (or a substitute) has three unexcused absences from consecutive Management Board meetings. If a Voting Partner is not represented at two consecutive Board meetings, a letter will be sent from the Chairperson to the Voting Partner inquiring as to their interest in continuing to serve as a Voting Partner. A Voting Partner

behaving in a manner that is not conducive to accomplishing the mission of the EGCP JV may also be removed for cause by a three-fourths vote of the remaining Voting Partners of the Management Board.

Revision of Operational Procedures

These procedures may be altered, amended, or repealed, and new procedures may be adopted by the Management Board at any meeting by a majority of the quorum.

Appendix B: Roles and Responsibilities
Approved by the EGCP JV Management Board 6/20/07

East Gulf Coastal Plain Joint Venture Management Board

Responsibilities of the EGCP JV Management Board:

- Lead and govern the activities of the EGCP JV, technical committees, and staff.
- Formulate strategies to further the EGCP JV's mission; periodically review and update the mission as necessary.
- Provide oversight of organizational and programmatic planning and evaluation.
- Ensure legal and ethical integrity and maintain accountability for the EGCP JV.
- Promote the activities of the EGCP JV and enhance the EGCP JV's visibility among partner organizations and the broader conservation community.

Expectations of EGCP JV Management Board members:

- Maintain commitments of time, focus, and financial support necessary to achieve the EGCP JV mission.
- Consistently attend and engage fully in Management Board meetings, conference calls, and ad hoc working groups as needed.
- Direct technical staff from his/her organization to fully participate on EGCP JV technical committees and contribute to the development of technical documents.
- Possess authority to represent his/her organization in decision-making on the EGCP JV Management Board.
- Serve as active partners in the EGCP JV's planning and implementation activities
- Act as EGCP JV ambassadors for their partner organizations and other public, private, and political leaders.
- Be alert to opportunities and threats likely to be encountered by the EGCP JV.
- Become familiar with EGCP JV finances, financial or resource needs.
- Understand the policies and procedures of EGCP JV.

EGCP JV Management Board Chair

Primary Role of Management Board Chair:

Serve as leader among Management Board members and manage Management Board meetings, ensuring proper procedural conduct and active participation by all Management Board members.

Additional Responsibilities of the Management Board Chair:

- Foster an environment promoting open communication and inquiry; ensure due process.
- Serve as ex-officio member of all committees.
- Work in partnership with the Coordinator to make sure Management Board initiatives are implemented.
- Assist Coordinator in preparing agenda for board meetings.
- Assist Coordinator in conducting new Management Board member orientation.
- Participate in searches for a Coordinator position.
- Oversee Coordinator's performance evaluation.

EGCP JV Management Board Vice-Chair

Role of Management Board Vice-Chair:

Serve as leader among Management Board members and perform, or assist the Chair in performing, the Chair's responsibilities (as listed above) when he or she is not able to do so.

East Gulf Coastal Plain Joint Venture Coordinator

Role of the EGCP JV Coordinator:

The ECGP JV Coordinator provides leadership and coordinates operation of the EGCP JV. The Coordinator is accountable to the EGCP JV Management Board and has primary responsibility for furthering the EGCP JV mission and implementation plan; programmatic, organizational, and financial management; and maintaining communication among partner organizations.

Areas of Responsibility:

Organizational Leadership

- Foster a vision for the EGCP JV's future and establish and implement strategies to achieve that vision.
- Support operations and administration of Board by advising and informing Board members.
- Cultivate a working knowledge of significant developments and trends in the field and among other Joint Ventures.
- Maintain and develop strategic regional alliances in the Southeast, consistent with the EGCP JV mission.

Board Administration and Support

- Assist Management Board Chairperson in setting Management Board meeting agenda
- Advise the Management Board on decisions pertaining to organizational growth.
- Facilitate activities of the Management Board's Executive Committee.
- Keep the Management Board fully informed on the status of EGCP JV operations and finances.
- Provide leadership to develop, with the Management Board, an interim implementation plan and maintain forward progress towards the goals outlined in the plan.

Program Administration

- Develop programs and practical strategies to meet goals and expectations set by the Management Board.
- Provide leadership and administrative support to technical committee(s) in developing and maintaining an infrastructure to implement the components of Strategic Habitat Conservation.
- Maintain working knowledge of pertinent funding opportunities.
- Assist partner organizations in implementing conservation programs.

Development and Financial Management

- Develop and implement fundraising strategies for approaching and cultivating new sources of major support, including Congressional appropriations, foundation and corporate grant programs, and partner contributions.
- Ensure grant and contractual obligations are met and reports to funders are prepared and submitted in a timely manner.
- Develop and maintain sound financial practices and ensure that adequate funds are available to permit the organization to carry out its work.

- With the Executive Committee, direct the preparation of annual and long-range development planning.

Internal Communications

- Serve as liaison to establish sound working relationships with all Voting and Non-Voting Partners.
- Communicate outcomes of conservation design process and potential funding opportunities to partner organizations.

External Communications/ Public Relations

- Communicate EGCP JV's goals and successes through presentations, media outreach, publications, and informal networking.
- Represent the EGCP JV to the conservation community, resource agencies, and elected officials, nationally and in the Southeast.
- Maintain an up-to-date web site.
- Participate in activities of the Association of Joint Venture Management Boards and cultivate relationships with the EGCP JV's Congressional delegation and staff.

Human Resource Management

- Recruit, manage, evaluate, and handle all matters of employment pertaining to staff that report directly to the Coordinator.
- Hires staff as necessary and within guidelines approved by the Management Board; sets goals and performance criteria for each staff member.

EGCP JV Executive Committee

Responsibilities of the EGCP JV Executive Committee:

- Provide leadership and advise Coordinator in the interim between full meetings of the Management Board.
- Serve as a liaison among the Management Board, EGCP JV Coordinator, and technical working groups.

Expectations of EGCP JV Executive Committee members:

- Engage, under the leadership of the Coordinator, in the EGJV's strategic planning, work planning, and budgeting processes, assess the options and make recommendations to the full Management Board.
- Monitor, evaluate and report to the Management Board on the progress and outcomes of particular issues assigned to the technical committee.
- Pre-process issues for Management Board consideration.
- On the basis of delegated authority from the Management Board, make decisions on issues judged not to require the consideration of the full Management Board.
- Take emergency decisions on behalf of the Management Board subject to ratification of such decisions by the next full meeting of the Management Board.
- Commit to serving a one to three year term

EGCP JV Technical Committee

Role of the EGCP JV Technical Committee:

Serve as the technical forum for coordination and communication among EGCP JV partners in matters pertaining to implementing Strategic Habitat Conservation (biological planning; conservation design; conservation delivery; and monitoring and research). The Technical Committee will ensure that the conservation actions of EGCP JV partners support the progressive refinement of EGCP JV conservation goals and objectives.

Responsibilities of the EGCP JV Technical Committee:

- Develop and refine EGCP JV priority species and habitat objectives that contribute to range-wide bird conservation plan population objectives (from PIF, waterbird, shorebird, quail, and waterfowl plans).
- Provide technical support in the development of decision support tools.
- Implement an adaptive approach for bird and habitat monitoring that can evaluate impacts of JV partner conservation actions.
- Initiate the development of a standardized, adaptive monitoring program.
- Consider the role of EGCP JV in integrating Comprehensive State Wildlife Plans.
- Identify research issues and needs pertinent to assumptions built into the EGCP JV biological foundation and coordinate the implementation of research projects.
- Represent the EGCP JV in communication and outreach to the public on the technical and scientific issues.
- Organize such ad hoc or standing sub-committees or working groups as deemed necessary.

Appendix C: Priority Birds of the East Gulf Coastal Plain

Priority birds of the EGCP JV Technical Committee (Common Name)	EGCP States' Wildlife Action Plans						National Bird Initiatives			
	AL[a]	KY[b]	TN[c]	MS[d]	FL[e]	LA[f]	Landbird[1]	Waterbird[2]	Shorebird[3]	Waterfowl[4]
American Avocet					X					
American Bittern		X	X	X	X		X	X		
American Coot								X		
American Black Duck	X	X		X			X			X
American Kestrel (SE SubSpp)	X			X	X		X			
American Oystercatcher	X			X	X		X		X	
American White Pelican		X		X				X		
American Wigeon										X
American Woodcock	X	X		X		X	X		X	
Anhinga			X	X						
Bachman's Sparrow	X	X	X	X	X	X	X			
Bald Eagle		X	X	X	X	X				
Barn Owl		X	X	X						
Bell's Vireo		X	X				X			
Bewick's Wren (Eastern)	X	X	X	X			X			
Black Rail	X			X	X		X	X		
Black Skimmer				X	X		X	X		
Black-crowned Night-Heron		X		X	X			X		
Blue-winged Teal										X
Blue-winged Warbler		X					X			
Brown Creeper		X	X							
Brown Pelican				X	X		X			
Brown-headed Nuthatch			X	X	X	X	X			
Buff-breasted Sandpiper		X	X				X		X	
Bufflehead										
Canada Goose (SJBP)										
Canvasback							X			X
Cerulean Warbler	X	X	X	X	X		X			
Chuck-will's-widow			X	X		X	X			
Clapper Rail										
Common Goldeneye										X
Common Ground-Dove				X	X		X			
Common Merganser										
Common Moorhen		X	X					X		
Common Tern		X				X		X		

Common Name	EGCP States' Wildlife Action Plans						National Bird Initiatives			
	AL[a]	KY[b]	TN[c]	MS[d]	FL[e]	LA[f]	Landbird[1]	Waterbird[2]	Shorebird[3]	Waterfowl[4]
Common Yellowthroat										
Dickcissel		X	X			X				
Eastern Meadowlark					X					
Field Sparrow						X	X			
Gadwall										
Glossy Ibis					X			X		
Grasshopper Sparrow		X	X	X		X				
Gray Kingbird					X					
Greater Scaup										X
Greater White-fronted Goose				X						
Green-winged Teal										
Gull-billed Tern				X	X		X	X		
Henslow's Sparrow	X	X	X	X	X	X	X			
Ivory-Billed Woodpecker	X			X	X	X				
Kentucky Warbler	X	X	X	X	X	X	X			
King Rail		X	X	X	X	X	X	X		
Lark Sparrow		X	X							
Le Conte's Sparrow				X		X				
Least Bittern	X	X	X	X	X			X		
Least Tern				X	X		X	X		
Lesser Scaup				X	X					X
Little Blue Heron		X	X	X	X			X		
Loggerhead Shrike		X	X	X	X	X	X			
Louisiana Waterthrush		X	X	X	X	X	X			
Mallard										X
Marbled Godwit			X	X	X		X		X	
Mississippi Kite		X	X		X					
Mottled Duck				X						
Mourning Dove										
Nelson's Sharp-tailed Sparrow	X			X			X			
Northern Bobwhite		X		X	X	X	X			
Northern Harrier	X	X	X			X	X			
Northern Pintail		X		X	X					X
Northern Rough-winged Swallow										

Common Name	EGCP States' Wildlife Action Plans						National Bird Initiatives			
	AL[a]	KY[b]	TN[c]	MS[d]	FL[e]	LA[f]	Landbird[1]	Waterbird[2]	Shorebird[3]	Waterfowl[4]
Northern Shoveler										
Painted Bunting			X	X	X	X				
Peregrine Falcon		X	X		X					
Piping Plover	X	X	X	X	X		X		X	
Prairie Warbler		X	X	X		X	X			
Prothonotary Warbler		X	X	X	X	X	X			
Purple Gallinule										
Red Knot (SE pop)			X	X	X		X		X	
Red-breasted Merganser										
Red-cockaded Woodpecker	X	X		X	X	X	X			
Reddish Egret	X			X	X		X			
Red-headed Woodpecker		X		X	X		X			
Redhead										
Ring-necked Duck		X								
Royal Tern				X	X		X			
Ruddy Duck										
Rusty Blackbird		X		X		X	X			
Sanderling		X			X		X			
Sandhill Crane (MS)				X			X	X		
Sandwich Tern				X	X			X		
Seaside Sparrow	X			X			X			
Sedge Wren		X				X	X			
Semipalmated Sandpiper		X			X		X		X	
Snow Goose										
Snowy Egret				X	X			X		
Snowy Plover (Cuban Subspp)	X		X				X			
Solitary Sandpiper		X							X	
Sora										
Stilt Sandpiper		X	X				X		X	
Swainson's Warbler	X	X	X	X	X	X	X			
Swallow-tailed Kite (No. Subspp)	X	X	X	X	X	X	X			
Tricolored Heron				X	X			X		
Upland Sandpiper		X	X						X	
Virginia Rail										

Common Name	EGCP States' Wildlife Action Plans						National Bird Initiatives			
	AL[a]	KY[b]	TN[c]	MS[d]	FL[e]	LA[f]	Landbird[1]	Waterbird[2]	Shorebird[3]	Waterfowl[4]
Western Sandpiper		X	X	X	X					
Whimbrel			X		X				X	
White Ibis				X	X			X		
Wild Turkey										
Willow Flycatcher		X								
Wilson's Plover	X		X	X	X		X		X	
Wilson's Snipe										
Wood Duck										
Wood Stork	X			X	X			X		
Wood Thrush	X	X	X	X	X	X	X			
Worm-eating Warbler	X	X	X	X	X		X			
Yellow Rail	X	X		X	X	X	X	X		
Yellow-billed Cuckoo			X			X	X			
Yellow-crowned Night-Heron		X		X	X	X		X		

[a] Species designated as Priority Level 1 or 2 in *Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources. 2005. Conserving Alabama's Wildlife: a comprehensive strategy.*

[b] Species of Greastest Conservation Need according to *Kentucky Department of Fish and Wildlife Resources. 2005. Kentucky's Comprehensive Wildlife Conservation Strategy.*

[c] Species of Greastest Conservation Need according to *Tennessee Wildlife Resources Agency. 2005. Tennessee's Comprehensive Wildlife Conservation Strategy.*

[d] Species of Greastest Conservation Need according to *Mississippi Museum of Natural Science. 2005. Mississippi's Comprehensive Wildlife Conservation Strategy .*

[e] Species of Greastest Conservation Need according to *Florida Fish and Wildlife Conservation Commission. 2005. Florida's Wildlife Legacy Initiative: Florida's Comprehensive Wildlife Strategy.*

[f] Species of Conservation Concern in Louisiana according to *Lester, Gary. D., Stephen G. Sorensen, Patricia L. Faulkner, Christopher S. Reid, and Ines E. Maxit. 2005. Louisiana Comprehensive Wildlife Conservation Strategy.*

[1] Species designated as either 'Highest Overall Priority', 'High Overall Priority', Physiographic Area Priority', 'Global Priority' in *Woodrey, M. S., R. P. Ford, W. C. Hunter, and J. Taulman. 1998. East Gulf Coastal Plain Partners in Flight bird conservation plan (physiographic area #04). Mississippi Museum of Natural Science, Jackson, MS.*

[2] Species designated with either Critical Recovery (CR), Immediate Management (IM), or Management Attention (MA) action codes in *Hunter, W.C., W. Golder, S. Melvin, and J. Wheeler. 2006. Southeast United States Regional Waterbird Plan.*

[3] Species designated as either 'Extremely High Priority' and 'High Priority' in *Hunter, W.C. 2002. Southeastern Coastal Plains- Caribbean Region Report U.S. Shorebird Conservation Plan.*

[4] Species designated as either a 'Moderately High Continental Priority' or 'High Continental Priority' for Waterfowl Conservation Regions 27 and 27.2 in *North American Waterfowl Management Plan, Plan Commmittee. 2004. North American Waterfowl Management Plan 2004. Implementation Framework: Strengthening the Biological Foundation.*

Appendix D: Descriptions of Key Habitats and Avian Species of the East Gulf Coastal Plain

Pine-Dominated Communities

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Distribution and Condition

In the East Gulf Coastal Plain (EGCP), pine-dominated habitats encompass portions of Louisiana, Mississippi, Alabama, and Florida and account for 49.8 percent (or 6,980,152 hectares) of all forest cover (McKerrow et al., *forthcoming*). Mesic pine flatwoods and savannas, hereafter referred to as flatwoods, and pine uplands and sandhills, hereafter referred to as uplands, are the principal natural habitats for much of the lower portion of the EGCP. These are open, fire-dependent forest habitats. Flatwoods are wetter environments and typically occupy in areas proximate to the coast. Uplands are drier and occupy from the northern boundary of the historic range of longleaf pine south to the northern extent of the range of flatwoods (Comer et al., 2003).

Alteration of the natural fire regime, in addition to a widespread conversion from longleaf pine to loblolly and slash pines have drastically altered much of the pine habitat across the EGCP (Mississippi Museum of Natural Science, 2005; Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005). According to 2001 land cover data, disturbed pine habitats, including pine plantations and dense stands with closed canopies, account for 86 percent of all pine-dominated forests in the EGCP. Uplands and flatwoods in a 'natural' condition account for a mere 4.3 and 9.6 percent, respectively, of all pine-dominated forests (McKerrow et al., *forthcoming*). This is in stark contrast to a landscape once dominated by open, low-density stands of pine uplands and flatwoods. Frost (1993) estimates that longleaf forests encompassed over 88 million acres from southeast Virginia to Texas; totaling 52% of all uplands and 36% of the entire southeastern U.S. landscape. This decline has sparked widespread interest in the conservation of what is considered one of the most critically endangered habitats in the U.S. today.

Mesic Pine Flatwoods and Savannas

Mesic pine flatwoods and savannas are open pine woodlands that occupy sandy, flat terrain principally found proximate to coastal habitats (Florida Natural Areas Inventory and Florida Department of Natural Resources, 1990; Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005). Bogs, freshwater marshes, and bay heads are frequently interspersed among flatwood and savanna habitats (Florida Fish and Wildlife Conservation Commission, 2005; Mississippi Museum of Natural Science, 2005). Soils range from well- to poorly-drained and are often acidic over a clay hard pan (Florida Natural Areas Inventory and Florida Department of Natural Resources, 1990).

Current Condition

In Mississippi, mesic longleaf pine savanna/forests were the most extensive community type of the piney woods region of southern Mississippi. They are considered 'imperiled' and only 3% of the habitat remains today (Mississippi Museum of Natural Science, 2005). In the Eastern Florida Parishes of Louisiana barely 1% of the estimated historic 100,000 to 500,000 acres of longleaf pine savannas remain (Lester et al., 2005).

Vegetation

Forest cover is low to moderately-dense, creating an open canopy (Florida Natural Areas Inventory and Florida Department of Natural Resources, 1990; Mississippi Museum of Natural Science, 2005). Pre-settlement habitat featured a canopy cover of much less than 50% (Lester et al., 2005). Sampling of virgin flatwood habitat in Mississippi nearly a century ago showed the average tree density to be at 100/ acre (Mississippi Museum of Natural Science, 2005).

Longleaf is the predominant pine species in the more well-drained flatwood habitats with slash pine dominating in intermediate or moderately moist areas (Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005; Florida Fish and Wildlife Conservation Commission, 2005). The most common vegetative associations are longleaf pine with little and slender bluestem grass and wiregrass (Mississippi Museum of Natural Science, 2005).

A highly diverse understory is associated with pine flatwoods; the richest, fire-maintained sites can support greater than 100 species per quarter acre (Mississippi Museum of Natural Science, 2005). The composition of the understory ranges from open and herbaceous-dominated to dense with shrubs (Comer et al., 2003). Most plant species associated with mesic pine flatwoods depend on fire for perpetuation through stimulation of flowering and fruit or seed production in herbs as well as through limiting the growth of fire-intolerant woody vegetation (Lester et al., 2005).

Pine Uplands and Sandhills

In general, pine uplands and sandhills have greater relief and are drier than flatwood communities, due in part to their dry, well-drained soils that are typically sandy with variable amounts of clay (Comer et al., 2003; Mississippi Museum of Natural Science, 2005). Pine uplands support a sparser ground cover and a flora and fauna that differs from flatwood habitats (Comer et al., 2003; Florida Natural Areas Inventory and Florida Department of Natural Resources, 1990). Creek bottoms frequently dissect upland habitats and herbaceous bogs and isolated wetlands are also often embedded within pine uplands (Lester et al., 2005; Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005).

Current Condition

In Alabama, longleaf pine has declined dramatically and what habitat does remain is in poor to fair condition (Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005). Mississippi's Comprehensive Wildlife Conservation Strategy characterizes the longleaf uplands as 'critically imperiled' and in Louisiana, it is estimated that only one to five percent of the original one to two million acres of upland longleaf forests remain (Lester et al., 2005; Mississippi Museum of Natural Science, 2005).

Vegetation

Longleaf dominates the uplands while loblolly existed primarily on moist upland flats, slopes of drainage ways, and high stream terraces (Mississippi Museum of Natural Science, 2005). Fire also plays a role in forest composition with longleaf pine dominating in areas where fire is most frequent and loblolly and shortleaf emerging where fire is less frequent. Loblolly and shortleaf are often thought to emerge in areas once disturbed by agriculture while longleaf almost always predominates in more pristine habitats (Florida Natural Areas Inventory and Florida Department of Natural Resources, 1990). Under natural

conditions, fire is believed to have been frequent enough to limit development of intolerant species of hardwoods as well as both loblolly and shortleaf pines (Comer et al., 2003).

The understory includes drought tolerant grasses, forbs, and legumes and a diverse herbaceous fauna is supported by areas of frequent fire (Mississippi Museum of Natural Science, 2005; Lester et al., 2005). The most common vegetative associations are longleaf pine with little and slender bluestem grass and wiregrass and runner oak or slash pine with gallberry and saw palmetto (Florida Natural Areas Inventory and Florida Department of Natural Resources, 1990).

Threats to Natural Habitats

Uplands and Flatwoods are impacted by a similar suite of threats. Alteration of the natural fire regime and forestry practices that significantly alter the composition and structure of both flatwood and upland habitat types are the dominant drivers in decline of these habitats (Florida Fish and Wildlife Conservation Commission, 2005; Mississippi Museum of Natural Science, 2005; Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005).

Fire frequency in flatwoods and uplands is naturally high and in pre-Columbian times fire frequency is thought to have ranged from one to eight years (Florida Natural Areas Inventory and Florida Department of Natural Resources, 1990; Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005). A combustible leaf litter and grassy understory carried fires important to the flowering and seed and fruit production of understory vegetation (Florida Fish and Wildlife Conservation Commission, 2005; Mississippi Museum of Natural Science, 2005). Without fire, canopy closure increases and a dense growth of hardwoods, shrubs, and vines pervades and the normally diverse native grasses and forbs are shaded out (Florida Fish and Wildlife Conservation Commission, 2005; Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005).

An increase in road density, human dwellings, and lack of public support due to concerns over air quality are impediments to managing pine habitats with fire today. Application of fire management during the dormant season does not effectively control stem proliferation of shrubs and hardwoods relative to growing season fires (Mississippi Museum of Natural Science, 2005).

State Wildlife Conservation Strategies from Louisiana, Mississippi, Alabama and Florida identify the following threats as of significance to the decline of pine Uplands and Flatwoods (Florida Fish and Wildlife Conservation Commission, 2005; Mississippi Museum of Natural Science, 2005; Lester et al., 2005; Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005):

- Altered fire regime
- Conversion to pine species other than longleaf
- Intensification of forestry practices (heavy stocking densities)
- Urban and Agricultural expansion
- Altered hydrology due to drainage ditches and raised roadbeds
- Exotic or invasive species
- Erosion from mechanized vehicle trails

Priority Bird Species

At least 86 species of birds occur in open pine communities; of these, 35 are permanent residents, 29 species are only present in nesting season, and 22 species are strictly winter residents (Engstrom, 1993). Partners in Flight also proposed a priority list of pine-dependent birds and management recommendations (Woodrey et al., 1998). Mississippi Sandhill Crane, Red-cockaded Woodpecker, Brown-headed Nuthatch, and Bachman's Sparrow rank among the highest priority species for the EGCP JV, and are largely sympatric with longleaf pine. Furthermore, these species commonly use a variety of micro-habitats, such as bogs and freshwater marshes, which are interspersed within pine-dominated communities. Other high priority species include Northern Bobwhite, Chuck-Will's-Widow, and Eastern Kingbird, as well as non-breeding species such as Henslow's and LeConte's Sparrows.

High priority bird populations in pine forests are most often limited by the structure and composition of the forest, rather than tract size, although spatial configuration of quality pine forests on the landscape is an important consideration. All pine-dominated communities are adapted to frequent fire for long term maintenance of habitat quality. Habitat structure and composition is dictated by frequent growing season burns, which maintain the diversity and density of bunch grasses (such as wiregrasses and bluestems), and a predominantly open canopy. Fire suppression or dormant season fires were emphasized in forest management during much of the 20th Century (Croker, 1987; Frost, 1993), and has resulted in a decline in grasses and forbs, and an increase in saw palmetto, gallberry, and bracken fern; this ground vegetation results in a reduction of habitat quality for most high priority bird species.

Spatial configuration of pine-dominated communities on the southeastern landscape also plays an important role in sustaining desired levels of priority bird distribution and densities. Although at least 50,000 ha of longleaf pine is recommended at each of six different areas in the Red-cockaded Woodpecker Recovery Plan (U.S. Fish and Wildlife Service, 2003), a minimum forest patch size and the importance of connectivity between patches is not currently known for most priority species of birds. An overarching acreage goal, proposed by Partners in Flight, is to establish at least 2.5 million ha of at least five year old longleaf stands by the year 2025 (Woodrey et al.,1998). The EGCP JV staff and Technical Committee are developing the biological foundation to refine this goal for the EGCP physiographic area (see Section III).

For most of the highest priority species, highest densities consistently occur in high quality longleaf pine forest; however, mature, open stands of loblolly and shortleaf pine also provide a stable habitat. Throughout the historic range of longleaf pine, many pine-dominated communities have been converted from longleaf to loblolly or other pine species either intentionally for logging, lack of fire, or lack of effective management after logging.

Umbrella species

The EGCP JV Technical Committee has agreed to designate umbrella species for pine-dominated communities to focus their biological planning and conservation design efforts. Red-cockaded Woodpecker can serve as one umbrella species to guide management priorities of the EGCP JV, especially in regard to forest tract size. Recovery of Red-cockaded Woodpecker populations will be accomplished only where large blocks of habitat include mature and over mature pine forests, managed for the specialized foraging and nesting habits of this species. However, detailed studies of different populations are allowing for refinement of existing guidelines for more effective local land conservation efforts (e.g., Beyer et al., 1996).

Guidelines for protecting and allowing for Red-cockaded Woodpecker expansion are delineated in the recovery plan. A habitat patch size of 50,000 ha or more assure that enough appropriately managed pine habitat will be available at all times to support a viable population (U.S. Fish and Wildlife Service, 2003). This figure was established assuming pine regeneration sites within a given patch will be temporarily unavailable for Red-cockaded Woodpeckers. Conservation and management of forests this large or larger would provide multiple benefits for a wide range of high priority species. The Red-cockaded Woodpecker Recovery areas are: (1) Apalachicola National Forest, (2) Conecuh National Forest, (3) DeSoto National Forest, (4) Bienville National Forest, (5) Noxubee National Wildlife Refuge, and (6) Homochitto National Forest.

Whereas a species such as Red-cockaded Woodpecker can serve as a valuable umbrella species for planning, caution is warranted in using the habitat needs of one species as the model for the habitat requirements of all other associated priority species. Bachman's Sparrows, for example, are probably more characteristic than Red-cockaded Woodpeckers to the majority of species strongly associated with longleaf pine forests. Bachman's Sparrows are heavily dependent on a grass-dominated ground layer with little understory or midstory. In contrast, Red-cockaded Woodpeckers only require a reduction of hardwoods in the midstory, which may or may not satisfy the requirements of most open- pine associated bird species. Therefore, for conservation planning in the EGCP, Red-cockaded Woodpeckers should serve as an umbrella species primarily for tract size.

Bachman's Sparrow is another umbrella species, and is especially common in pine-dominated habitats within which frequent warm growing season fires reduce hardwoods and encourage a dense and diverse grassy ground cover (Abrahamson and Hartnett, 1990; Myers, 1990). The core of this species distribution probably coincided closely with the distribution of Red-cockaded Woodpecker at the time of European settlement. The highest numbers of Bachman's Sparrows are associated with high volumes of grasses and forbs within the ground layer, and with low volumes of vegetation within the understory and midstory (Dunning and Watts, 1990). These conditions are most likely prevalent in open pinewoods subject to frequent growing season burning and during the first few years after a regeneration cut. These habitat conditions also support relatively high densities of other pine-dependent birds such as Northern Bobwhite, Brown-headed Nuthatch, and wintering Henslow's Sparrow populations. Careful management of other southern pine forest types, including a combination of cool and warm season burning and mechanical removal of hardwoods, can also provide optimal habitat for many of these same species.

Northern Bobwhite is a priority species because of both its recent population declines and its importance as a social, cultural, and economic resource. Across the entirety of the Southeastern Coastal Plain (including states along the Atlantic Coast), statistics provided by the ten states showed that harvest of Northern Bobwhites declined from nearly six million birds in 1980 to slightly more than 1.5 million in 1999 (73.7%). In Louisiana, Mississippi, and South Carolina, the Northern Bobwhite harvest declined more than 90%. The pre-hunt population density of Northern Bobwhites on the improvable acres of agricultural (IAA) lands in 1980 was 0.460 birds/IAA. In 1999 that density had declined to 0.145. To restore the Northern Bobwhite population density to 1980 levels will require the addition of 859,378 coveys to the autumn pre-hunt population in Bird Conservation Region 27 (Dimmick et al., 2002).

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Eastern Interior Grasslands

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Distribution and Condition

In the East Gulf Coastal Plain (EGCP), the historic extent of natural grasslands primarily includes western Kentucky (Jackson Purchase portion of the Kentucky Barrens), western Tennessee (Jackson Purchase portion Kentucky Barrens; Black Belt prairies), Alabama and Mississippi (Black Belt and Jackson prairies) (DeSelm and Murdock, 1993; Brown, 2003). It is thought, although highly debated, that the grasslands in the EGCP originated at the same time as those of the Midwest tallgrass prairie (DeSelm and Murdock, 1993). In addition, there is an assortment of non-native grasslands used as either pasture or cropland.

Much of the historic extent of grassland habitats was converted to agriculture during early settlement and remains in agricultural use (DeSelm and Murdock, 1993; Hill, 2004; Barone, 2005a and b). Today cropland and pasture lands comprise nearly 22% (nearly 13 million acres) of the total EGCP area, while native meadows and prairies account for only 0.3% (nearly 16,000 acres) (McKerrow et al., *forthcoming*). Those remnant patches are often degraded by advanced succession or consist of small patches that are maintained on right-of-ways or woodland edges where they may be mown or impacted by agricultural pesticide applications on agricultural land (Mississippi Museum of Natural Science, 2005). Specific concerns with loss and degradation of these habitats are discussed below under each community type.

Meadows and Prairies

Black Belt and Jackson Prairies

The Black Belt Prairies, located primarily in Tennessee, Mississippi, and Alabama, consist of several communities that occur on deep and somewhat poorly drained soils (Gibson, 1941; Jones and Patton, 1966; Rankin 1974). Remnant prairies are dominated by little bluestem, generally a dry-site dominant in the tallgrass prairie. More mesic sites are dominated by big bluestem, the dominant of the more mesic tallgrass prairie sites. Much of the Black Belt and Jackson Prairies were converted long ago to agricultural use and either plowed or converted to tame pasture and hayland. The Black Belt is an esteemed part of the “old south” cotton culture (Gibson, 1941). Remaining grasslands are small and potentially degraded due to lack of management, or dominated by tame pasture. Jackson Prairie remnants occur in areas largely surrounded by mixed pine-hardwood forests (Moran et al., 1997).

Jackson Purchase Kentucky Barrens

Jackson Purchase grasslands are a part of the Kentucky Barrens (Transeau, 1935; Braun, 1950) and occur in the western Kentucky Jackson Purchase and adjacent western Tennessee (DeSelm and Murdock, 1993). The dominant grasses are little bluestem and sideoats grama or big bluestem and indiangrass. As with grasslands elsewhere in the EGCP, most grasslands in this area were converted to agriculture and pasture and remain in agricultural use. Remnants are small and degraded or have been converted to tame pasture.

Other Barrens

Prairie communities were historically present within the Mississippi Embayment (coastal plain) (Braun, 1950). Some of these prairies were present on limestone substrates (Lawless et al., 2006). DeSelm (1989) examined six barrens sites in the western Tennessee coastal plain. These sites, remnants of

historically more numerous grasslands, were dominated by little bluestem (DeSelm, 1989; Lawless et al., 2006). Floristically these barrens more closely resemble the barrens found in the Western Highland Rim rather than those of the Jackson Purchase (DeSelm, 1989). They are small and isolated and threatened with woody invasion if not managed. More extensive areas may already have succeeded to woodland or forest. DeSelm (1989) also provides the hint that there may have been cordgrass (*Spartina pectinata*) prairie in this area.

Cropland and Pastureland

Croplands and pasture are present throughout EGCP and are generally bordered by forest or pasture lands. Primary crops are cotton, soybeans, peanuts, and hay. Pastures and haylands are primarily tall fescue, bahiagrass, and Bermuda grass and are bordered by forests in many cases. Grass buffers, including native warm season grass buffers, have been planted along some crop fields under Continuous Signup Conservation Reserve Program (CCRP). Croplands enrolled in Conservation Reserve Program (CRP) have been planted to native warm season grasses or exotic grasses.

Savanna and Woodland

The increasing evidence of pre-European agriculture and use of fire, as well as the existence of bison east of the Mississippi River, suggests that many areas were savanna or woodland (Nelson, 2005; Belue, 1996). Savannas are grasslands that are interspersed with scattered trees in an orchard-like pattern. Woodlands contain more trees with a denser canopy cover as low as 30% and with a sparse under or midstory and dense groundcover (Nelson, 2005). Savanna and woodland habitats are transitional to grasslands and depending on vegetation structure can provide habitat for species such as Northern Bobwhite.

Priority Bird Species

Five species are year-around residents and include Loggerhead Shrike, Northern Bobwhite, Field Sparrow, Eastern Meadowlark, and Lark Sparrow. Several of these species are also migratory and increase in densities during the winter months in portions of the EGCP. Henslow's Sparrow nests and winters in the EGCP, but is not considered a resident species. It is a peripheral breeder only nesting in a small area within the EGCP; however a significant portion of the continental population winters in the lower JV. Dickcissel is a Neotropical migrant utilizing the JV during the breeding season mostly. Bell's Vireo and Bobolink are occasional breeders within the northern periphery of the EGCP, but the latter is more frequently encountered during migration. The remaining species are non-breeders that winter in varying densities within the EGCP and include LeConte's Sparrow, Short-eared Owl, Northern Harrier, Yellow Rail, and Sedge Wren. Lastly, Henslow's Sparrow, Short-eared Owl, Dickcissel, and Bell's Vireo are also considered species of continental concern and are identified in the Partners in Flight (PIF) North American Landbird Conservation Plan's Watch List (Rich et al., 2004).

Umbrella species

Henslow's Sparrow ranks in the highest tier on the PIF Watch List meaning it is a species with multiple causes for concern across its entire range (Rich et al., 2004). Because this species is sensitive to a combination of factors responsible for its decline and ranks the highest among the other high priority grassland-dependent species in the EGCP, it should be considered an umbrella species for immediate conservation efforts. Although not currently on the PIF Watch List, the Loggerhead Shrike is another high priority species exhibiting nationwide declines. A substantial portion of its North American population utilizes the EGCP, and combined with its unique habitat requirements, should also warrant

being an umbrella species to address regional conservation planning. Emphasis placed on managing for Henslow's Sparrows and Loggerhead Shrikes should also benefit most other high priority bird species dependent on grassland communities, although habitat usage may differ subtly among species.

Henslow's Sparrows breed peripherally within the EGCP, primarily within portions of western Kentucky and perhaps western Tennessee. However, most individuals utilize the southern portions of EGCP during the non-breeding season, with one account suggesting up to a third of the entire global population (Woodrey et al., 1998). Favorable conditions for Henslow's Sparrows suggest that periodic disturbances (e.g. fire, mowing, or light grazing) are required to maintain a dense and moderately tall grassland structure as well as restricting hardwood encroachment. However, Henslow's Sparrows avoid using recently burned sites (same-year burns). Therefore, a combination of fire and mowing in different segments of a grassland unit on a rotational basis helps maintain preferred habitat conditions annually (Skinner, 1975; Zimmerman, 1988; Herkert, 1994). This management regime may also support other populations of grassland-dependent species like Northern Harrier, Short-eared Owl, Le Conte's Sparrow, Sedge Wren, and Dickcissel. Much less is known about habitat usage on wintering grounds, but is thought to be similar to breeding habitats (Herkert et al., 2002). In southern portions of the EGCP, Henslow's Sparrows tend to favor moist savannas and pitcher plant bogs dominated by grasses and forbs, which are generally associated with open pine-dominated communities with sparse undergrowth (Herkert et al., 2002). These communities also require frequent fire to maintain a diverse and open tree-grass community structure. Controlled burns performed in late spring, encourage graminoid seed production, which provides forage for numerous species during winter months when insect biomass is relatively low. Overall, specific management regimes will be dependent on the locations of grasslands and target objectives within the EGCP.

Loggerhead Shrikes breed and winter throughout the EGCP. Highest densities occur during the non-breeding season throughout the JV with an influx of migrants from areas north of the EGCP. Although not restricted entirely to grasslands, general habitat requirements include open areas with numerous perches to hunt from. Within these conditions, dense woody vegetation (typically along fence rows) is favored for nesting sites (Hall et al., 1997).

Northern Bobwhite occupy the EGCP year-around. Northern Bobwhites require three basic habitat components for usable space (Guthery and Bingham, 1992; Guthery, 2002). These three components are bare ground, herbaceous vegetation, and woody cover (Stoddard, 1931; Rosene, 1969; Roseberry and Sudkamp, 1998). Herbaceous vegetation is used by bobwhites for nesting, foraging, thermal protection, and roosting (Rosene, 1969; Klimstra and Ziccardi, 1963). Woody cover, in the form of low shrubs with dense canopy cover and low stem density, are critical for escape, foraging, and thermal protection (Rosene, 1969; Guthery 2002). This is true even in the western portions of the bobwhite range that are predominantly grasslands (Hernandez and Peterson, 2007; Robinson, 1957). Bare ground facilitates foraging (especially for chicks), movement, and dusting. Low density overstory trees such as pines and hardwoods are irrelevant to Northern Bobwhites as long as the other components are present; if they are not, then areas with overstory trees are either detrimental or are not used (Rosene, 1969). Generally speaking, grasslands alone do not provide optimal bobwhite habitat if they are monocultures, lack woody cover, and/or are too dense. Northern Bobwhite evolved to occupy the early stages of forest succession or grassland/forest borders, including those sites considered to be savannas and open stocked woodlands. Savannas and woodlands have succeeded to high density forests. In the recent past, croplands associated with agricultural clearing of forested landscapes became habitat windfalls for bobwhite (Rosene, 1969). These lands are now on the decline or have become so intensively farmed that bobwhite can no longer use them (Klimstra, 1982).

To restore the Northern Bobwhite population density to 1980 levels will require the addition of 859,378 coveys to the autumn pre-hunt population in Bird Conservation Region 27 (Dimmick et al., 2002). Capel et al. (1994) recommended that pasture and range wildlife populations should be restored to pre-1980 levels across the nation. Specifically, objectives included retaining 1,600,000 ha (400,000 acres) of existing range dominated by native warm-season grasses and restoring pastures to native warm-season grasses on an additional 4,092,400 ha (10,231,000 acres. Partners in Flight recommended a long term habitat restoration goal for the East Gulf Coastal Plain as an additional 40,000 ha (100,000 acres) of high quality grasslands, ideally concentrated in 5 areas, including the Kentucky Barrens, Jackson Prairie, and Black Belt (Woodrey et al. 1998). The East Gulf Coastal Plain JV and the Technical Working Group will work to refine these objectives and make these objectives spatially explicit.

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Coastal Communities

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Distribution and Condition

The boundaries of the EGCP JV encompass the Florida coast from the Florida-Alabama border east to the Apalachicola River. Major coastal communities within this area (hereafter referred to as the Florida Panhandle) include Beaches and Dunes, Maritime Shrub-Scrub, Maritime Forest and Hammock, Estuarine Emergent Marsh, Tidal Mudflats, and Near-shore Open Waters. All of these habitats are heavily influenced by sun, wind, storms, and salt via salt spray or high soil salinity (Florida Natural Areas Inventory, 1990). These communities make up only 0.2% of the total EGCP JV area yet provide critical habitat for birds as well as protection for inland communities from the severe effects of hurricanes and winter storms (Florida Natural Areas Inventory, 1990; Enge et al., 2003; McKerrow et al., *forthcoming).*

The condition of coastal communities is generally considered poor and declining (Florida Fish and Wildlife Conservation Commission, 2005). In the Florida Panhandle, urban development has primarily been concentrated along the coast, and conversion to residential housing and vacation resorts has altered the landscape drastically. Current estimates based on Southeast Gap Analysis Project data indicate approximately 48,000 acres of undeveloped coastal communities exist today. In addition to habitat loss and fragmentation, coastal communities are negatively affected by incompatible recreational activities, degraded water quality, and beach nourishment.

Priority Bird Species

This suite of coastal communities is important to all birds – whether breeding, migratory, or wintering; but they are especially critical to migratory songbirds, migratory and non-migratory shorebirds, and waterbirds. Each community provides habitats for different subsets of vulnerable species. Forty-four species of Neotropical migrants, shorebirds, and raptors (some of which are considered high priority by the Florida Fish and Wildlife Conservation Commission) primarily use coastal upland habitats. An additional 35 species of Neotropical migrants whose population numbers are suspected to be declining use maritime forest and hammock (Enge et al., 2003).

A minimum of 25 species of shorebirds winter in Florida and many more migrating species use stopover sites in Florida. The Piping Plover, Cuban Snowy Plover, American Oystercatcher, Whimbrel, Marbled Godwit, Red Knot, Ruddy Turnstone, and Sanderling are wintering species considered to be high priority by the Florida Fish and Wildlife Conservation Commission. Except for the latter two, all are considered to be priority species by the EGCP JV. At least seven shorebird species nest in Florida's coastal habitats including the Cuban Snowy Plover, American Oystercatcher, Wilson's Plover, and Black Skimmer and all but the Black Skimmer included are among the EGCP JV's priority species list (see Appendix C). Eleven species of gulls and terns breed in Florida, including the high priority Royal, Roseate, Gull-billed, and Least Terns (Enge et al., 2003).

Beaches and Dunes

This community consists of active beach, wave-deposited upper beach, and wind-deposited foredune, and occurs along shorelines subject to moderate- to high-energy waves (Florida Natural Areas Inventory, 1990; Enge et al., 2003). As such, this is a dynamic community that can be significantly altered by storms

(Florida Natural Areas Inventory, 1990). Active beach is subject to daily tides which prohibit plant growth (Florida Fish and Wildlife Conservation Commission, 2005). The upper beach may also be disturbed by waves, typically every year or two, and is continuously recolonized by herbaceous plants (Johnson and Barbour, 1990). Panhandle beaches and barrier islands are primarily composed of quartz sand, and longshore drift here is mainly westward, with accretion occurring on the western ends of islands (Johnson and Barbour, 1990).

Current Condition

Beach and dune habitats are deteriorating in quality (Florida Fish and Wildlife Conservation Commission, 2005). Development in coastal uplands continues to degrade environmental quality in beaches, dunes, and other low-lying areas. Shoreline hardening continues to erode the coastline, while beach nourishment only delays further loss.

Vegetation

Many pioneer species colonize and vegetate the foredune such as sea oats, beach cordgrass, sand spur, dune or bitter panic grass, railroad vine, beach morning glory, seashore paspalum, beach elder, dune sunflower, sea purslane, and sea rocket (Florida Natural Areas Inventory, 1990; Enge et al., 2003). Vegetation may be sparse or dense, with stems trapping wind-blown sand and building dune structure, while roots stabilize the dune (Enge et al., 2003).

Birds

Beaches and dunes are important feeding areas for migratory and wintering shorebirds, such as the federally listed Piping Plover, as well as resident colonial nesting waterbirds and migratory raptors (Hunter et al., 2001; Florida Fish and Wildlife Conservation Commission, 2005). Beach above the high tide line and dunes also provide primary nesting habitat for numerous shorebirds including several high priority species such as the Cuban Snowy Plover and Wilson's Plover (Hunter et al.; 2001; Florida Fish and Wildlife Conservation Commission, 2005). Beaches are also an important nesting area for seabirds such as Least Terns, federally endangered Royal Terns, and Black Skimmers (Enge et al., 2003). This community also hosts wintering Red Knots and the federally endangered Piping Plover (Hunter et al., 2001).

Umbrella Species

One umbrella species is the Cuban Snowy Plover, which is a subspecies of the Snowy Plover (Rodgers et al., 1996). The majority of Florida's breeding Cuban Snowy Plovers are distributed patchily throughout the Panhandle where it is a resident (Florida Fish and Wildlife Conservation Commission, 2003). While population numbers have likely declined due to habitat loss and increased recreation, it is difficult to determine definite population trends based on a lack of earlier estimates (Page et al., 1995; Rodgers et al., 1996). The Snowy Plover requires sandy beaches for nesting, where a shallow scrape is created on open ground near the front dune line (Page et al., 1995; Florida Fish and Wildlife Conservation Commission, 2003). The inner dunes are essential for brood protection (Florida Fish and Wildlife Conservation Commission, 2003). Snowy Plovers forage at the tide's edge for crustaceans, mollusks, and annelid worms, and on dunes and dry sand for adult and larval insects (Rodgers et al., 1996).

Destruction and degradation of habitat due to development and increasing recreational use of beaches are the primary reasons the Cuban Snowy Plover is listed as a threatened species in Florida (Page et al., 1995; Rodgers et al., 1996). Snowy Plovers are quick to abandon nests when they are disturbed by humans and pets that come within 100 meters of the nest (Rodgers et al., 1996; Florida Fish and Wildlife

Conservation Commission, 2003). Eggs and chicks are then susceptible to predators, exposure to sun and wind, and human disturbance. Snowy Plovers will rarely nest on artificial structures (Rodgers et al., 1996).

Maritime Shrub-Scrub

This habitat type lies between beach dune and maritime hammock on deep, well-drained sandy soils along high-energy shorelines with salt-tolerant shrubs occupying the stabilized, wind-deposited dunes (Florida Natural Areas Inventory, 1990; Enge et al. 2003; Florida Fish and Wildlife Conservation Commission, 2005). Maritime shrub-scrub can also be found on barrier islands. While fire may reduce succession towards hammock, maritime influences alone are often sufficient to inhibit succession (Florida Natural Areas Inventory, 1990; Johnson and Barbour, 1990). In the Florida Panhandle, sand pine scrub occurs in a narrow band along the coast and on barrier islands. This habitat type is found on deep, droughty, nutrient-poor soils and is shaped by infrequent, high-intensity fires (ten to 100 years) and windfall caused by hurricanes (Myers, 1990).

Current Condition

Maritime shrub-scrub is the most rapidly disappearing community in Florida (Florida Natural Areas Inventory, 1990), with less than 50% of its historic extent estimated to remain (Johnson and Barbour, 1990). The major threat to this community type is loss of habitat to development (Florida Natural Areas Inventory, 1990).

Vegetation

Vegetation in the maritime shrub-scrub community changes from the low-lying, herbaceous vegetation seen on the upper beach and foredune to salt-tolerant, woody shrub species (Florida Fish and Wildlife Conservation Commission, 2005). Dominant plant species include saw palmetto, sand live and myrtle oaks, cabbage palm, yaupon, sea grape, and Spanish bayonet (Enge et al., 2003). Low-growing vines, grasses, and other herbaceous plant species can also be found in this habitat type. Typical species include beach morning glory, railroad vine, and sea oats (Florida Fish and Wildlife Conservation Commission, 2005). Vegetation often forms a dense thicket (Florida Natural Areas Inventory, 1990; Enge et al., 2003; Florida Fish and Wildlife Conservation Commission, 2005). In sand pine scrub, sand pines dominate the canopy, reaching a height of 20 meters at maturity on productive sites. Dominant shrubs include myrtle, scrub, sand live, and Chapman's oaks along with saw palmetto, rusty lyonia, and Florida rosemary (Myers, 1990).

Birds

Both maritime shrub-scrub and maritime forest and hammock are crucial for providing food and shelter for Neotropical migratory songbirds (Florida Natural Areas Inventory, 1990; Hunter et al., 2001; Enge et al., 2003). These communities host several migratory species exhibiting declining population trends: Prothonotary Warbler, Wood Thrush, and Eastern Kingbird. Along with beaches and dunes, these upland habitats are also important to several raptor species that are associated with migratory songbirds and shorebirds such as the Arctic Peregrine Falcon, Merlin, Cooper's Hawk, and Sharp-shinned Hawk (Enge et al., 2003). The Common Ground-Dove is a resident of the maritime shrub-scrub community (Bowman, 2002). While it is not currently a high priority species, steep declines in the Southeastern subspecies may warrant some consideration (Hunter et al., 2001); these population declines may be due to habitat loss and degradation through fire suppression (Bowman, 2002). Species

occurring in sand pine scrub include Red-bellied, Downy, and Hairy Woodpeckers, Great Crested Flycatcher, Carolina Wren, Pine Warbler, Mourning Dove, and Eastern Screech-Owl (Myers, 1990).

Neotropical songbirds spend up to four months of each year migrating. Some consider this period the most vulnerable and unpredictable times of the year for these birds. Weather, risk, resources, and body condition determine where a bird will stop and for how long (Mehlman et al., 2005). Maritime shrub-scrub and maritime forest and hammock provide critical stopover sites to Neotropical migrants (Florida Natural Areas Inventory, 1990; Hunter et al., 2001). For Trans-Gulf migrants, these communities provide the last opportunity to rest and refuel before crossing the Gulf of Mexico. Similarly, these habitat types are the first potential landfall for birds returning across the 1000km of water (Enge et al., 2003). The Gulf Coast is of greater importance than the South Atlantic Coast for the majority of Neotropical migrants returning in spring (Hunter et al., 2001).

Maritime Forest and Hammock

Maritime forest and hammock occurs in a narrow band lying just inland of maritime shrub-scrub (Florida Natural Areas Inventory, 1990; Hunter et al., 2001). This community is also associated with high-energy wave coastlines that form on old coastal dunes (Enge et al. 2003). Plant species within this community are adapted to withstand sun, wind, salt spray, drought, nutrient-poor soils, and periodic hurricanes (Hunter et al., 2001). In mature successional maritime forests and hammocks, live and laurel oaks dominate and form a dense canopy that prevents hurricanes from uprooting trees while reducing temperature variations within (Florida Natural Areas Inventory, 1990; Hunter et al., 2001; Enge et al., 2003). Fire occurs infrequently (25-100 years) due to accumulation of moisture-retaining humus (Florida Natural Areas Inventory, 1990; Enge et al., 2003). In the Florida Panhandle however, slash pine flatwoods occur more frequently in the interdunal swales, indicating younger successional stands (Hunter et al., 2001; Johnson and Barbour, 1990).

Current Condition

Current condition of maritime forest and hammock is similar to maritime shrub-scrub, with development pressure again being the primary threat to this community. Only about 33,000 acres of maritime forest and hammock remain (McKerrow et al., *forthcoming*).

Vegetation

Dominant species found in this community include live and laurel oaks, pines, and redbay (Hunter et al., 2001). Other plants include cabbage palm, American holly, southern magnolia, southern red cedar (Enge et al., 2003).

Birds

In addition to the birds listed under maritime shrub-scrub, late-stage successional forests and hammocks provide breeding opportunities for the Yellow-throated Warbler and Northern Parula (Hunter et al., 2001), while the Common Ground-Dove also occurs in the early successional slash pine flatwoods (Bowman, 2002).

Estuarine Emergent Marsh

Estuarine emergent marsh consists of expanses of grasses, rushes, and sedges in the intertidal zone along low-energy coastlines and river mouths where mangroves are absent (Florida Natural Areas

Inventory, 1990; Enge et al., 2003; Florida Fish and Wildlife Conservation Commission, 2005). Tidal range determines whether a marsh is high (infrequently inundated) or low (frequently inundated), while tidal fluctuations within this community create one of the most biologically productive natural communities in the world (Florida Natural Areas Inventory, 1990; Florida Fish and Wildlife Conservation Commission, 2005). This community type is also important for its capacity to buffer storms and filter pollutants (Florida Natural Areas Inventory, 1990).

Soils are typically poorly drained muck or sandy clay loams that have a high organic content (Florida Natural Areas Inventory, 1990; Enge et al., 2003). Vegetation traps detritus originating from both ocean currents and upland runoff to form peat deposits. Plants must tolerate high soil salinity, poor soil aeration, frequent submersion and exposure, intense sunlight, and occasional fires (Florida Natural Areas Inventory, 1990). Wildlife that uses this habitat must be able to tolerate or avoid daily fluctuations in salinity, water levels, and temperature (Montague and Wiegert, 1990). Arthropods and birds form the basis of the terrestrial food web (Enge et al., 2003).

Current Condition

Estuarine emergent marsh is considered to be in poor condition and declining (Florida Fish and Wildlife Conservation Commission, 2005). This habitat type comprises just under 18,000 acres of the EGCP JV (McKerrow et al., *forthcoming*). Threats to this estuarine emergent marsh are many, including development, associated altered fresh water flow, dredging and filling, and water quality degradation due to pollution.

Vegetation

Smooth cordgrass occurs at lower elevations while black needlerush occupies slightly higher elevations; both typically form dense, uniform stands (Florida Natural Areas Inventory, 1990; Enge et al., 2003; Florida Fish and Wildlife Conservation Commission, 2005). In the upper reaches of river mouths where an influx of fresh water occurs, sawgrass may be found in dense stands (Florida Natural Areas Inventory, 1990; Montague and Wiegert, 1990). Other plants that occur at higher elevations in the transitional zone to uplands include glasswort, saltwort, saltgrass, soft rush, salt myrtle, marsh elder, sea ox-eye daisies, saltbush, and many other species (Enge et al., 2003; Florida Fish and Wildlife Conservation Commission, 2005). Species distributions are not always uniform and depend on elevation, slope, substrate, salinity, wave energy, and competing species (Florida Fish and Wildlife Conservation Commission, 2005).

Birds

Vegetation provides cover and forage for many nesting and wintering species, including several high priority species (Hunter et al., 2001). Wintering Nelson's and Salt Marsh Sharp-tailed Sparrows and resident Wakulla and Louisiana Seaside sparrows are high priority sparrow species occurring in this habitat type in the Florida Panhandle (Florida Natural Areas Inventory, 1990; Hunter et al., 2001; Enge et al., 2003). Wintering Yellow Rails, resident Black Rails, and resident Marsh Wrens are also high priority species that occupy this community type (Hunter et al., 2001; Florida Natural Areas Inventory, 1990; Enge et al., 2003). Tidal creeks are important foraging areas for egrets, herons, Wood Storks and Roseate Spoonbills (Enge et al., 2003). Other taxa that occur in estuarine emergent marsh are waterfowl, raptors, shorebirds, and terns (Florida Natural Areas Inventory, 1990; Florida Fish and Wildlife Conservation Commission, 2005).

Umbrella Species

Of the 6 extant subspecies of Seaside sparrows that reside in Florida, the Wakulla and Louisiana Seaside Sparrows occur in the Panhandle (Rodgers et al., 1996). These birds are found only in small, localized populations throughout their range (Post and Greenlaw, 1994). The Wakulla Seaside Sparrow is endemic to and comprises the majority of Seaside Sparrows found along the upper Gulf Coast (Rodgers et al., 1996).

Seaside Sparrows are habitat specialists, found in estuarine emergent marsh and intertidal areas in mixed dense stands of medium-high black needle rush and cordgrass, as well as scattered stands of saltgrass (Post and Greenlaw, 1994; Rodgers et al., 1996; Enge et al., 2003). They nest in clumps of black needle rush and cordgrass, approximately one to three feet above the ground (Florida Fish and Wildlife Conservation Commission, 2003). Seaside Sparrows forage in the vegetation and on open, muddy areas for insects, spiders, crustaceans, and seeds, and thus require areas that are not subject to extreme flooding (Rodgers et al., 1996; Florida Fish and Wildlife Conservation Commission, 2003). Wakulla and Louisiana Seaside Sparrows occupy a relatively narrow band of easily fragmented habitat along the Gulf Coast of the Panhandle and have already been affected by habitat modification (Post and Greenlaw, 1994). Seaside Sparrows are listed as a species of special concern in Florida, while the Wakulla subspecies has been proposed for federal listing under the Endangered Species Act (Rodgers et al., 1996).

Prior dredging, filling, and impounding activities due to mosquito control and waterfowl population enhancement has resulted in habitat destruction and degradation, although wetlands protection has mostly halted these activities (Rodgers et al., 1996). Impoundments flood the habitat, destroying natural vegetation and covering the substrate necessary for foraging (Rodgers et al., 1996). Alternatively, drainage of marshes allows woody vegetation to invade; once these woody species reach a critical density, Seaside Sparrows will abandon the site (Rodgers et al., 1996; Hunter et al., 2001). As a habitat specialist and because they are sensitive to habitat degradation, Seaside Sparrows are considered a potential indicator species for ecosystem health of estuarine emergent marsh and thus an appropriate choice for an umbrella species (Post and Greenlaw, 1994).

Tidal Mudflats

This community occurs in many estuarine areas and is comprised of non-vegetated sand or mud protected from wave action (Hunter et al., 2001; Florida Fish and Wildlife Conservation Commission, 2005). They are composed mostly of mud that originates from tidal channels (Florida Fish and Wildlife Conservation Commission, 2005). Tidal mudflats are harsh, unpredictable environments; organisms inhabiting this community type must withstand flooding, high soil salinity, and hot temperatures (Dillworth and Withers, 2007). Nonetheless, the unconsolidated substrate can support a large number of infaunal organisms, as well as transient planktonic and pelagic organisms when the flats are flooded (Florida Natural Areas Inventory, 1990). Both estuarine emergent marsh and submerged aquatic vegetation habitats supply nutrients to tidal flats in the form of detritus; both may also provide a source for invertebrates (Dillworth and Withers, 2007). A significant characteristic of this community type is the alternating cycle of inundation and exposure, allowing a myriad of species access to forage for the many invertebrates found in this community (Florida Fish and Wildlife Conservation Commission, 2005).

Current Condition
Tidal mudflats are considered to be in poor and declining condition (Florida Fish and Wildlife Conservation Commission, 2005). The major threat to this community type is degraded water quality due to multiple forms of pollution.

Birds
Tidal flats provide an abundant food source for shorebirds (Florida Natural Areas Inventory, 1990; Florida Fish and Wildlife Conservation Commission, 2005). Tidal flats are also an important foraging area for migratory and wintering waterbirds, colonial nesting birds, and raptors (Hunter et al., 2001).

Umbrella Species
While there has been no comprehensive survey of Red Knots in Florida, it is thought that those wintering in Florida have not experienced the population declines seen elsewhere. Even so, Red Knots are a priority species in the EGCP JV because they may be a separate subspecies that winters mainly in Florida. Additionally, other subspecies migrate through Florida (Niles et al., 2007). Red Knots are found on moderately high-energy coastlines that provide sand (Harrington, 2001). Winter and migration habitats are similar: muddy or sandy coastal areas such as tidal mudflats, sandy beaches, mouths of bays and estuaries, and unimproved tidal inlets (Harrington, 2001; Niles et al., 2007). Hard-shelled bivalves are the main food source (Niles et al., 2007).

Aside from threats at critical stopover sites, such as the decreased availability of horseshoe crab eggs in Delaware Bay, habitat loss, and human disturbance cause additional concern for potential population declines. Beach nourishment may negatively impact invertebrate prey, thereby displacing wintering Red Knots. In addition to beach nourishment, shoreline hardening has also substantially altered much of Florida's coastline (Niles et al., 2007). Human disturbances have potentially fatal energy costs considering that both wintering and migratory birds need to acquire sufficient energy reserves to migrate to the breeding grounds in the arctic (Harrington, 2001). Red Knots were listed as a candidate for federal listing in 2006 (Niles et al., 2007). The EGCP JV considers Red Knots a priority species.

Near-Shore Open Waters

This habitat type encompasses unconsolidated substrate devoid of any vegetative growth as well as areas of submerged aquatic vegetation. Near-shore open waters include seagrass beds, inlets, shoals, and expansive open water habitat associated with marshes. Highly productive, species-rich seagrass beds typically occur in subtidal zones in clear, coastal water with moderate wave energy (Florida Natural Areas Inventory, 1990; Florida Fish and Wildlife Conservation Commission, 2005). They provide food and shelter for hundreds to thousands of plants and animals (Florida Fish and Wildlife Conservation Commission, 2005).

Inlets are natural or man-made breaks in the shoreline that connect coastal and inland waters, creating hot spots of biodiversity (Florida Fish and Wildlife Conservation Commission, 2005). Shoals are raised areas of (typically) sand that result in shallower water. If a shoal is located in the intertidal zone, these areas can be periodically exposed. Depending on water depth, both shoals and inlets can be important foraging habitats for shorebirds and waterbirds (Florida Natural Areas Inventory, 1990).

Unconsolidated substrate has less than ten percent vegetative or coral cover and in the Florida Panhandle can consist of mud, mud/sand, sand, or shell. This community also can support large numbers of infaunal organisms in addition to transient planktonic and pelagic organisms (tube worms, mollusks, isopods, amphipods, burrowing shrimp, and crabs). When conditions are appropriate, unconsolidated substrate forms the foundation for the development of other coastal communities (Florida Natural Areas Inventory, 1990).

Current Condition

There are 83,000 acres of open waters within the EGCP JV administrative boundary and most are thought to be in poor and declining condition (Florida Fish and Wildlife Conservation Commission, 2005; McKerrow et al., *forthcoming*). Principal threats to this community include pollution, dredging and filling, and recreational impacts to submerged aquatic vegetation.

Vegetation

In areas with vegetation, seagrasses such as turtle grass, manatee grass, and shoal grass dominate, forming nearly pure or mixed stands (Florida Natural Areas Inventory, 1990). These grasses stabilize the sediments, thereby maintaining water clarity (Florida Fish and Wildlife Conservation Commission, 2005). Light availability, water temperature, salinity, sediment composition, nutrient levels, wave energy, and tidal range all affect the ability of seagrass to establish and grow (Florida Natural Areas Inventory, 1990; Florida Fish and Wildlife Conservation Commission, 2005).

Birds

Seagrass beds serve as important nursery grounds and shelter for invertebrates and fish, while inlets provide critical recruitment areas for these organisms and crucial spawning areas for several marine fishes (Florida Natural Areas Inventory, 1990; Florida Fish and Wildlife Conservation Commission, 2005). In turn, these habitats provide forage for waterbirds and shorebirds (Florida Fish and Wildlife Conservation Commission, 2005). Exposed mollusk reefs are also important feeding areas for shorebirds and wading birds.

Threats to Natural Habitats

Certain threats impact multiple coastal habitats. Chief among these shared disturbances are development and pollution. Every coastal community discussed above is directly and/or indirectly impacted by development, while the lowland habitats (beaches and dunes, estuarine emergent marsh, tidal mudflats, near-shore open waters) share a wide variety of pollution inputs.

Development

Development has destroyed an estimated 50% of coastal habitats in Florida and remains a large threat to all habitats within the coastal community (Johnson and Barbour, 1990). Florida's current population is approximately 18 million (1000 Friends of Florida, 2007). Roughly 75% of this population lives in coastal areas (Enge et al., 2003). The Panhandle's current population is roughly 885,000; this number is expected to double by the year 2060. The cities of Pensacola and Milton are located on the Gulf Coast and are two of the four areas where the majority of projected growth in the Panhandle is likely to be concentrated (1000 Friends of Florida, 2007). Development is the primary threat to both maritime shrub-scrub and maritime forest and hammock communities because these habitats are considered to be prime real estate (Florida Natural Areas Inventory, 1990). While conversion of wetlands has slowed since regulatory protection in the 1970's, development in uplands still indirectly affects the

environmental quality of these lower lying areas through runoff (Florida Natural Areas Inventory, 1990; Rodgers et al., 1996; Enge et al., 2003).

Disturbance

Even if foredunes are left undeveloped, development further inland can still impact dunes through increased human activity in the area (Enge et al., 2003). Beaches are vulnerable to compaction and dunes are subject to destabilization from human activities such as foot and off-road vehicle traffic (Florida Natural Areas Inventory, 1990; Enge et al., 2003). Destabilized dunes are vulnerable to wind and water erosion which causes blowouts (Florida Natural Areas Inventory, 1990). Sand from blowouts further destabilizes dunes further inland by burying vegetation, allowing storm surges access to inland habitats (Florida Natural Areas Inventory, 1990; Enge et al., 2003). Nesting, foraging, and roosting birds are disturbed by a myriad of recreational activities. Pets, foot-traffic, and vehicles can kill eggs and chicks. Adults flushed from the nest expose eggs and chicks to sun, wind, and predators (Enge et al., 2003).

Shoreline Hardening and Beach Nourishment

In addition to recreational activities, construction of seawalls also causes beaches and dunes to erode. While erosion by wind and water is a natural process, when longshore drift is cut off by seawalls, or other forms of shoreline hardening, the natural process of accretion is also halted. The coast of Florida has lost 0.3-0.6m/yr. over the last several decades. All other lowland coastal habitats – estuarine emergent marsh, tidal mudflats, and near-shore open waters – have also been impacted by dredging and filling ("beach" nourishment in other habitat types) activities. Seawalls, groins, jetties, and beach nourishment all destroy foraging and roosting habitat for shorebirds, gulls, and terns (Enge et al., 2003).

Pollution

Multiple and varied forms of pollution impact beaches and dunes, estuarine emergent marsh, tidal mudflats, and near-shore open waters. Oil and chemical spills occur as both offshore and point source pollutants (Florida Natural Areas Inventory, 1990; Enge et al., 2003). Runoff from uplands delivers other pollutants such as herbicides, pesticides, fertilizers, and toxic heavy metals that also degrade water quality (Florida Natural Areas Inventory, 1990). Often domestic and industrial wastes are also dumped into these habitats (Florida Natural Areas Inventory, 1990; Montague and Wiegert, 1990).

Pollution can kill substrate-dwelling organisms, thus eliminating food sources for shorebirds (Florida Natural Areas Inventory, 1990). Oil spills have numerous impacts on birds. Ingestion of oil may cause death by dehydration. Oiling can decrease the hatching success of gulls and terns. Oiled feathers cause heat to be released from the body more rapidly and result in an energy cost due to the increased amount of time spent preening. Organochlorine pesticides and herbicides may poison adult birds or influence egg laying. Toxic metals that have accumulated in fish may affect gulls, terns, and loons (Enge et al. 2003). This list of actual and potential harmful effects of pollution on birds is far from complete.

Additional Threats

Certain communities are subject to additional threats that are specific to that habitat type. Estuarine emergent marsh is affected by the alteration of freshwater flow due to human activities (Enge et al. 2003). However, perhaps the greatest impact to this community has been the impoundment of these areas for mosquito control. Impounding causes native vegetation to die-off, freshwater or aquatic species to invade, and causes Seaside Sparrows and Black Rails to abandon the site (Rodgers et al. 1996). Seagrass beds are vulnerable to boat traffic; propellers, anchors, and trawls can all cause scarring.

Increased temperature from power plant outfalls and sedimentation can also affect the vegetation in near-shore open waters (Florida Natural Areas Inventory, 1990).

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Upland Hardwoods and Mixed Pine-Hardwood Forests

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Distribution and condition

In the EGCP, upland hardwood forests and mixed pine-hardwood forests occur north of the longleaf pine belt to western Kentucky, west to the loess bluffs adjoining the Mississippi River floodplain, and east through central Mississippi and Alabama. Upland hardwood forests of the EGCP are part of the Oak-Hickory Vegetation Type as defined by Kuchler (1964) that includes large portions of the Central Hardwoods Bird Conservation Region (BCR). Mixed pine-hardwood forests in the EGCP are part of a major community type that extends from the Cross Timbers region of Texas, through the central portion of the Southeastern U.S. to the Chesapeake Bay area (Kuchler, 1964).

Both upland hardwood forests and mixed pine-hardwood forests were a dominant component of the EGCP landscape; these forests were an integral part of a mosaic of barrens, grasslands, scrub-shrub and floodplain forest communities. Upland forest types have a close association with soils and geology in the area (see Bryant et al., 1993), and were also sustained by human caused fire and natural disturbances (Spetich, 2004). Natural, as well as human caused fire seemed especially important in sustaining oak dominance in upland forests (Van Lear, 2004).

Hardwood-dominated forests remain a major component of the EGCP upland landscape. Pine is a significant presence in upland forests of central Mississippi and Alabama, while in western Tennessee and Kentucky, forests are primarily hardwood. Approximately 21% of the total land base of the EGCP physiographic area is classified as upland hardwoods or pine-hardwood forests (McKerrow et al., *forthcoming*).

Although extensive forests remain in uplands, large areas have been converted to other land uses, primarily pasture, agriculture, and expanding rural communities. The largest patches of mixed pine-hardwood forests currently occur east and west of the black belt in north central Mississippi and western central Alabama. The largest patches of upland hardwood forest currently occur in the northernmost portions of the EGCP, on the Tennessee Plateau near the Tennessee River, and along the loess bluffs, especially in the southern portion (McKerrow et al., *forthcoming*; Woodrey et al., 1998).

Of the existing upland forests, most have been altered significantly from their original structure and composition. Fire suppression has likely had a major impact on some sites to regenerate oaks (Van Lear, 2004), and has impacted both composition and structure of upland forest stands. Selective logging, which uses a diameter-based limit for harvesting trees, has been a common practice in the region for generations, and has resulted in “high-grading”; that is, harvest of the best trees over time leaving a lower quality forest stands to regenerate (see U.S. Department f of Agriculture Forest Service, 1988). Furthermore, the global demand for pulpwood, which uses pole sized timber or smaller, has resulted in increased logging in upland forests and it remains unclear how natural regeneration will respond (for example, see Ingrain et al., 1993).

Only one percent of upland hardwood habitats are protected in the EGCP (McKerrow et al., *forthcoming*). No outstanding examples of this forest type are known to occur, and as a result, very little is known about how these forests function or the bird species that utilize them. Much of the existing forest lands on private lands, including lands held by forest industry, can be classified as “low

quality land" in relation to other land uses, such as row crop agriculture. As a result, predictions for changes can be modeled on stumpage value. Ahn et al. (2002) predicted that if stumpage values fall, then total acreage of forest lands could decrease by 1.5% by the year 2050. However, if stumpage values continue to increase similar to historical rates then total acreage in forest lands may increase in the region by up to 5% as landowners find a viable market for timber. However, urban expansion and agricultural policies can strongly influence cumulative effect of land use patterns of private land and are impossible to capture while modeling forest changes.

Tennessee Plateau

Surveyors working for the General Land Office survey in 1820, listed 71% of the trees in the "Lands West of the Tennessee River" as oaks and hickories (Bryant and Martin, 1988), dominant oak species included post, blackjack, white and red oak. Generally, similar conditions probably occurred east of the Mississippi River as well. Across the Tennessee Plateau, the landscape mosaic was upland hardwood forest, barrens, post oak-blackjack oak savannas, white oak uplands, and elm-ash-maple associations. In Kentucky, it is likely that mature closed canopy forest was abundant on the eastern side of the area, near the Tennessee River (Palmer-Ball, 1996). Generally, the substrate of the Tennessee Plateau consists of Tertiary deposits, although a thin loess layer occurs in a few places (Bryant et al., 1993).

Current condition

In the Tennessee Plateau section of the EGCP, ridgetops and north facing slopes are largely dominated by smaller diameter post oak and blackjack oak forests, while richer sites, such as bluffs near rivers and protected coves, hold white oak communities. In white oak forests, trees have typically larger diameter and height, and the understory layer is much more fully developed. Many forest stands have closed canopies, and generally, could be regarded as mid-successional and senescent.

Loess Bluff Forest

Upland hardwood forests along the loess bluffs are continuous forests along the bluff between the EGCP and the Mississippi Alluvial Valley ecoregions (McKerrow et al., *forthcoming*). Loess bluff forests were extremely diverse in composition and structure; these forests represent a mixture of mixed mesophytic from the north, bottomland hardwoods to the west and southern mixed forest to the south and east. Historically, there was a great variety of oak, hickory, walnut, tulip tree, basswood, elm, beech, pawpaw, and a dense undergrowth of cane (Martin et al., 1993).

Current condition

Loess bluff forests remain largely intact since the steep slopes and fragile soils of the bluffs do not invite development. Furthermore, since any one landowner has a relatively small portion of this forest on the bluff, and since soil erosion is a major concern, many areas are not extensively logged. However, in spots, the forest is dominated by invasive, exotic plants (such as kudzu) or housing developments (Woodrey et al., 1998).

Vegetation

Forest conditions along the loess bluff are diverse in both composition and structure. In the southern end of the region, magnolia-holly-beech forest associations are dominant. Through the middle part of the EGCP, characteristic forest cover is white oak, sugar maple, beech, black cherry, and yellow poplar. In the northern part of the region, the west Kentucky bluffs were called the "cane hills", one of the

heaviest and most varied of original forest growth, dominated by white, chestnut, black and Spanish oaks, as well as hickories, walnut, poplar, basswood, elm, beech, and others. A dense understory dominated by cane was not uncommon (Martin et al., 1993).

Mixed pine-hardwood forests

Mixed pine-hardwood forests are extensive over much of north and central Mississippi and Alabama in the EGCP. The structure and composition of mixed pine-hardwood forests is described by Kuchler (1964) as medium to tall forest, dominant tree species include a variety of hickories, shortleaf pine, loblolly pine, white oak and post oak. Early European settlement likely played a role in the development of the mixed pine-hardwood forest. Europeans cleared the most fertile land for agriculture, which was probably dominated by hardwoods, but abandoned that land as it became less productive. Once abandoned, pure stands of pine may have dominated the site and sustained a presence, or even dominance, over time (Skeen et al., 1993).

Current condition

Much of the mixed pine-hardwood upland forest remains in large tracts across the EGCP, the largest patches of mixed pine-hardwood forests currently occur east and west of the black belt in north central Mississippi and western central Alabama. For example, the mixed pine-hardwood forest occupies about 22% of all forest lands in Mississippi, although the vast majority is privately owned and not intensively managed over time (Leopold et al., 1989). Mixed pine-hardwood forests often occur on ridgetops and dry slopes, or occur in areas of high, frequent disturbance in the EGCP (Skeen et al., 1993). Much of this forest is frequently logged, and the economic discussion is ongoing regarding management to sustain mixed pine-hardwood forests, allow natural regeneration to develop the next forest stand or convert stands to pine plantations (see Waldrop, 1989). Many forest stands have closed canopies, and generally, could be regarded as mid-successional and senescent. However, pine dominance in these forests decreases with stand age (Leopold et al., 1989).

Vegetation

Mixed pine-hardwood forest characteristics include an overstory dominated or co-dominated by pine, most often loblolly or shortleaf, with an array of hardwood species present in the canopy that includes post oak, southern red oak, white oak, hickories, sweetgum, red maple and winged elm (Perkins and Hurst, 1989). Natural regeneration of these forests is extremely complex and, in some cases, remains unpredictable. Plant species diversity, canopy and understory composition, and composition changes over time can be variable regardless of management treatments, topographic position, and soil classes (Leopold et al., 1989).

Threats to Natural Habitats

The upland hardwoods of the EGCP remain in fairly large tracts in many areas, fragmented primarily by roads and small rural communities. Large areas cleared for row crop agriculture were probably grassland historically, such as the Black Belt in central Mississippi and Alabama, the area of northwest Tennessee, and the barrens areas of western Kentucky. The large tracts of forest remaining will probably continue to be classified as forest lands through at least the year 2050, depending in part on stumpage value, agricultural incentive programs, and increasing urban development (Ahn et al., 2002). Most existing forest land is probably at its highest and best value and is not at significant threat to

conversion to row crop agriculture or pasture lands. Transportation corridors and urban development remain the great threat to conversion of much forest lands in the EGCP.

Greater challenges exist in regard to sustaining and improving the quality of this forest as priority bird habitat. Most of the forest has a relatively low basal area, lower diversity of tree and plant species in the overstory and understory, and has a less complex stand structure compared to historic conditions; general forest conditions can be described as mid-successional and senescent (Hunter et al., *in press*). Continued threats to high quality bird habitats remain from alteration of the forest by unsustainable and unplanned forest management, such as high-grading or conversion to pine plantations for the pulpwood market. Natural regeneration is a common practice after logging; however, site preparation and long term planning is difficult to implement and makes the quality of the regenerating forest difficult to predict.

Overabundance of white-tailed deer is a potential threat to forest regeneration and to nesting habitat for birds using understory and shrub layers, such as Hooded Warbler and others. In many areas, deer herds are at highest recorded numbers. Furthermore, current age and sex ratios of these populations indicate that deer herds may continue to increase.

Invasive plants can be a serious threat in some areas, actually changing entire forest composition and structure. In the uplands of the EGCP, this may be most pronounced along the loess bluff, where entire stands have been overtaken, then destroyed, by kudzu.

Priority Bird Species

EGCP upland hardwood forests, including upland hardwoods, mixed-pine hardwood, and loess bluff forests, are significant bird habitats because of their extensive range and diversity of forest types. Although much of this forest is less complex than historical conditions, these forests provide extensive habitats for breeding, migrant, and over-wintering birds. At least 250 bird species occur regularly in upland hardwoods and/or mixed pine-hardwood stands throughout the EGCP. In the northernmost area of the EGCP, approximately 100 breeding bird species can occur in a single county, of which about 50 may use upland hardwood forests (see Ford and Hamel, 1993; Ford and Waldron, 1997). In the southernmost upland forests of the EGCP, about 120 bird species may nest. Of these, about 60 may use upland hardwood and mixed pine–hardwood forests. Partners in Flight proposed a priority list of birds that occur in upland hardwood and mixed pine-hardwood forests of the EGCP (Woodrey et al., 1998). These species represent a wide geographic distribution through the EGCP upland forests and a variety of specific habitat requirements.

Umbrella species

In upland hardwood forests, umbrella species were selected to serve as a guide to direct EGCP JV Partner actions in priority habitats and as one possible benchmark to evaluate progress towards objectives. As such, umbrella species were selected for each of three conservation and management categories: 1) restore populations dependent on an ecologically more complex forest structure and complex composition to areas where they do not currently occur, 2) increase populations of birds that respond to improved management of existing forests, especially private land forest, where smaller than desired population currently occur, and 3) provide landscape corridors of habitat for birds in migration and for birds to adapt to climate change.

Restore Populations where they are currently non-existent.
Cerulean Warbler best represents an umbrella species that requires a more complex structure and composition of upland forests and, currently, has limited distribution in the EGCP. Furthermore, Cerulean Warblers require large diameter canopy trees, a complex canopy structure, and fairly large tracts of forest land for successful nests (Robbins et al., 1992).

This species is known to occur only in the northernmost portions of the EGCP, and almost solely in large tracts of mature bottomland hardwood forest (Nicholson, 1998; Palmer-Ball, 1996). However, this species most likely also occurred historically in upland forests as well in the EGCP, nesting in heavily forested areas on moist slopes or in the forests of the loess bluffs.

Increase populations where smaller than desired numbers currently occur.
Yellow-billed Cuckoo, Wood Thrush, Red-eyed Vireo, and Brown-headed Nuthatch are examples of umbrella species that are widespread and relatively common in the EGCP, and are species that will respond to improved management and restoration of upland hardwood and mixed pine-hardwood forests. These species require a range of forest structure and composition conditions. Management of existing forest to move from a mid-successional stage and out of senescence would potentially increase the nesting success and relative abundance of these species.

Furthermore, sustaining and increasing the integrity of forest tract size can increase nesting success. Forest birds seem to have lower nesting success in landscapes of less than 70% forest cover within a 10 km radius (Donovan et al., 1995, Robinson et al., 1995). Tracking the relative abundance and nesting success of these species, as well as the presence of Cerulean Warbler, can provide management insight into overall forest conditions.

Landscape corridors.
Many of the long distance migrant birds that nest in the Eastern U.S. and Canada utilize EGCP upland forests during spring and fall migration. Migration habitats can be limiting factors for some species populations (Melhman et al., 2005), even if stop-over habitats are not near coastal zones. Furthermore, increasing evidence regarding climate change suggests that biologists should start landscape scale planning to help provide for wildlife adaptation to potential large scale changes in habitat potential (see Intergovernmental Panel on Climate Change, 2001). Climate change will impact several aspects of migratory bird species' annual cycle, including migration timing and shifts in breeding and/or wintering ranges (e.g., see Ledneva et al., 2004; Matthews et al., 2004). Planning for, and sustaining, landscape scale corridors, utilizing existing upland forests with other habitats, can help mitigate impacts of climate change over time, potentially allowing for more dependable stopover habitats, and the need for ecological communities to shift over time.

Partners in Flight (Woodrey et al., 1998) proposed habitat objectives for the upper unit of the EGCP (west Tennessee and Kentucky) and for the loess bluffs, including the restoration and management of at least five different areas of upland hardwood forests of at least 10,000 acres each. These habitat objectives and locations were further refined by the Tennessee Wildlife Resources Agency (Tennessee Wildlife Resources Agency and U.S. Fish and Wildlife Service, 2001). For the middle unit of the EGCP, Partners in Flight proposed that at least 10 areas greater than 10,000 acres be sustained in upland mixed pine-hardwood forests (Woodrey et al., 1998).

The EGCP JV will continue to refine Partners in Flight objectives and integrate those objectives into state comprehensive wildlife planning. Furthermore, the JV will examine the role of upland forests to serve as a fundamental part of landscape scale corridors to account for wildlife adaptation to changing climate.

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Eastern Shrub-Scrub Communities

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Distribution and Condition

Shrub-scrub habitats cover over 20 percent of the 48 contiguous states (Smith, 2007). In the EGCP, there are 6.4 million acres of shrub-scrub habitat, totaling 11 percent of the EGCP JV administrative area (McKerrow et al., *forthcoming*). For example, in Mississippi, shrublands occupy about 16 percent of the state (Mississippi Museum of Natural Science, 2005). Shrub-scrub communities include naturally occurring habitats, such as tornado or hurricane paths, frequent fire prone areas, and areas where flooding limits overstory trees. Early-successional, scrub-shrub habitats are also human caused and maintained, in areas such as recently logged lands, transportation or transmission line right-of-ways (ROWs), abandoned farm fields, hedgerows, and agricultural/urban habitat edges. Generally speaking, many scrub-shrub habitats are transitional and in relatively small patches.

Prior to European settlement, early successional shrub-scrub habitat was probably much more widespread because of large-scale disturbances as fire, grazing of hoofed animals, hurricanes, and tornadoes that allowed for natural succession of grasslands. Furthermore, during the early 1900's, inefficient farming practices on smaller farms and larger and more frequent clearcuts in forests were more common in the Southeastern U.S., which likely allowed for a replacement of the more natural scrub-shrub habitats lost during this same time period (see Woodrey et al., 1998). Today, with more efficient farming practices on large farms, fewer clearcutting practices, and increased fire suppression, early successional and scrub-shrub habitats are not replaced on the landscape, in either quality or quantity, to sustain priority bird populations at 1960 levels in the EGCP. In addition, many ROWs are now mowed or sprayed frequently to prevent shrubs and trees from creating hazards (e.g., blocking vision, growing across roadways, or growing into transmission lines); the result is that fewer shrub-scrub habitats are maintained long term in many ROWs.

Vegetation

Vegetation of shrub-scrub habitats is highly variable and depends on the length of time since disturbance, abandonment, or management (Smith, 2007). The herbaceous layer consists of various grasses and forbs. In many cases in the EGCP, typical ecological succession results from the abandonment of cropland and pasture, which then become grassland, to shrub-scrub, to woods. Shrub-scrub habitat may take five to ten years to establish following abandonment and succeed into forest habitat when the trees reach an average height of 15 feet (Mississippi Museum of Natural Science, 2005). Shrub-scrub communities are also discussed in other sections of this Appendix, specific to those broader habitat types (such as buttonbush swamps or beaver ponds in forested wetlands).

For ROWs, the maintenance of shrub-scrub habitat depends on the management regimes established to maintain the public service (roads, transmission lines, etc.). Right-of ways are often mowed or sprayed with herbicides to deter vegetative growth, but if left for a number of years, shrub-scrub habitat develops. Hedgerows and agricultural edges are often left along property lines and between croplands and may provide an extensive source of shrub-scrub habitat.

Threats to Natural Habitats

State Wildlife Conservation Strategies from Louisiana, Mississippi, Alabama, Kentucky, and Florida identify the following threats as of significance to the decline of shrub-scrub habitats (Kentucky Department of Fish and Wildlife Resources, 2005; Mississippi Museum of Natural Science, 2005; Lester et al., 2005; Wildlife and Freshwater Fisheries Division, Alabama Department of Conservation and Natural Resources, 2005):

- Altered fire regime
- Altered community structure
- Mowing regimes
- Pesticide and herbicide use
- Urban, industrial, and agricultural expansion
- Clean farming practices
- Depredation and/or parasitism
- Road construction/management
- Altered hydrology due to drainage ditches and raised roadbeds
- Exotic or invasive species
- Erosion from mechanized vehicle trails

Conservation Opportunities

Shrub-scrub habitat can be created through managed disturbances such as burning, light disking, mowing, and grazing and then allowing natural regeneration to occur (Smith, 2007). Threats, such as the high risk of undesired invasive species dominance, should be anticipated and mitigated when creating and maintaining shrub-scrub habitats. Tree planting can be utilized if no natural regeneration sources are available or if a faster response is needed. Various programs, such as the Federal Farm Bill Programs, are available to enhance or maintain shrub-scrub habitats on agricultural fields, including the establishment of field borders, maintaining shelterbelts, burning, and herbicide applications. Additionally, coordination with utility companies or transportation agencies to develop programs that create better shrub-scrub habitat such as feathered edges is important. Programs should target creating habitat that varies in age, species, and structure.

For these and other pasture and range species, Capel et al. (1994) specifically set goals to reaching and sustaining 4,550,000 acres of long term (10 – 20 years) herbaceous and shrub cover habitats. Partners in Flight provided step-down habitat objectives for the EGCP as 600,000 acres of actively managed, 10 – 20 year shrub-scrub habitat, although they cautioned for the need for more discussion about these objectives (Woodrey et al., 1998). Scrub-shrub habitats are a lower priority for the EGCP JV, except as within the context of broader habitat types and landscape context needs for priority species such as Northern Bobwhite. The EGCP JV Technical Committee will continue to work with states and the Northern Bobwhite Conservation Initiative to refine and implement these objectives.

Priority Bird Species

The EGCP JV considers Bachman's Sparrow, Bewick's Wren, Northern Bobwhite, Southeastern American Kestrel, and Prairie Warblers as species priorities for management and conservation emphasis in shrub-scrub communities. Additional priority species include Blue-winged Warbler, Painted Bunting,

Loggerhead Shrike, American Woodcock, and Rusty Blackbird. These species require some combination of grass and forb layer with a diverse shrub component. For instance, Loggerhead Shrikes require grasslands to hunt yet require small patches of dense shrubs to nest and perch from. Therefore, a diverse vegetative structure and composition is the major habitat component for these species.

Bachman's Sparrows are best treated as a species of open pine forests (see discussion of pine-dominated communities beginning on page D-6); however, this species successfully uses early successional habitats with a high percentage of grassy cover, including habitat produced for the first few years after clearcutting. More importantly, Bachman's Sparrow seems to use early successional corridors for dispersal between sites, which could provide management opportunities using ROWs, tornado alleys, or a series of linear clearcuts (Dunning et al., 1995).

Northern Bobwhite is a priority species because of both its recent population declines and its importance as a social, cultural, and economic resource. Across the entirety of the Southeastern Coastal Plain (including states of the Atlantic Coast), statistics provided by the ten states showed that harvest of Northern Bobwhites declined from nearly six million birds in 1980 to slightly more than 1.5 million in 1999 (73.7%). In Louisiana, Mississippi, and South Carolina, the Northern Bobwhite harvest declined more than 90%. The pre-hunt population density of Northern Bobwhites on the improvable acres of agricultural (IAA) lands in 1980 was 0.460 birds/IAA. In 1999 that density had declined to 0.145. To restore the Northern Bobwhite population density to 1980 levels will require the addition of 859,378 coveys to the autumn pre-hunt population in this Bird Conservation Region (Dimmick et al., 2002). Hunting pressure on public lands continues to increase on some areas, despite declining populations (Brennan and Jacobson, 1992). Hunting records from shooting-plantation game books in the Southeastern U.S. show evidence that relatively stable and abundant populations can be maintained for multiple decades if proper habitat is maintained through management (Brennan et al., 1995).

Broad-scale data derived from Christmas Bird Count, Breeding Bird Survey (BBS), and state game agencies suggest a widespread decline throughout the U.S. (Brennan, 1993; 1994). Annual declines from 1966 to 1988 averaged 3% in eastern Untied States and 1.8% overall in U.S. (Droege and Sauer, 1990). Declines are attributed primarily to habitat loss from changing land uses in agriculture, forestry, and expanding suburbanization. However, other alternative hypotheses of factors (i.e., global warming, presence of exotic fire ants) related to the decline must also be considered (Brennan, 1999).

In riparian habitats this bird shows a clear preference for early successional scrub vegetation created by disturbances from fire, agriculture, and timber-harvesting (Rosene, 1969). Recent Farm Bill practices have attempted to establish warm season grass habitat buffers around farm fields in attempts to increase cover for breeding and non-breeding Northern Bobwhite. These field borders may play a critical role in filling the gap in habitat needs of Northern Bobwhite quail by supplying grasses and shrub cover between fields and woods. Management of habitat for Northern Bobwhite exclusively may not adequately provide for all riparian scrub edge priority species. The other priority birds require more extensive shrub cover for nesting and foraging, however management for Northern Bobwhite via field borders and/or shrub development will likely benefit other species.

Painted Bunting, easily recognizable and attractive, is a species of high priority because of population declines in recent decades. The EGCP supports birds in the western population of the species, which is disjunct from the Atlantic coast population. Overall, BBS data show population declines for Painted Bunting of –3.2%/yr for 1966–1995; significant decline evident for the period 1966–1979 (–2.6%/yr; n = 190, $p < 0.01$), but no significant trend found for 1980–1995 (Sauer et al., 1997)

Population declines have not been attributed to specific sources, but may be attributed to the loss of scrub-edge habitat throughout their range. One possible source is highway maintenance where roadsides are cleared of shrubby vegetation favored for nesting (Lowther et al., 1999). Another more recent source is capture of birds for the pet trade. Inigo-Elias et al. (2002) reported that at least 6000 Painted Buntings are captured annually in Mexico for the domestic market with equal numbers captured for the international trade in Japan and the European Union. More than 100,000 Painted Buntings were trapped in Mexico from 1984 through 2000, an average of 5,800 birds per year. This does not include any information on the illegal trade, which is commonplace but very difficult to document (Inigo-Elias et al., 2002). Additional birds are captured in Cuba and likely other Caribbean counties, but the extent to number of captures is unknown. Color-banded Painted Buntings from the east coast population have been found in cages in Cuba (Paul Sykes, pers. comm.)

Management for Painted Buntings as a priority species will greatly benefit other species that prefer early successional habitats. Regeneration of scrub habitat along riparian corridors and old fields will provide the nesting substrate needed by these species. Managing a semi-open country with scattered bushes and trees, tall roadside or streamside brush and patches of grasses will best benefit the Painted Bunting (Lowther et al., 1999).

The Blue-winged Warbler is one species of conservation concern along riparian scrub/edge in the EGCP that has experienced population declines in the southeast. Populations have been expanding north and eastward and rangewide BBS trend shows a slight increase overall of 0.21%/yr from 1966 to 1993 (Peterjohn et al., 1994). However, BBS data show significant decreases (1966–1996) in Alabama (-7.6%/yr) and Kentucky (-8.7%/yr) (Gill et al., 2001).

Although this species is poorly understood, population declines in the Southeastern U.S. are believed to be due to habitat changes induced by humans, especially loss of early- and midsuccession habitats on abandoned farmland and forest clear-cuts. Most habitat descriptions refer to use of saplings or forest edge or forest clearings and dense shrub or dense thickets. In one study, they preferred clearcuts with dense shrub cover (0.5–1.5 m high), canopy height <7 m, and close to roads or power line rights of way; not sensitive to size of clearcut (Zuckenberg, 1998). Research on conservation of shrubland birds, however, is critically needed because of advancing succession and suburban sprawl (Gill et al., 2001).

One species of highest conservation concern in the EGCP is the American Woodcock as this physiographic area serves as a fairly major wintering area for this species (Woodrey et al., 1998). U.S. Fish and Wildlife Service data indicate a significant long-term decline of 2.1 percent annually for American Woodcock in the eastern region (Kelley, 2004). The U.S. Shorebird Conservation Plan (USSCP) lists woodcock as a Species of High Concern and as a species known or thought to be declining (Brown et al., 2004). They are listed on the Audubon Watchlist “yellow list” of those species that are in slow decline and of national conservation concern (National Audubon Society, 2004).

Unlike most other shorebirds and marsh birds, woodcock are a forest-dwelling species. Woodcock are often associated with forested wetlands. In the southeast, alluvial floodplains with a brushy forest understory are apparently a preferred habitat type. Swamp privet, holly, switch cane, honeysuckle, peppervine, trumpet creeper, green briar, and grapes have been identified as important understory species (Owen et al., 1977; Roberts, 1989). The composition of the tree overstory appears unimportant (Owen et al., 1977).

Old fields, croplands, pasturelands, wet seeps and damp thickets also provide important habitat for woodcock on wintering grounds. Old fields and other early successional habitat types are often used as nocturnal habitat, and should be located within 230 m of diurnal habitats (Berdeen and Krementz, 1998). While a high density of plant stems is preferred by woodcock, open ground underneath the canopy is a necessity to provide easy access to worms and other invertebrates in the ground litter (Roberts, 1989; Krementz and Jackson, 1999).

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Freshwater Wetland Communities

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Distribution and Condition

Freshwater wetlands occur in a variety of types throughout the East Gulf Coastal Plain (EGCP). Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season (Mitsch and Gosselink, 1993). The wetland communities discussed in this report include non-forested, forested, and open water wetlands, which make up 14% or 8,521,439 acres of the EGCP (McKerrow et al., *in forthcoming*). In this report, non-forested wetlands are defined as those communities with less than 30% canopy cover by woody species. Types within the EGCP include freshwater emergent marshes, bogs, seepage slopes, ephemeral wetlands, sandbars, and mudflats. Forested wetlands are defined as those areas with greater than 30% cover by woody species. Types within the EGCP include freshwater shrub-scrub, bottomland hardwoods, cypress/tupelo, bay swamps and depressional wetlands. In this report, open water wetlands are permanently flooded lands lying below the deepwater boundary of wetlands and include oxbow lakes, reservoirs and artificial ponds.

Freshwater wetlands have suffered major acreage losses as well as degradation in the EGCP. Losses and degradation have resulted from human activities such as development, agriculture, drainage, fragmentation, stream channelization, wastewater and stormwater runoff, mosquito control, grazing, timber harvest, and deposition of fill (Mitsch and Gosselink, 1993). Severe flooding and nutrient deposition to downstream waters have often followed marsh destruction and degradation, indicating the vital roles these wetlands play.

Freshwater Non-Forested Wetlands

Non-forested wetlands are a collection of wetland plant communities dominated by herbaceous plant species. Like all wetlands, this habitat occurs on sites with a high water table, and many non-forested wetland communities are flooded for most or all of the year. Because of the high water table or flooding, soils in these habitats are usually saturated for prolonged periods and are often anaerobic. Many dominant plants in wetland communities are tolerant of persistently deep water levels and have stems, leaves, and roots that contain intercellular air spaces that store oxygen and diffuse it from above-water structures to roots during waterlogged conditions (Mitsch and Gosselink, 1993).

Marshes occur on permanently or periodically inundated sites. These communities are typically inundated by nutrient-rich water. They include emergent and open marshes. Emergent marshes are dominated by vascular plants, such as cattails, that can survive indefinitely with their roots and lower stem submerged and their aerial shoots above water. In addition to cattails, emergent marshes are characterized by perennial emergent plants, such as bulrushes and arrowheads, mixed with annual forbs during low-water periods when substrates are exposed, and with floating-leaved and submergent aquatic plants in settings with persistent standing water. Emergent plants provide important habitat for a variety of wetland bird species. Plants with floating leaves, such as water lilies, dominate open marshes, which are sometimes classified as aquatic communities. Variation in species composition over time in response to changes in hydrological conditions is common in marshes.

Freshwater Emergent Marsh and Bogs/Seepage Slopes/Ephemeral Wetlands

Emergent marshes are shallow wetlands that are flooded with standing or running water much of the year. They are dominated by erect, herbaceous vegetation. Their cover consists of such plants as cattails, bulrushes, pickerel weed, loosestrifes, and arrowheads. Emergent marshes provide nesting habitat, food, and cover for many waterfowl and other wildlife, and add large quantities of nutrients to food chains.

Threats to Natural Habitats

Freshwater emergent marshes are subject to many threats, including invasive plants and animals, incompatible water quality, surface and groundwater withdrawal, incompatible forestry practices, urban/suburban development, agricultural conversion, incompatible recreational activities, altered fire and hydrological regimes, and road construction/management. Widespread ditching, diking, and hydrologic fragmentation caused by roads in or adjacent to these habitats commonly alter the hydrologic regime. Groundwater withdrawal for municipal and agricultural purposes has impacted depressional marsh wetlands in localized areas throughout the EGCP.

Nearly all freshwater marsh systems have suffered from direct habitat conversion and altered landscape context as much of the surrounding upland and wetland habitats have been converted to other land uses, primarily agriculture and urban/suburban development. Many marshes in both agricultural and urban settings receive nutrients as part of discharges from storm water management systems which may lead to substantial changes in plant community composition and associated faunal changes (Florida Fish and Wildlife Conservation Commission, 2005).

Some ephemeral ponds are dependent on fire to maintain open, herbaceous habitat, which is ideal for breeding amphibians and ultimately ideal for foraging wading birds. However, fire suppression is a significant threat to maintenance of these habitats in the EGCP (Mississippi Museum of Natural Science, 2005).

Bog systems also suffer from threats common to most unprotected low-order headwater stream systems, including the operation of dams or control structures on small steephead and seepage streams where these systems have historically been utilized for small-scale water supplies or fishing impoundments. Herbaceous seepage systems also suffer from inadequate fire, often leading to succession of associated herbaceous communities to hardwood swamp wetlands (Florida Fish and Wildlife Conservation Commission, 2005; Mississippi Museum of Natural History, 2005).

Priority Bird Species

King Rail, Bald Eagle, Wood Stork, and Little Blue Heron rank among the highest priority species for the East Gulf Coastal Plain Joint Venture (EGCP JV). Other high priority species include Purple Gallinule, American and Least Bittern, White Ibis, Yellow- and Black-crowned Night-Herons, Short-eared and Barn Owls. Priority waterfowl in the EGCP include Northern Pintail and Northern Shoveler.

Wading birds are priority species in freshwater marshes and bogs and ephemeral wetlands primarily because they are often limited by the structure of the vegetation and water levels. Quality marsh habitats have been dramatically reduced across the landscape, which has resulted in fewer suitable nesting and foraging sites for wading birds such as the Little Blue Heron. Wood Storks, which arrive from southern breeding grounds and spend late summer through early fall in the EGCP, require shallow

water systems for adequate foraging. Alteration to the flooding regime is likely the single most important factor for determining habitat use by the majority of priority birds in freshwater marshes in the EGCP. Maintaining appropriate management of ephemeral wetlands, bogs, and seepage slopes is critical to providing habitat for these species.

Umbrella Species

One species of very high conservation concern is the King Rail. The EGCP has both resident and migratory populations of King Rails (Meanley, 1992; Reid et al., 1994). The scarce breeding populations in the northern part of the EGCP are thought to over-winter in the coastal marshes of the EGCP JV, while the population in the southern portion of the EGCP is resident. Most of the migratory populations of King Rails are classified as being of Greatest Conservation Need by many Southeastern states. Breeding Bird Survey data indicate that King Rails have declined significantly from 1966-2002. Although the sample sizes from which these trends are estimated are very low and results should be viewed with caution, in a recent review of the status of King Rails in the Mississippi Flyway it was noted that King Rails have declined from regularly uncommon to a rare summer resident. The Southeastern U.S. has significant responsibility for the conservation of the King Rail with the noted declines of the migratory northern populations (Cooper, 2006).

Researchers have documented small populations of nesting King Rails in Tennessee in the EGCP; however there is uncertainty in the size of the historical breeding population of King Rails in Tennessee and Kentucky in the northern portion of the EGCP (Bob Ford, USFWS, pers. comm.). Limitations for breeding rails in the northern part of the EGCP are related directly to lack of available habitat. The loss of freshwater wetlands, especially those supporting tall emergent vegetation interspersed with dry ground, shallow, open water, seems to be the most likely potential cause of the population declines. In addition, the lack of habitat information hinders the development of effective management and restoration techniques to help this species in the northern section of the EGCP. Establishment and maintenance of moist soil units and other units that contain dense emergent plant communities, mixed with shallow open water areas and few overstory trees on the levees, would most benefit the King Rail in the EGCP (Cooper, 2006).

Mudflats/Sandbars/Shoals

Mudflats are wetlands that form when mud is deposited by the tides or rivers, sea and oceans. Mudflats are sedimentary intertidal habitats found in estuaries and other sheltered areas. The sediments generally consist of silts and clays with a high organic content. Mudflats frequently occur as part of the natural sequence of habitats between the sublittoral zone and vegetated salt marshes. Like most other intertidal areas they dissipate wave energy and thus have an important role to play in reducing the risk of erosion damage to salt marshes and coastal defenses, and of tidal flooding in low-lying coastal areas.

Mudflats are typically high productive habitats supporting a large biomass but relatively low species diversity with few rare species. The precise nature of the biota reflects both the prevalent physio-chemical conditions and the degree of enrichment by, for example, sewage pollution. The maintenance of mudflats is important in preventing coastal erosion. However, mudflats worldwide are under threat from predicted sea level rises due to climate change, land claims for development, dredging due to shipping purposes, and chemical pollution.

A shoal is a somewhat linear landform within or extending into a body of water, typically comprised of sand, silt or small pebbles. Alternatively termed sandbar or sandbank, a bar is characteristically long and

narrow (linear) and develops where a stream or ocean current promote deposition of granular material, resulting in localized shallowing (shoaling) of the water. Bars can appear in the sea, in a lake, or in a river. They are typically composed of sand, although could be of any granular matter that the moving water has access to and is capable of shifting around (for example, soil, silt, gravel, cobble, shingle, or even boulders). The grain size of the material comprising a bar is related to the size of the waves or the strength of the currents moving the material, but the availability of material to be worked by waves and currents is also important.

Threats to Natural Habitats
Several significant threats to sandbars include channel modification, operation of dams/impoundments, recreation activities (e.g., off road vehicles), incompatible resource extraction practices, invasive species, and over exploitation/incidental capture (Mississippi Museum of Natural History, 2005). Agricultural runoff and in-channel bank erosion continues to cause excessive siltation. The aforementioned agricultural runoff carries residual pesticides into waterways, cycling into the food web (Nelson, 2005).

Priority Bird Species
Little Blue Heron, Lesser Yellowlegs, and Black-Crowned Night-Heron are species of highest priority as recognized by the EGCP JV. The St. James Bay population of the Canada Goose and the Northern Pintail are other species of high conservation concern. Piping Plover was identified as a species of Greatest Conservation Need in Mississippi as they stopover on sandbars and mud flats during migration (Mississippi Museum of Natural History, 2005).

Priority species utilizing mudflats and sandbars primarily use these habitats for foraging and roosting. Sandbars provide ample opportunity for shorebirds to forage on invertebrates or waterfowl (e.g., Mallard) to forage on vegetation in shallow waters. Migrating and wintering Northern Pintails forage almost exclusively on vegetation in shallow water and from bank edges (Austin and Miller, 1995).

Umbrella species
Little Blue Heron is an umbrella species for mud flats, sandbars, and shoals in the EGCP. Populations are generally declining across the coastal states of the Southeastern U.S. Lack of historic and accurate survey data hinders trend analysis for Little Blue Herons. Aerial surveys are a poor measure for surveying Little Blue Herons. Habitat loss and human-caused changes in local water dynamics are the most serious threats, but conservation of wetlands will help stabilize the decline of this species (Rodgers and Smith, 1995).

The Piping Plover is another umbrella species for sandbars, mudflats, and shoals. Piping Plovers utilize these freshwater habitats in the EGCP exclusively during migration. Piping Plovers are reported periodically at inland sites in Mississippi and Alabama, but are often undetected among large flocks of other shorebirds. Tennessee has had over 40 records of Piping Plovers, mostly single birds; however details were not provided to determine specific locations in Tennessee (i.e. inside or outside the EGCP) (Haig, 2004).

Freshwater Forested Wetlands

Freshwater forested wetland communities are a collection of tree associations that are dictated by flood regime and ground water table. The floodplain forest of the Southeastern U.S. can range in area from broad river floodplains to narrow strips along small stream channels. Many areas are characterized by

sloughs, oxbow lakes, and natural levees of coarse material deposited by flooding. Topographic relief is low, but these levees form high points on the floodplain (Sharitz and Mitsch, 1993).

Southern floodplains have alluvial sediments from five to 80 meters thick. Soils range in texture from silty clay and clay to sand. High clay content results in greater phosphorus content. Soils are somewhat acidic, with pH ranges between five and six. Organic matter content is usually two to five percent higher than in upland soils. High organic matter content accounts for higher nitrogen concentrations and may explain, in part, why bottomland forests tend to be more productive than upland forests. Organic matter content has been reported as high as 36 percent in black tupelo swamps. Nutrients are readily available and are continually replenished by flooding (Sharitz and Mitsch, 1993).

Canopy dominants include a conifer, bald cypress, and several hardwood species, particularly oaks and water tupelo. Species composition in southern floodplain forests is a function of constantly shifting factors like stream migration, soil erosion, and deposition, which change the substrate. Plant species differ in their tolerance of flooding and shade and in their colonizing abilities (Sharitz and Mitsch, 1993).

Bay Swamps & Shrub Swamps

Bay swamps are hardwood swamps dominated by broadleaf evergreen trees that occur in shallow, stagnant drainages or depressions often found within pine flatwoods, or at the base of sandy ridges where seepage maintains constantly wet soils. Where Bay Swamp occurs in seepage areas it is often associated with or grades into Seepage/Steephead Stream habitat. The soils, which are usually covered by an abundant layer of leaf litter, are mostly acidic peat that remains saturated for long periods but over which little water level fluctuation occurs. The overstory within bayheads primarily is composed of evergreen hardwood trees, but bay trees, especially sweet bay, red bay, and loblolly bay, dominate the canopy and characterize the community. Depending on the location within the state, other species including pond pine, slash pine, black gum, cypress, and Atlantic white cedar can occur as scattered individuals. Understory and ground cover species may include dahoon holly, wax myrtle, fetterbush, green briar, royal fern, cinnamon fern, and sphagnum moss (NatureServe, 2007).

Shrub wetland communities have a woody cover of shrubs and small trees, with an herb layer similar to those of emergent wetlands. In the EGCP, these communities are often created and sustained by beaver activity. In many cases, however, a scrub-shrub wetland typifies a community in transition and exemplifies the dynamic nature of wetlands in general. Many emergent wetlands, left undisturbed, will gradually be replaced through succession by woody vegetation that will in time climax with the scrub-shrub phase. The scrub-shrub wetland is often found grading shoreward from an emergent wetland which borders a lake, stream, or pond. The woody vegetation accounts for at least 30% of the vegetation present, and must be less than 6 meters tall. Species composition is dependent on the length of inundation, with willows and dogwood growing in the temporarily to seasonally wet areas and buttonbush in semi-permanently flooded areas (Jones, 2005).

The soils in this community typically are wet phases of alluvial soils. They may have been cropland at one time, particularly where they border large constructed reservoirs.

Priority Bird Species

Breeding bird species composition, relative abundance, and densities may vary widely among bottomland hardwoods and cypress-tupelo swamps of the EGCP. In the upper EGCP, 90 species were

observed in forested habitats of west Tennessee watersheds; an average of 113 individuals and 28 species occurred at 59 sites sampled (Ford, 1990). Highest breeding bird densities occurred in watersheds characterized by large forest tract size and relatively normal flood regimes; while highest species richness occurred near major continental rivers, such as the Mississippi and Tennessee Rivers (Ford, 1990).

The Ivory-billed Woodpecker is a species of highest priority and is reported to occur in the EGCP, although their presence has yet to be positively confirmed (Hill et al., 2006). The highest priority breeding species associated with this habitat type include Prothonotary Warbler, Swainson's Warbler, Kentucky Warbler, Cerulean Warbler, Wood Thrush, and Swallow-tailed Kite. Although some of these species are fairly restricted to bottomland hardwoods and cypress bottoms (e.g. Prothonotary Warbler and Swallow-tailed Kite), other species are often found in other forested wetland systems in the EGCP. Other priority species include Yellow-billed Cuckoo, American Woodcock, Louisiana Waterthrush, Red-headed Woodpecker, Little Blue Heron, White Ibis, Wood Duck, and both Yellow- and Black-crowned Night-Herons. Rusty Blackbirds are a key species spending the non-breeding season in the EGCP. Rusty Blackbirds preferentially search through leaf litter for prey items on the ground in wet and flooded forests (Avery, 1995).

Umbrella species

We identify a series of species that represent umbrella species for this suite of habitats. Swainson's Warbler, Swallow-tailed Kite, Cerulean Warbler, Prothonotary Warbler, Kentucky Warbler, and Yellow-billed Cuckoo constitute the forested wetland bird species assemblage of highest concern in the EGCP. Of these species, Prothonotary Warbler, Kentucky Warbler, and Yellow-billed Cuckoo are distributed throughout the EGCP in appropriate habitats (Woodrey et al., 1998). Rusty Blackbirds and American Woodcock are also umbrella species with habitat requirements that need specific attention and appropriate management.

In the EGCP, breeding bird communities are likely limited by cumulative impacts which reduce forest tract size, reduce habitat quality, and alter natural flood regimes. Cumulative impacts are watershed scale phenomena and result from "the summation or interaction in space or time of individual minor projects" (Gosselink et al., 1989). In one Louisiana watershed, for example, densities of 11 of 37 birds declined and an estimated three to four species have been extirpated per decade because of the cumulative impacts and loss of bottomland hardwood forest (Gosselink et al., 1989, Woodrey et al., 1998).

The North American breeding subspecies of the Swallow-tailed Kite was much more widespread and numerous at the turn of the century, suffering the most dramatic reduction of any still extant landbird species in eastern North America since then (Meyer, 1995). The Swallow-tailed kite probably bred historically in 21 states, with concentrations in nine, but is now known to breed only in seven states, with the greatest nesting concentrations in peninsular and subtropical Florida (Meyer, 1990; Meyer and Collopy, 1990). In the EGCP, the Swallow-tailed Kite is found only in the lower unit. Apparently, stable populations occur on the lower Pearl River (J. Coulson, unpublished data), Pascagoula River (M. Woodrey, unpublished data), and the Florida panhandle rivers (K. Meyer; J. Cox, unpublished data). Swallow-tailed Kites may require a minimum of 100,000 acres of bottomland hardwood forest for stable nesting populations of 80 to 85 pairs (Cely and Sorrow, 1990; Woodrey et al., 1998).

Cerulean Warbler persists in the highlands and plateaus from the Southern Appalachians westward, but has been reduced from its historical distribution as a breeding species in the EGCP. Cerulean Warblers

were present on 15 of 59 study sites spread among west Tennessee watersheds, and averaged nearly three singing males per one km transect on sites where they occurred. This species occurred only on public lands or lands managed for saw-timber and hunt clubs (Ford, 1990). Currently, the only known persistent population in the EGCP is located in forested wetlands in west Tennessee, most birds probably occur in the Hatchie River floodplain forest (Woodrey et al., 1998). However, a 2007 survey at Hatchie National Wildlife Refuge documented only four singing Cerulean Warbler males during nesting season (Bob Ford, USFWS, and Melinda Welton, pers. comm.).

Swainson's Warbler and Prothonotary Warbler, which occur throughout the EGCP, are high priority species which require conservation attention. Although widespread throughout the area, Swainson's Warblers have been extirpated from panhandle Florida since the 1970's. In west Tennessee, this species occurred on 26 of 59 study sites, and averaged almost two singing males per site where it occurred (Ford, 1990). A 2007 survey at Hatchie National Wildlife Refuge documented common to abundant Swainson's Warblers in floodplain forest (Bob Ford, USFWS, and Melinda Welton, pers. comm.). Nesting Swainson's Warblers prefer cane thickets or other dense shrub layer under a fairly closed canopy (Somershoe et al., 2003). A source population of Swainson's Warblers probably requires at least 6,000-10,000 acres of mature forested wetlands in agriculturally-dominated landscapes (Woodrey et al., 1998).

Prothonotary Warblers are cavity nesting birds, probably requiring habitat patches of 4,000 to 7,000 acres in agriculturally-dominated landscapes of mature forested wetlands for a sustainable population. This species will also actively adopt artificial nesting boxes, given the proper placement of the nesting boxes over standing water (Petit, 1989; Ford, 1990).

The Rusty Blackbird is one of the most rapidly declining species in North America. An analysis of the literature on the distribution of North American birds from the late-18th to the late-19th century shows a consistent long-term decline in the qualitative assessment of this species' abundance. More alarmingly is that both national indicators of songbird abundance, the Breeding Bird Survey (BBS) and the Christmas Bird Count (CBC), show sharp declines over the past three decades (Avery, 1995).

This precipitous decline equates to a loss of more than 95 percent of the population that existed when the BBS was initiated in the late 1960's. Therefore, it appears that Rusty Blackbirds have shown both long-term chronic and short-term acute patterns of decline. Despite the severity of the declines in this species, the bird research and conservation community has been slow to recognize and investigate the plight of this species (see Avery, 1995; Niven et al., 2004; Greenberg et al., *in prep*.).

Clues to the cause of the precipitous drop in numbers may be gleaned from the species' unique natural history. The Rusty Blackbird is arguably the most ecologically specialized of the North American blackbirds, both in its feeding habits and habitat uses. Throughout the year this species feeds to a considerable extent on animal prey and it is one of the few bird species restricted year-round to wooded wetlands.

Rusty Blackbirds winter primarily in wooded wetlands of the Southeastern U.S. An analysis of CBC data suggests that the greatest winter concentrations are found in the Mississippi River Valley (Niven et al., 2004). The species seems to roost with many other blackbird species, but often is found foraging in single species flocks or together with Common Grackles in or near wooded wetlands and only occasionally in flooded agricultural fields with other blackbirds (Avery, 1995; Greenberg et al., *in prep.*).

One species of highest conservation concern in the EGCP is the American Woodcock as this physiographic area serves as a fairly major wintering area for this species (Woodrey et al., 1998). U.S. Fish and Wildlife Service data indicate a significant long-term decline of 2.1 percent annually for woodcock in the eastern region (Kelley, 2004). The U.S. Shorebird Conservation Plan lists American Woodcock as a Species of High Concern and as a species known or thought to be declining (Brown et al., 2004). They are listed on the Audubon Watchlist "yellow list" of those species that are in slow decline and of national conservation concern (National Audubon Society, 2004).

Unlike most other shorebirds and marsh birds, American Woodcock are a forest-dwelling species. Woodcock are often associated with forested wetlands. In the Southeastern U.S., alluvial floodplains with a brushy forest understory are apparently a preferred habitat type. Swamp privet, holly, switch cane, honeysuckle peppervine, trumpet creeper, green briar, and grapes have been identified as important understory species (Owen et al., 1977; Roberts, 1989). The composition of the tree overstory appears unimportant (Owen et al., 1977).

Old fields, croplands, pasturelands, wet seeps and damp thickets also provide important habitat for woodcock on wintering grounds. Old fields and other early successional habitat types are often used as nocturnal habitat, and should be located within 230 m of diurnal habitats (Berdeen and Krementz, 1998). While a high density of plant stems is preferred by woodcock, open ground underneath the canopy is a necessity to provide easy access to worms and other invertebrates in the ground litter (Roberts, 1989; Krementz and Jackson, 1999).

Threats to Natural Habitats

The main threats to riparian woodlands in the EGCP include dams, channelization, manmade levees and other modifications which have restricted the extent of riparian forests. The modified river environment has inhibited the riverfront cottonwood and willow community regeneration. Riparian woodlands have declined in some areas because of flood control projects which have altered the natural flow regimen of Southeastern river systems. Loss of the scouring action of streams subsequent to impoundment reduces the hydrologic forces that rework the channel, and which expose the mineral soils necessary for the germination and establishment of cottonwood and black willow trees. However, myriad channelization projects have destabilized other drainage systems, resulting in loss of bare mineral soil available for colonization by these species (Mississippi Museum of Natural Science, 2005). With much riparian habitat lost, conversion of the remaining natural vegetation to cropland, pasture, industrial development, roads, and housing posed a significant threat to riparian scrub habitats and streamside vegetative communities (Nelson, 2005).

Unsustainable logging, inadequate stream buffer width and maintenance, and clearing for cottonwood or pine plantations are also significant threats to riparian forests. Invasive plant species impact riparian site after disturbance events such as clearing and/or logging and can prevent reestablishment of the natural communities, which are often replaced by Chinese privet and other exotic plants (NatureServe, 2007).

Beaver Ponds

This association incorporates vegetation of beaver ponds and other semi-permanent impoundments in the northern extent of the EGCP. Stands of this vegetation are dominated by some combination of *Polygonum punctatum, Polygonum hydropiperoides, Leersia lenticularis*, and/or *Leersia virginica*. Other herbaceous species present include *Saururus cernuus, Proserpinaca* sp., *Bidens aristosa (Bidens*

polylepis), and *Xanthium strumarium*. Scattered individuals of *Cephalanthus occidentalis a*nd *Acer saccharinum* may be present (NatureServe, 2007).

Threats to Natural Habitats

Beavers and their ponds create more bottomland forest and wetland acreage, thus they produce habitat important for many priority bird species. Beavers channelize streams and their dams create ponds that alter the local flooding regime and tree species composition, resulting in increased bottomland hardwood forests where such habitat previously did not occur.

The main threat specific to beaver ponds is loss through destruction of beaver dams. Beavers are managed as a pest species because of their potential to exacerbate flooding on forest, agriculture and developed lands. In addition, wildlife managers and forestry personnel control beaver populations in attempts to reduce tree mortality. Other lesser impacts include eutrophication impacts when water from agricultural or developed landscapes is drained into these swamps (Florida Fish and Wildlife Conservation Commission, 2005; Mississippi Museum of Natural Science, 2005).

Priority Bird Species

The EGCP JV considers five species to be of highest priority for management and conservation emphasis in these habitats. The highest priority breeding species associated with this habitat type include Prothonotary Warbler, Red-headed Woodpecker, Little Blue Heron, and American Black Duck. Rusty Blackbirds are a critical species that spends part of the non-breeding season in the EGCP. Rusty Blackbirds preferentially search through leaf litter for prey items on the ground in wet and flooded forests.

Umbrella Species

Prothonotary Warbler and Red-headed Woodpecker are the umbrella species in beaver ponds across the EGCP. Prothonotary Warblers are cavity nesting birds, probably requiring at least 4,000 to 7,000 acres in agriculturally-dominated landscapes of mature forested wetlands, which includes beaver ponds, for sustainable populations. This species will also actively adopt artificial nesting boxes, given the proper placement of the nesting boxes over standing water (Petit, 1989; Ford, 1990) on and around beaver ponds (Woodrey et al., 1998).

Red-headed Woodpeckers are a declining species that prefers open forest with reduced basal area and canopy cover. The increased tree mortality on beaver ponds decreases canopy cover and basal area and provides the forest structure preferred by these birds. Red-headed Woodpeckers have declined rapidly in recent decades due to loss of habitat and competition with invasive species, i.e. European Starling. Increased beaver activity will likely create suitable habitat for this species (Smith et al., 2000).

Open Water

Open water habitats are permanently flooded lands lying below the deepwater boundary of wetlands. Deepwater habitats include environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live, whether or not they are attached to the substrate. As in wetlands, the dominant plants are hydrophytes; however, the substrates are considered non-soil because the water is too deep to support emergent vegetation (Soil Survey Staff, 1975).

Threats to Natural Habitats

Open water systems in the EGCP are under a myriad of threats including urbanization, pollution and land-use practices that have generally increased levels of toxins and nutrients in lakes. Exotic species, some of which are quite aggressive, now present a threat to native lentic communities. Particular types of concern include aquatic plants (hydrilla and water hyacinth), fish (Asian carp) and zebra mussels. Exotic zooplankton species are also reportedly present in Mississippi lakes. The exotics could impact the low-end of the food chain for many fishes including sport fish and filter feeders such as paddlefish (Mississippi Museum of Natural Science, 2005).

Existing dams and associated water withdrawal pose a serious source of stress to the alluvial stream habitat on many rivers (e.g., Apalachicola and Tennessee Rivers) and a potential future threat on several additional rivers. Dams and other activities, including incompatible forestry practices and channel modification, can appreciably alter sediment dynamics in this habitat. Additional threats specific to this habitat include dam operations and management of nature (i.e., water control structures/dams and levees, especially on the large interstate rivers of the Florida panhandle, as well as channel modification for the Apalachicola River specifically). Incompatible recreational activities such as wave-runners and boating pose disturbance threats to waterfowl and may affect Bald Eagle foraging success and use of these areas.

Priority Bird Species

The EGCP JV considers five species to be of highest priority for management and conservation emphasis in these habitats. The highest priority breeding species associated with this habitat type is the Bald Eagle, while the majority of priority species are wintering waterfowl (e.g. St. James Bay Canada Geese, American Black Duck, Northern Pintail, and Northern Shoveler).

Umbrella species

The Bald Eagle represents an ideal umbrella species for open water systems in the EGCP. The Bald Eagle has experienced a population rebound since the banning of DDT in the 1970's. Hacking programs, which translocate wild born chicks into historic areas of the species range and requires human care until fledgling occurs, across the U.S. have been successful in reestablishing many breeding populations, especially in Tennessee. The number of estimated breeding pairs has risen in the lower 48 states from 487 in 1963 to approximately 9789 nests in the lower 48 states in 2006. Significant increases in nesting pairs, increases in productivity, and expanded distribution across the 48 contiguous states led to de-listing in 2007 (Buehler, 2000; Federal Register, 50 CFR Part 17, 2007).

Breeding pairs are found throughout the EGCP, while concentrated on reservoirs and large river systems. Bald Eagles hunt from perches or while soaring over suitable habitat (e.g. large bodies of open water). Loss of shoreline nesting, perching, roosting, and associated aquatic foraging habitat to human development is the most significant agent of habitat loss; human development may limit expansion of breeding populations in many areas and limit eagle carrying capacity at or below current population levels in some areas in future (Fraser et al., 1996).

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