Waterbird Conservation Plan

East Gulf Coastal Plain Joint Venture

VERSION 1.0

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Contributors

The East Gulf Coastal Plain Joint Venture thanks the many partners whose insight, input, and review were critical to this plan's completion.

Authors

Amy Schwarzer, Primary Plan Coordinator
Rob Holbrook, East Gulf Coastal Plain Joint Venture
Kristine Evans, Department of Wildlife, Fisheries and Aquaculture, Mississippi State University
Jeff Gleason, U.S. Fish and Wildlife Service
David Hanni, Tennessee Wildlife Resources Agency
Lianne Koczur, Alabama Audubon
Jennifer Manis, National Park Service
Anne Mini, Lower Mississippi Valley Joint Venture
Raya Pruner, Florida Fish & Wildlife Conservation Commission
Eric Soehren, Alabama Department of Conservation and Natural Resources
Mark Woodrey, Coastal Research and Extension Center, Mississippi State University

Catherine Rideout (Coordinator), Rob Holbrook (Assistant Coordinator)
East Gulf Coastal Plain Joint Venture
Migratory Bird Program, U.S. Fish and Wildlife Service
1875 Century Blvd. NE, Atlanta, GA 30345
www.egcpjv.org

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Cover Photograph: Little Blue Heron by Anne Macias

Executive Summary

The East Gulf Coastal Plain Joint Venture (**EGCPJV**) is a public-private partnership dedicated to protecting and restoring bird populations by conserving important bird habitats of the East Gulf Coastal Plain (EGCP). The EGCPJV's Technical Advisory Team (TAT), under the direction of the Management Board, formed the Waterbird Working Group (WWG) to address the population and habitat needs of waterbirds, a diverse group of species which have numerous conservation challenges past and present, and includes both species' populations that are growing and others that are declining. The TAT tasked the WWG with the development of a Waterbird Conservation Plan (hereafter, the Plan) to include, at a minimum, quantified waterbird population and habitat objectives for species that occur within the East Gulf Coastal Plain region. This Plan is the second in a series of plans for conservation of various avifaunal taxa within the EGCP. However, it differs somewhat from the previous plan in that the planning area was extended to include the Big Bend Region of Florida. Although this area falls within the Atlantic Coast Joint Venture (ACJV), both Joint Ventures (JV) recognized that there was an opportunity for synergistic planning that would fill conservation gaps in the area not already addressed by ACJV plans and activities.

> **"Geographically allocated habitat objectives and information about habitat condition inform how individual EGCPJV partners can focus conservation efforts to meet local and regional objectives."**

Bird populations are under increasing pressures from habitat loss and fragmentation, degradation and conversion to other land cover types and uses, climate change, and other stressors. This Plan takes an initial step in biological planning for waterbirds by establishing population and habitat objectives for priority waterbirds and their priority habitats. The Plan describes the process for selecting priority habitats and species and reports a transparent, science-based approach to answering three fundamental questions in conservation planning:

- How many birds?
- How much habitat?
- Where is the current habitat available and where do we need more?

For the purposes of the Plan, a waterbird was defined as any bird species except for waterfowl that are dependent on water-based ecosystems and habitats for the majority of their lifecycle needs. Waterfowl were excluded because, as game species, they have specific considerations for conservation and management planning and will be addressed in their own EGCPJV plan in the future.

The WWG determined priority waterbird species (Chapter 2) based on priority lists in the Partners in Flight (PIF) Avian Conservation Assessment Database (ACAD; Partners in Flight 2021), the EGCPJV Implementation Plan (EGCPJV 2008), the North American Waterbird Conservation Plan (Kushlan et al. 2002), Southeast United States Regional Waterbird Conservation Plan (Hunter et al. 2006), South Atlantic Migratory Bird Initiative (Watson and Malloy 2006), Birds of Conservation Concern 2021 (U.S. Fish and Wildlife Service 2021), Regional Species of Greatest Conservation Need (Southeast Association of Fish and Wildlife Agencies 2019), State Wildlife Action Plans (SWAPs), and plans and lists from adjacent migratory bird joint ventures (hereafter, JVs). First, species from all plans were aggregated into one list.

Next, the WWG excluded species if there were already extensive planning and conservation efforts underway for those species (e.g., waterfowl), were outside the scope of EGCPJV management (e.g., pelagic seabirds), or only occurred incidentally within the planning area. The remaining species list was refined by a scoring process which included scores for a) conservation concern, b) trend, and c) habitat used within the planning geography. Priority species were selected if they

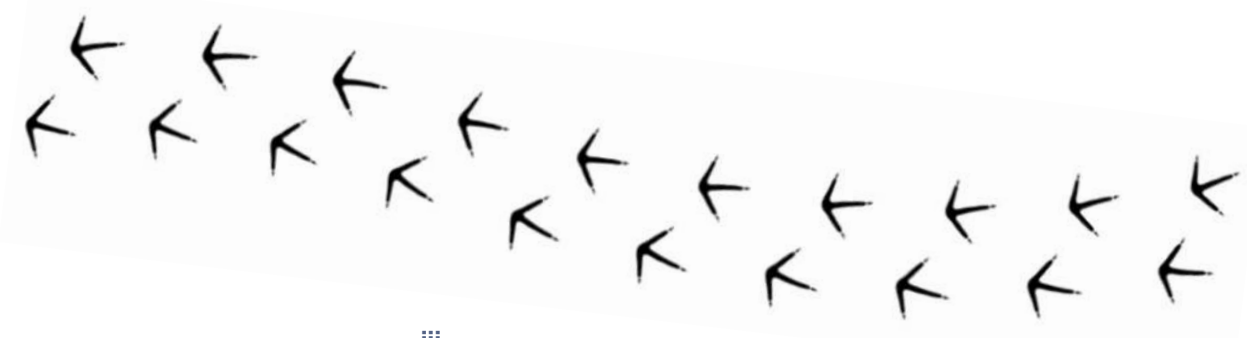
1) scored highly in the scoring process, and
2) were representative of other species using the same habitat types OR were not represented by any other species in the JV, and
3) already had sufficient data to calculate population and/or habitat objectives OR could be monitored with additional resources.

The WWG assigned each of the resulting 23 priority species to one or more of the multiple waterbird habitats within the planning area. A habitat type was selected as a priority habitat if 1) it served multiple priority species at once or 2) was critical to the annual life cycle for one or more priority species.

Population objectives (Chapter 3) for priority species were developed using the 10- and 30-year population timeframes outlined in the EGCPJV Landbird Conservation Plan (Greene et al. 2021) to stabilize and/or increase bird populations in decline. Habitat objectives were set for each habitat type using population objectives and species density estimates. The WWG determined that the species requiring the most habitat area to meet its population objective would be used to establish the baseline habitat objective for each habitat type (Chapter 4). The WWG also allocated habitat objectives by state. Geographically allocated habitat objectives and information about habitat condition inform how individual EGCPJV partners can focus conservation efforts to meet local and regional objectives.

The determination of priority species, population objectives, and habitat objectives includes many decision points and assumptions. We explicitly state critical assumptions (Chapter 3) and recognize the need to re-evaluate processes and associated assumptions as new information becomes available. This document represents our best estimation of the amount and placement of suitable habitat to meet population objectives. These objectives will be revisited every 10 years, and this Plan will be revised in subsequent iterations to include additional data on both bird populations and habitat trends, as well as more specific conservation strategies to counteract threats and declines.

Objective setting plays a critical role in supporting successful conservation delivery by our partners. We address how objectives support conservation decisions of administrators and land managers and acknowledge how defined goals provide a means to measure our success in conserving sustainable bird populations and habitats (Chapter 5). Defining measurable population goals serves to meet our overarching goal of conserving sustainable bird populations and their habitats (U.S. Fish and Wildlife Service 2008).



List of Abbreviations and Acronyms

ac	acres
ACAD	Avian Conservation Assessment Database
ACJV	Atlantic Coast Joint Venture
BBS	Breeding Bird Survey
BCR	Bird Conservation Region
CC	Coastal Connections
CLC	Cooperative Land Cover
CS	Conservation Score
EGCP	East Gulf Coastal Plain (referring to the physiographic region)
EGCPJV	East Gulf Coastal Plain Joint Venture
GAP	Gap Analysis Project
JV	Joint Venture
LLW	Long-legged Wading bird
NABCI	North American Bird Conservation Initiative
NLCD	National Land Cover Database
PIF	Partners in Flight
SGCN	Species of Greatest Conservation Need
SMB	Secretive Marshbird
SME	Subject or species matter expert
SWAP	State Wildlife Action Plan
TAT	Technical Advisory Team
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WWG	Waterbird Working Group

Waterbird Conservation Plan
East Gulf Coastal Plain

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Introduction

Overview

The East Gulf Coastal Plain Joint Venture (EGCPJV) is a public-private partnership dedicated to protecting and restoring bird populations by conserving important bird habitats of the East Gulf Coastal Plain (EGCP). The EGCPJV is a self-directed partnership of 14 state, federal, and non-governmental conservation organizations and is led by a diverse and dedicated Management Board and staff. Key to the JV's success is the development and implementation of scientific plans through networks of scientists, land managers, and conservationists whose work improves the quantity and quality of bird habitats.

The formation of a JV in the EGCP was first discussed in 2002. The stakeholders formed a Management Board and Technical Advisory Team, which then established the partnership's administrative, organizational, and technical responsibilities (for more information on the history and purpose of the EGCPJV see Appendix A). These responsibilities and the strategic approach to conservation are articulated in the 2008 Implementation Plan (EGCPJV 2008), which established the EGCPJV's mission to protect and restore bird populations of this geography by coordinating effective conservation of key habitats. The Implementation Plan articulated the EGCPJV's commitment to a science-based approach to conservation strategically implemented at the landscape-scale to maximize conservation benefits and to leverage human and financial resources. The Implementation Plan positioned the EGCPJV partnership as a key communicator and platform for aligning bird conservation priorities for partner organizations and the broader regional conservation community.

The Implementation Plan also established the EGCPJV's mission and strategic conservation framework. Management goals for priority species and their habitats are necessary to advance the mission of sustainably protecting and restoring bird populations of the EGCP. The EGCPJV is currently pivoting to identifying taxonomic priorities, quantifying bird population and habitat objectives, and developing, among other plans, the Waterbird Conservation Plan (hereafter, Plan). For the purposes of the Plan, a waterbird was defined as any bird species except for waterfowl that are dependent on water-based ecosystems and habitats for the majority of their lifecycle needs. Waterfowl were excluded because, as game species, they have specific considerations for conservation and management planning and will be addressed in their own EGCPJV plan in the future. Population trends among waterbird species vary

Some waterbirds of the East Gulf Coastal Plain, from left: Horned Grebe / Richard Holgersson; Great Blue Heron / Trish Hartmann; Laughing Gull / Alan Schmierer; American Avocet / Renee Grayson

greatly by taxa group, species within a taxa group, and sometimes even regionally within a species. Almost all shorebird species are declining, with several species having declined by more than 50% since the 1970s (NABCI 2022). Some species of colonial-nesting birds, particularly ground-nesting seabirds, have faced similar declines, while most long-legged wading birds are either stable or increasing (NABCI 2022). Yet, major exceptions exist even for long-legged wading birds. For example, the population of Reddish Egrets, a coastal-dependent species, has declined (Cox et al. 2019) within the planning area, and Green Heron is considered as a common species in decline nationwide (Partners in Flight 2021).

> "Almost all shorebird species are declining, with several species having declined by more than 50% since the 1970s"

The Plan builds upon the North American Waterbird Conservation Plan (Kushlan et al. 2002) and numerous regional, state-level, and species recovery plans that contribute to the growing body of knowledge about priority bird species' ecology, population status, threats, response to management, and paths to recovery. The Plan can be used by partner organizations which, individually or in collaboration, deliver on-the-ground conservation projects.

Planning Area

The EGCPJV administrative boundary (Figure 1-1) approximates the EGCP physiographic region defined by Partners in Flight (PIF). Although Joint Ventures generally align with **Bird Conservation Regions** (BCRs), delineating JV boundaries is imperfect and often results in sections of multiple BCRs residing within a single JV. The EGCPJV's geographic area covers the portion of North American Bird Conservation Initiative (NABCI) BCR 27 (Southeastern Coastal Plain) that lies west of the Alabama-Georgia state line, and includes much of the panhandle of Florida, much of central and southern Alabama and Mississippi, parts of western Tennessee and Kentucky, and eastern Louisiana. The EGCPJV boundary also encompasses portions of BCR 29 (Piedmont), BCR 28 (Appalachian Mountains) and BCR 26 (Mississippi Alluvial Valley).

In addition to the standard boundary of the EGCPJV, the waterbird planning boundary was expanded to include the Florida Big Bend region, adhering to the Suwannee River Water Management District boundary in Florida

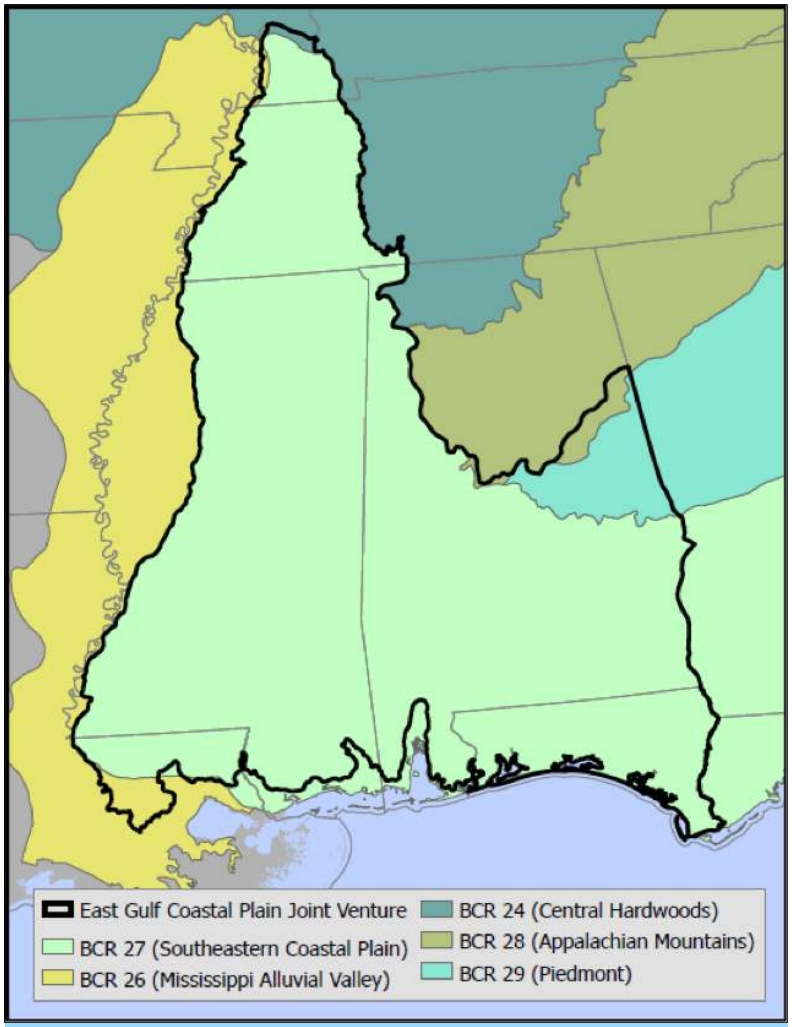


Figure 1-1. The EGCPJV boundary and the represented BCRs within and around the JV.

(Figure 1-2). While this area lies in the ACJV, that JV's current formal bird plans do not cover all waterbirds, but instead focus on three flagship species (ACJV 2019, ACJV 2020). The extended area has similar political and biogeographical concerns to those areas within the EGCPJV. After discussions between both JVs, it was determined that extending the planning area would serve both organizations' interests and conservation concerns and deliver better conservation outcomes for waterbirds.

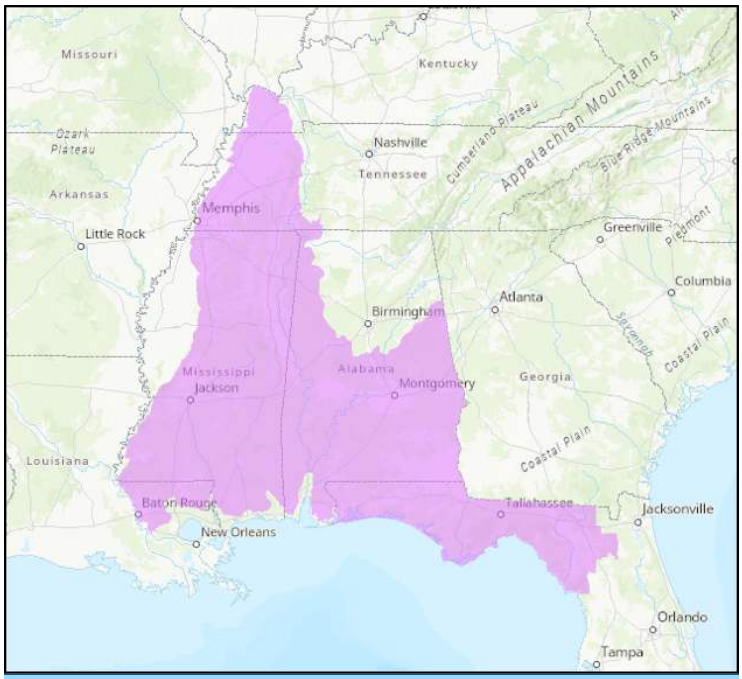


Figure 1-2. Map showing the extended planning area for the Plan. Shaded area indicates the EGCPJV along with the extended planning area.

American Oystercatcher / Bobbi Carpenter

The East Gulf Coastal Plain: Physical Features and Vegetation

The EGCPJV geography includes 62.63 million ac of diverse lands and waters. Forest is the predominant land cover type: 23% pine, 12% upland and bottomland hardwoods, 12% mixed pine-hardwood forest, and 14% woody (or forested) wetlands (Figure 1-3). Agricultural land use (~20%) is common, particularly within the Black Belt prairie region, in western Kentucky and Tennessee, and in portions of southern Alabama. Developed areas (<7%), shrub-scrub conditions (<6%), and herbaceous land cover (<4%) are less common. Both salt and fresh herbaceous wetland types and shrub-scrub wetlands are included in the latter two cover types in the Landfire Physiognomic Order (Landfire 2022).

Although the EGCP is dominated by upland land cover types, the planning area contains significant waterbird resources supporting a diverse, robust population of waterbird species (Wilson et al. 2019). Important land cover types for waterbirds include freshwater forested wetlands, freshwater emergent herbaceous wetlands, savanna, tidal marshes (salt, brackish, and tidally influenced freshwater), and coastal habitats (dunes and interdunal wetlands, open beaches, tidal flats, and nearshore open waters).

Freshwater forested wetlands in the EGCP includes several forested wetland types. Bottomland hardwood wetlands are closed canopy wetlands typically composed of gum (*Liquidambar styraciflua*), oaks (*Quercus* sp.), and Bald Cypress (*Taxodium distichum*). Cypress-tupelo swamps are dominated by cypress and tupelo trees (*Nyssa* sp.). Bay swamps are dominated by bay trees (*Magnolia virginiana*, *Persea borbonia, Gordonia lasianthus*), but often contain other broadleaf evergreen species. Riparian woodland is usually dominated by small deciduous tree species (NatureServe 2018) such as red maple (*Acer rubrum*) and willows (*Salix* spp.). Freshwater herbaceous emergent wetlands are composed of a wide diversity of herbaceous wetland plants (NatureServe 2018). The species of plants vary widely depending on soil type, hydrological variability, and nutrient inputs, but can include rushes, sedges,

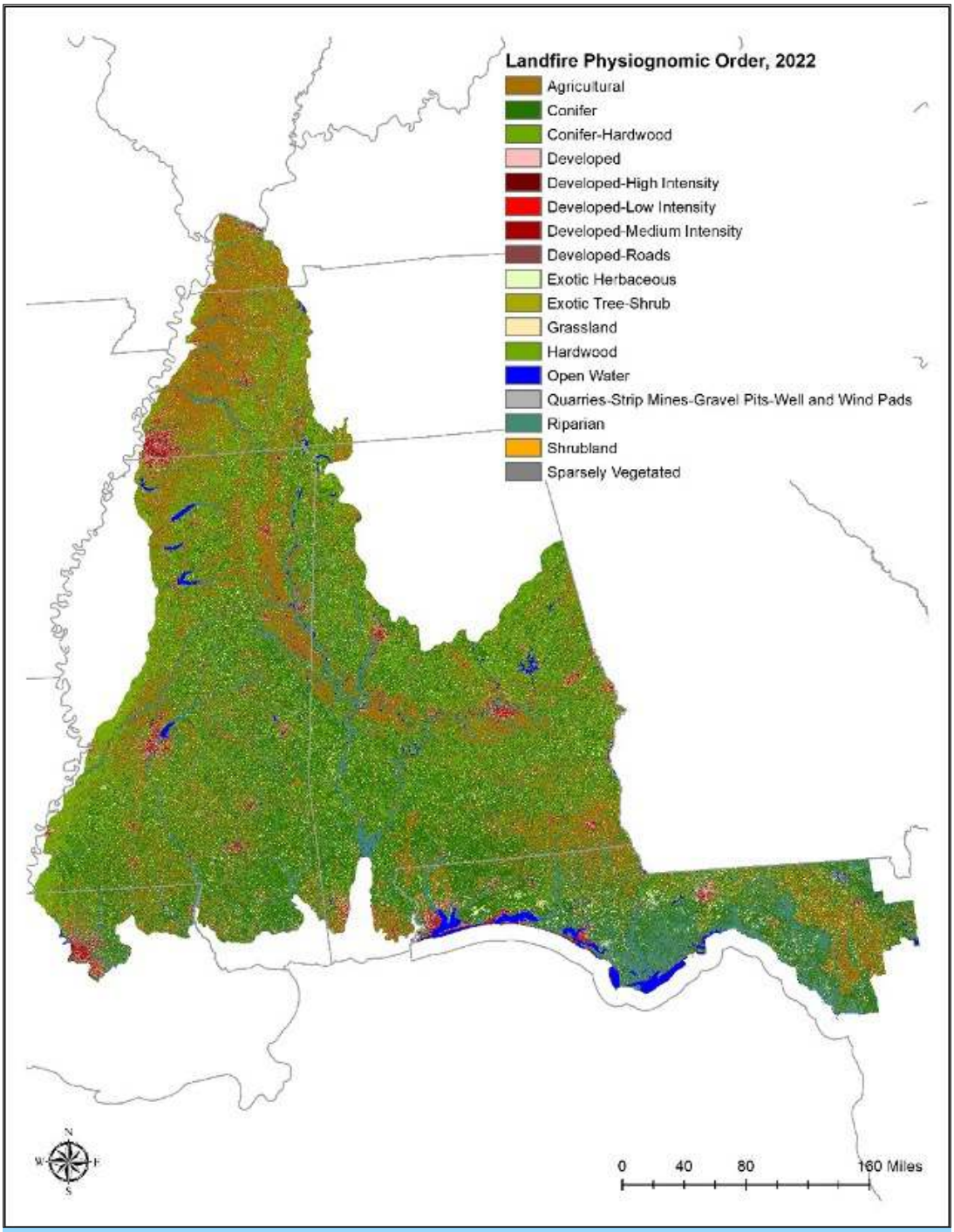


Figure 1-3. Land use class and cover types in the EGCPJV planning area derived from Landfire Physiognomic Order (Landfire 2022).

cattails (*Typha* spp.), pickerelweed (*Pontederia cordata*), and arrowhead species (*Sagittaria* spp.). Upslope herbaceous wetlands can also be dominated by grass species such as sand cordgrass (*Spartina bakeri*). Freshwater scrubby species such as willow and buttonbush (*Cephalanthus occidentalis*) can occur within both forested and emergent herbaceous marshes (NatureServe 2018) and can be important features for some waterbird species. Savanna is characterized by sparse pine trees (*Pinus* spp.) with an open understory (NatureServe 2018). While not all savanna is appropriate waterbird habitat, savanna that is flooded irregularly and is dominated by grasses can be important, particularly for non-breeding species.

Closer to the coast, freshwater and oligohaline tidal marshes are often dominated by rushes, cattails, *Spartina* species and *Phragmites* (NatureServe 2018). Salt and brackish marshes are generally dominated by grassy species (NatureServe 2018; *Spartina alterniflora, Spartina bakeri, Spartina patens, Distichlis* spp.) and black needlerush (*Juncus roemarianus*). Nearshore or barrier island beach dune habitats are characterized by a mosaic of vegetated and open sandy habitat. Vegetated areas are generally dominated by sea oats (*Uniola paniculata*) and bitter panicgrass (*Panicum amarum*). Dune blowouts, washover fans, or habitat seaward of the foredunes tends to have limited vegetation with higher quantities of bare ground. Early colonizing vegetation in these areas includes sea rocket (*Cakile spp.*) and crested saltbush (*Atriplex cristata*). The availability of sparsely vegetated, early successional beach habitats and embedded dunal wetlands (e.g., dune swales, ephemeral tidal pools, mud flats) are strong drivers of waterbird distribution on beaches.

Natural Disturbances, History, and Land Use

Disturbance regimes are key in maintaining many vegetative communities in the EGCP, including waterbird habitat (e.g., Brawn et al. 2001, Engstrom et al. 2005). Natural and anthropogenic fire has shaped much of the EGCP's uplands and flatwoods into a pyric landscape (Stanturf et al. 2002) and is essential for maintaining the savanna that some waterbird species use. The EGCP also hosts a diverse array of coastal, riverine, and non-alluvial wetlands moderated by hydroperiod, soils, and relatively infrequent fire. Tornadoes, hurricanes, and, within the northern portion of the JV, ice storms also provide isolated, seasonal disturbances that reset wetland and coastal habitats and shape bird communities (e.g., Schulte and Simons 2016).

Prescribed Fire in Savanna, MS / Mark Woodrey

While fire shaped the uplands, the additional influence of hydroperiod and soils defined the EGCP's various forested and non-forested coastal, riverine, and non-alluvial wetlands. Wetland hydroperiods may be derived from seasonal rainfall, riverine flooding, groundwater, deep groundwater sources, or some combination (Winger 1986), and fire can be moderately infrequent (Wade et al. 2000). By their very nature, wetlands tend to contain highly biodiverse communities, and these habitats also provide key habitat for a variety of waterbirds including long-legged wading birds, secretive marshbirds, shorebirds, seabirds, and waterfowl, including numerous state and federally listed species.

Change in coastal wetlands and beaches is complicated within the planning area. Raabe and Stumpf (1997) found little tidal marsh loss in the Big Bend region of Florida, and some models predict salt marsh expansion in the future due to sea level rise in the area (Geselbracht et al. 2015, Raabe and Stumpf 2015), though some of those gains could be offset by northward expansion of mangroves (Geselbracht et al. 2015). Meanwhile, McCarthy et al. (2018) found a reduction in coastal freshwater hardwood swamps due to the same pressures, and loss is accelerating. Likewise, beaches, coastal islands, and tidal flats are also declining (Vitale et al. 2021, Clark and Weeks 2023) due to a combination of sea level rise, increased human development, and coastal engineering projects. These coastal habitats are further characterized by their high susceptibility to rapid and extreme changes induced by tides, winds, and severe storms. While hurricanes and tropical storms can benefit coastal ecosystems by resetting beach habitat and creating favorable sparsely vegetated conditions for beach-nesting birds (Convertino et al. 2011, Walker et al. 2019, Robinson et al. 2020), their increased frequency and intensity may cause incompatible levels of erosion (Walker et al. 2019, Bacopolous and Clark 2021) or direct avian species mortality (Wiley and Wunderle 1993, Clairbaux et al. 2021).

Wood Storks / Christy Hand

Little Blue Herons / Anne Macias

Mitigation, landowner assistance programs, easements, and promotion of forested wetland restoration and management for waterfowl and riparian songbirds have all endeavored to stop wetland loss. Despite these efforts wetland loss continues at an accelerated rate. The rate of loss of wetlands from 2009-2019 increased more than 50% over the previous decade, with the East Gulf Coastal Plain experiencing some of the highest rates in the United States (Lang et al. 2024). A recent study of wetland loss in northeastern Florida demonstrates cumulative wetland loss, fragmentation, and restructuring despite compulsory mitigation (Goldberg and Reiss 2016). In addition to a net loss of over 200,000 acres, a troubling trend for waterbirds is remaining wetlands are being converted from vegetated to non-vegetated wetlands. These conversions are primarily driven by conversion to uplands for development, agriculture, and silviculture, and conversion to open water ponds and lakes (Lang et al. 2024).

While much wetland loss is at the site scale, altered hydrology can have watershed and regional-scale impacts to wetlands. Channelization of rivers, construction of dams for

flood control and hydropower, and groundwater withdrawal for agriculture, industrial, and municipal uses may impact the quantity and quality of waterbird habitat. For example, recent studies in the Apalachicola River found long term changes in hydrology from upstream dams, water demand, and within-stream dredging, which have caused drier floodplain conditions (Light et al. 2006, Mossa et al. 2017, Amanambu et al. 2024) and a resulting shift in forest species composition and structure (Darst and Light 2008, Stallins et al. 2010, la Cecilia et al. 2016). Despite these challenges there are examples where wetland conservation is working. Recent gains in oak-gum-cypress (*Quercus-Liquidambar-Taxodium* spp.) and elm-ash-cottonwood (*Ulmus-Fraxinus-Populus* spp.) bottomland forest types in Louisiana are budding examples of mitigation banks and the Conservation Reserve Program at work (Forest Inventory and Analysis 2019). Over 300,000 ha (>740,000 ac) of restored forested wetlands in the Mississippi Alluvial Valley are in varying stages of succession (Berkowitz 2019). Dedicated conservation funding from the Duck Stamp paid by waterfowl hunters, North American Wetlands Conservation Act funds, and perpetual easements through the United States Fish and Wildlife Service (USFWS) Partners for Fish and Wildlife Program appears to be aiding the recovery of waterfowl species, the only taxonomic group currently on the rise (Rosenberg et al. 2019).

Future land use and climate change models project additional habitat loss for numerous wildlife species (Bateman et al. 2016). While some waterbird species may benefit from some aspects of climate change (such as coastal secretive marshbird species with the projected expansion of salt marsh), others may struggle to survive (e.g., beach-nesting shorebirds and seabirds). Coastal resiliency projects intended to protect infrastructure may also degrade remaining habitat by altering natural responses to coastal storms and flooding and promoting the growth of unwanted vegetation. Concern is also increasing about development pressure near areas set aside for conservation (e.g., National Wildlife Refuges; Hamilton et al. 2016), which can decrease connectivity among protected sites, reduce the ability to use prescribed fire as a management tool, and alter hydrology. This can reduce bird productivity and suitable habitat in the surrounding landscape. As a result, agencies, public-private partnerships, and non-governmental organizations are re-evaluating conservation strategies, habitat goals, and apportionment of conservation responsibilities in the context of land-use scenario planning and climate change vulnerability assessments (Bagne et al. 2014, Galbraith et al. 2014, Culp et al. 2017, Rempel and Hornseth 2017).

Gull-billed Tern nest / Bill Summerour

Goal of the Waterbird Conservation Plan

The Plan defines quantitative, spatially explicit bird population and habitat objectives derived from biological planning and conservation design processes. This Plan addresses three key questions:

1. How many birds are needed to maintain or increase populations of priority species?
2. How much habitat is needed to support the population targets set out in #1?
3. Where is the current habitat, and where is additional habitat needed?

Overview of Process

The Plan identifies priority species and habitats and establishes both population and habitat objectives to inform future conservation delivery. This Plan includes both 10- and 30-year objectives to align with the **EGCPJV Landbird Plan** (Greene et al. 2021) and continental planning horizons (e.g., the North American Waterbird Conservation Plan, Kushlan et al. 2002) and sets expectations for evaluation of conservation delivery with Plan revision based on conservation delivery, monitoring, and evaluation outcomes (Figure 1-4). The Plan is intended to be re-evaluated and revised every 10 years.

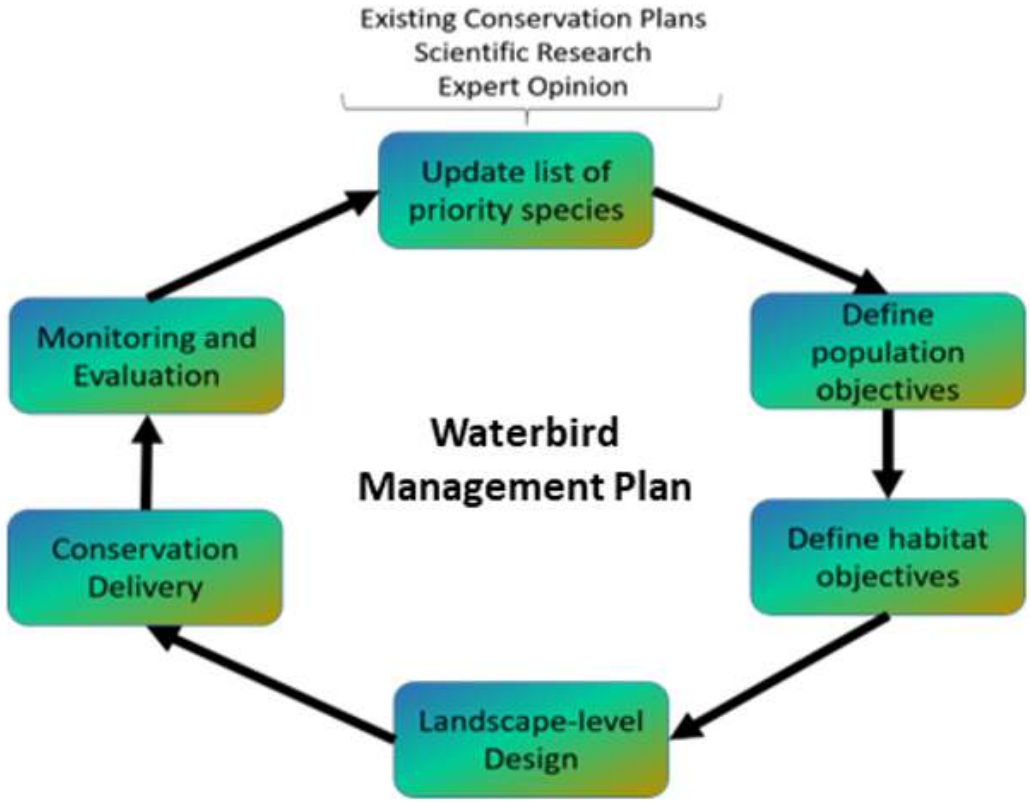


Figure 1-4. The EGCPJV's Waterbird Conservation Plan outlines an iterative process that emphasizes collaborative, strategic, and outcome-driven avian conservation.

The Waterbird Working Group (WWG) identified priority species (refer to Chapter 2, Table 2-2) using a scoring process that included the PIF Watch List, State Wildlife Action Plans (SWAPs), plans from neighboring JVs, and other related efforts. The WWG then assigned each priority species to one or more habitats (e.g., estuarine salt marshes, freshwater herbaceous emergent marshes, etc.). Additional details per the selection of priority species and the scoring process can be found in Chapter 2 and descriptions of the vegetative communities associated with the priority habitats can be found in Chapter 4.

Population and habitat objectives were then established through a multi-step process, which included assigning priority species to one or more habitats, setting a desired percent increase for each species for 10- and 30-year timelines, calculating what percent increase in habitat would be needed to support a given population increase, and determining the overall amount of each priority habitat needed to achieve population objectives. Population and habitat objectives were established for the portion of the planning area within each state based on estimates of current bird populations, habitat availability, and the proportion of restorable habitat available within the waterbird planning area (refer to Chapters 3 & 4). Ultimately, the success of the Plan is contingent on creating, obtaining, restoring, and/or maintaining habitat at the right spatial scale and location and on bird populations responding as predicted (e.g., Ahlering and Faaborg 2006) to either increases in available habitats and/or through improvements in the quality of available habitats. For the purposes of the Plan "habitat" is defined as the vegetative communities (or lack thereof), as well as the hydrological and geophysical features required by a species during one or more of the stages of its annual life-cycle. Some species have more specific requirements than other more generalist species, and therefore habitat descriptions may vary somewhat throughout the Plan in terms of specificity and scale.

Fledgling Wood Storks / Christy Hand

Priority Waterbird Species and Habitats

Overview

Identifying priority bird species is a critical step in refining biological planning within priority habitat types. However, many bird species priority lists exist at the federal, regional, and state levels that identify declining and important indicator species on which to focus conservation efforts. These lists often result from stakeholder engagement, and frequently such lists also account for species population trends, range, and threats to sustainable populations. The WWG acknowledged the extensive efforts and science behind existing prioritization efforts and, as a first step, aggregated priority species lists from continental, regional, and state plans. The initial species list included all waterbird species listed in national, regional and state-level lists and plans (Table 2-1) that had any records within the planning area. In particular, the North American Waterbird Conservation Plan (Kushlan et al. 2002) served as a foundational component of this Plan. The WWG then developed a decision tree and scoring structure (described in brief below, details in Appendix B) to identify and rank EGCPJV priority waterbird species.

Black Skimmers / AL Audubon

Table 2-1. Plans considered to determine the conservation importance of a species.

North American Waterbird Conservation Plan (Kushlan et al. 2002)
East Gulf Coastal Plain Joint Venture Implementation Plan (EGCPJV 2008)
Southeast United States Regional Waterbird Conservation Plan (Hunter et al. 2006)
South Atlantic Migratory Bird Initiative (Watson and Malloy 2006)
Birds of Conservation Concern 2021 (U.S. Fish and Wildlife Service 2021)
Regional Species of Greatest Conservation Need (Southeast Association of Fish and Wildlife Agencies 2019)
States Wildlife Action Plans – AL, FL, KY, LA, MS, TN (respectively: **Alabama** Department of Conservation and Natural Resources 2015, **Florida** Fish and Wildlife Conservation Commission 2019, **Kentucky** Department of Fish and Wildlife Resources 2023, **Louisiana**: Holcomb et al. 2015, **Mississippi** Museum of Natural Science 2015, **Tennessee** State Wildlife Action Plan Team 2015)
Mentions in adjoining Joint Venture plans and species lists – Atlantic Coast, Gulf Coast, Lower Mississippi Valley, Central Hardwoods

Focal Species and Other Important Species

For this Plan, a focal species approach was selected, with a single species chosen to represent other species with similar habitat needs. A focal species approach works well when changes in the populations of non-focal species mirror changes in the focal species population (Caro and O'Doherty 1999, Wiens et al. 2008). Thus, it can be assumed that if a focal species responds positively to habitat management and restoration, similar changes will occur in the non-focal species. This was a primary consideration throughout the process outlined below. In some cases, there were specific species that did not function well as a focal species, nor were their habitat needs well-represented by other species, but nonetheless, their conservation status prompted their inclusion as a priority species for this Plan. These determinations were made on a case-by-case basis with input from subject matter experts (SMEs).

Methodology

Initially the WWG created three species groups – secretive marshbirds, long-legged wading birds, and coastal connections. Broadly speaking, these groups were defined by similar taxonomy, behavioral attributes, and/or habitat specialization. The WWG developed species lists based on the species within these groups that occurred within the planning area boundary. In some cases, certain species were placed in a group not because they shared taxonomic relations with other group members but because their habitat needs and management priorities more closely approximated other species in that group. For example, Reddish Egret (*Egretta rufescens*) was placed in the coastal connections group despite being a long-legged wading bird (Frederick and Green 2019) because of its restricted use of only coastal habitats. Similarly, Seaside Sparrow (*Ammospiza maritima*) was placed in the secretive marshbird group since it uses habitats that overlap with secretive marshbird species and is surveyed using similar methods (e.g., Woodrey et al. 2019). As such, the species groups should not be considered rigid taxonomic classifications, but rather convenient groupings of species that share similar habitat requirements.

Snowy Plover / Larry Goodman

Group-specific teams composed of species SMEs, or taxa teams, reviewed the full lists and removed species based on the following criteria: 1) the species was only incidental to the JV or 2) the species already had comprehensive conservation plans (such as waterfowl). A total of 128 species were initially considered and 50 species were removed (Appendix B, Table B-1, B-2). Several species were removed from one taxa group and placed in another as appropriate, such as in the Reddish Egret example above. The species list generated for further consideration included 43 species in coastal connections, 20 in long-legged wading birds, and 15 in secretive marshbirds (Appendix B, Table B-1).

The taxa teams then reviewed the taxa lists and ranked breeding/year-round residents and non-breeding species separately. Six factors were considered for breeding species: 1) conservation concern, 2) population trend, 3) proportion of the species habitat within the planning boundary, 4) habitat used, 5)

ability to manage or otherwise influence population-limiting factors, and 6) ability to monitor species. A decision tree incorporating these six factors was created to help guide the selection of focal species (Figure 2-1). The first three factors were combined into a group-specific equation to help rank species, and SMEs used the remaining three factors to finalize species selection.

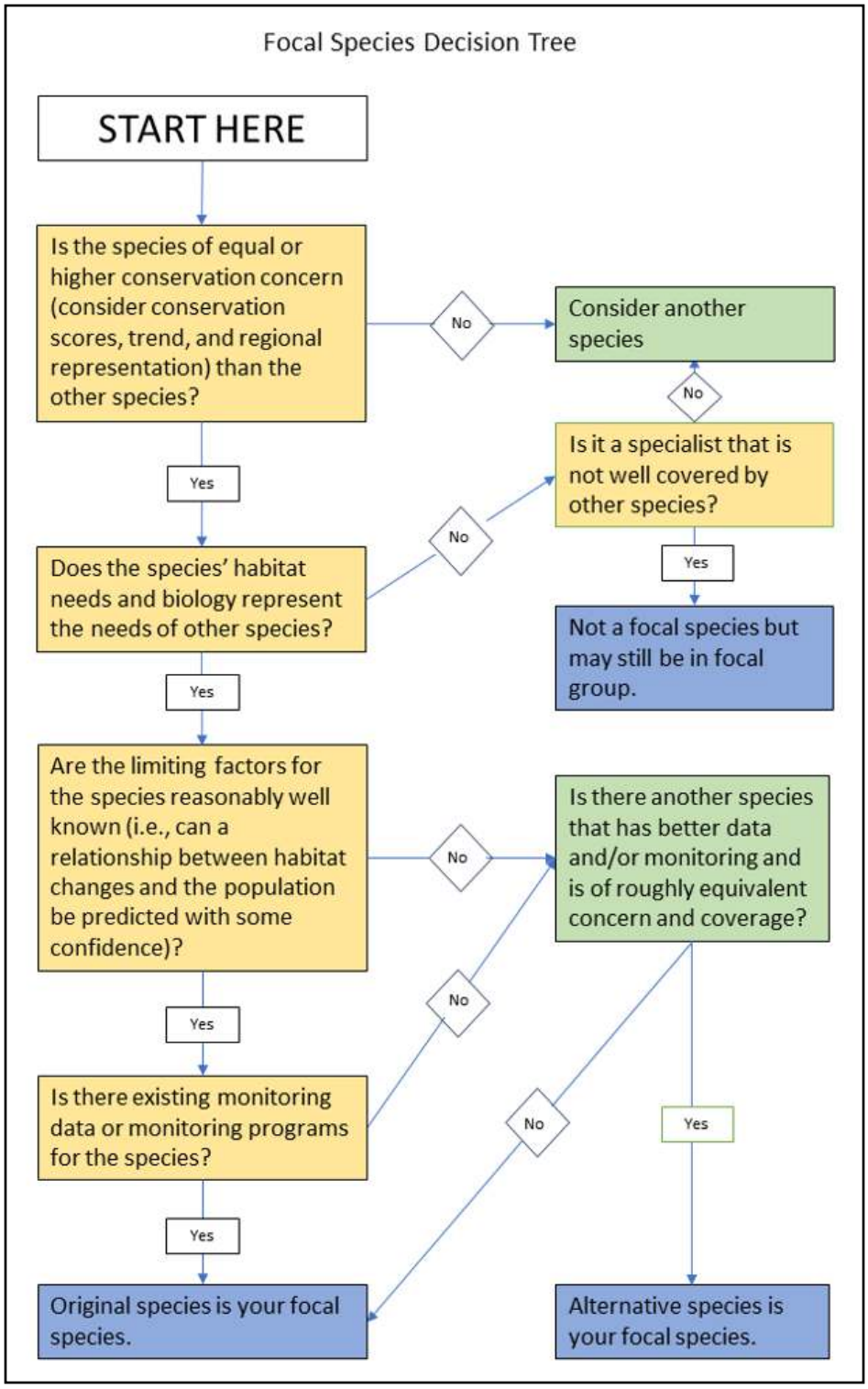


Figure 2-1. Decision tree developed to guide the selection of focal species for the EGCPJV Waterbird Conservation Plan.

Non-breeding focal species were selected using five of the six factors used for breeding species: 1) conservation concern, 2) trend, 3) habitat used, 4) ability to manage or otherwise influence population-limiting factors, and 5) ability to monitor species. Estimating the proportion of species' habitat within the planning area boundary for non-breeding species was difficult and subject to broad errors based on existing available data. Group-specific equations were also used to rank non-breeding species. For the long-legged wader species group, only breeding species were considered, as it was determined that most species considered were present year-round and that the breeding species represented the habitat needs of the few true non-breeding species.

Definitions of the factors and the equations used to rank species and scores for each species (Table B-3) are described in Appendix B. Once the process was applied, the taxa teams designated 23 priority species: 11 in coastal connections, 5 long-legged wading birds, and 7 secretive marshbirds. Most species met all focal species criteria, but three - American Oystercatcher (*Haematopus palliatus*), Black Rail (*Laterallus jamaicensis*), and Reddish Egret - were chosen because they either represented a unique set of habitat requirements not adequately represented by other species and/or were of high enough conservation concern to warrant inclusion. The final selected priority species are listed in Table 2-2 below.

"For this Plan, a focal species approach was selected, with a single species chosen to represent other species with similar habitat needs. These determinations were made on a case-by-case basis with input from subject matter experts."

Reddish Egret / Anne Macias

Table 2-2. Finalized list of priority waterbird species. Status within the JV indicates during which part of a species' annual lifecycle they are present in the planning area.

Common Name	Scientific Name	Status within the JV
Coastal Connections		
American Oystercatcher	*Haematopus palliatus*	Resident
Gull-billed Tern	*Gelochelidon nilotica*	Breeding
Least Tern	*Sternula antillarum*	Breeding
Reddish Egret	*Egretta rufescens*	Resident
Snowy Plover	*Anarhynchus nivosus*	Breeding
Wilson's Plover	*Anarhynchus wilsonia*	Resident
Black Tern	*Chlidonias niger*	Non-Breeding
Common Tern	*Sterna hirundo*	Migrant
Piping Plover	*Charadrius melodus*	Non-Breeding
Red Knot	*Calidris canutus*	Non-Breeding
Semipalmated Sandpiper	*Calidris pusilla*	Migrant
Long-Legged Wading Birds		
Green Heron	*Butorides virescens*	Resident
Little Blue Heron	*Egretta caerulea*	Resident
Sandhill Crane	*Antigone canadensis*	Resident
Wood Stork	*Mycteria americana*	Resident
Yellow-crowned Night-Heron	*Nyctanassa violacea*	Resident
Secretive Marshbirds		
Black Rail	*Laterallus jamaicensis*	Resident
King Rail	*Rallus elegans*	Resident
Least Bittern	*Ixobrychus exilis*	Resident
Purple Gallinule	*Porphyrio martinica*	Resident
Seaside Sparrow	*Ammospiza maritima*	Resident
American Bittern	*Botaurus lentiginosus*	Non-Breeding
Yellow Rail	*Coturnicops noveboracensis*	Non-Breeding

PRIORITY HABITATS

Overview

Upon the partnership's formation, the EGCPJV's Technical Advisory Team and Management Board selected priority habitats to drive initial conservation efforts. Priority habitats were selected based on conservation concerns for species associated with each habitat type, the importance of each habitat to partner organizations, and the current quantity and quality of habitats within the geography (EGCPJV 2008). The habitat framework includes four broadly defined systems waterbirds use during some portion of their annual life-history period: Freshwater Non-forested Wetlands, Freshwater Forested Wetlands, Riparian, and Coastal Communities. For habitat type descriptions, refer to the Appendices of the Implementation Plan (EGCPJV 2008).

While selecting priority species, the WWG also wanted to refine and further narrow the habitats within these systems that were most important to the priority species in this Plan. As such, the taxa teams compiled lists of the various habitat types the priority species used and evaluated them using the process described below to arrive at a final list of priority habitats.

Methodology

Priority habitats were selected using the process described below (Table 2-3). The WWG recognized that some species had more specific habitat needs than others, so each taxa team reviewed habitat classes independently, and developed their own taxa-specific list of communities for that guild of birds. The taxa teams compiled the list of habitats defined within each community described in the Implementation Plan for the long-legged wading birds and coastal connections groups. The WWG recognized that the secretive marshbird group's habitat needs tend to be more specific than the habitats listed in the Implementation Plan. We instead used the land cover classes in the Landfire Existing Vegetation Cover data (Landfire 2022). To do so the WWG determined which wetland and wet prairie cover types occurred within the planning boundary. The complete list of habitats considered is provided in Appendix B.

Sandhill Crane / Sam Boatman

After compiling the list of potential habitats, each taxa team evaluated the importance of each habitat type. First, SMEs indicated whether each species used a particular habitat. For secretive marshbirds, this included what season(s) the habitat was used (i.e., breeding, non-breeding, migration, year-round, or some combination thereof), while the Coastal Connections Team emphasized important life history activities including foraging, nesting, and roosting along with seasonality of use. This species-specific

approach ensured that the most important habitats for the species' biological needs were considered and included. After ranking each habitat by species, the taxa teams summed across species to see which habitats were used by the most species with each species group.

Lastly, each taxa team decided which of the habitats represented priority habitats. Coastal connections and secretive marshbirds used a "natural break" approach because there was a clear divide between habitats used by multiple species and those used by very few species. The Long-legged Wading Bird Team selected the top two habitats within the four Implementation Plan wetland communities. The Secretive Marshbird team also added one additional habitat based on the needs of one of the priority species which was not extensively used by other species. In total, 17 habitats from the Implementation Plan and 26 land cover classes from the Landfire data were examined. The Coastal Connections Team selected 4 priority habitats, the Long-legged Wading Bird Team selected 8 priority habitats, and the Secretive Marshbirds Team selected 12 priority habitats. Given the overlap between species groups and the habitats, we developed a reduced list of 11 habitats, some with emphasis on certain features (Table 2-3).

Table 2-3. Priority habitats selected by the taxa teams to represent the needs of the waterbirds within the EGCPJV planning boundary.

Priority Habitats
Freshwater Herbaceous Emergent (includes littoral and floodplain marshes)
Freshwater Shrub-scrub (includes scrub in riparian, forested, and littoral marshes)
Freshwater Forested • Bottomland Hardwood
Riparian • Riparian Woodland
Savanna
Coastal • Marine Shrub-scrub • Fresh/Oligohaline Tidal Marshes • Salt/Brackish Tidal Marshes • Beaches and Dunes - includes dunal wetlands • Tidal Flats • Near-shore Open Waters

Population and Habitat Objectives

Overview

The primary purpose of the Plan is to set temporally specific species and habitat objectives to guide the JV and its partners in waterbird conservation. To do this, first, the WWG set population objectives for our priority species based on several factors including the level of imperilment and threats to the species' habitat needs, significant barriers to habitat management, such as sea level rise for our coastal species, and population growth or decline. The process is described below. Once the WWG established population objectives, we then established habitat objectives for 10 of the 11 priority habitats. The WWG did not set habitat objectives for nearshore open water because the management actions necessary to conserve priority species in this habitat are not related to the spatial extent of the available habitat. The WWG set objectives using a four-step process: 1) estimated current population sizes, 2) calculated population objectives, 3) determined percent of each species' use of each habitat type, and 4) calculated habitat objectives.

Current Population Estimates Within the Planning Boundary

The WWG used several resources to estimate population sizes (number of individuals) within the planning boundary. We evaluated each species individually to find the best available scientific information, which included monitoring data from partners, population estimates (published and unpublished), published density estimates by habitat type and habitat suitability models, SME opinion, eBird data, and PIF's Avian Conservation Assessment Database (ACAD, Partners in Flight 2021). Given the variability of certainty around population estimates and the differing sources of information, the WWG chose to represent population estimates as a single point estimate per species and not as a range of population estimates or a population estimate with associated confidence intervals (Table 3-1). We used a categorical uncertainty classification system to define the uncertainty associated with each population estimate: Low, Moderate, or High.

- Low = species were defined as having low uncertainty if there were annual surveys of the species across most or all of its range within the planning boundary and/or robust population estimates were available within the planning boundary
- Moderate = species were defined as having moderate uncertainty if survey data had less robust coverage temporally and/or spatially. In addition, any species with published density estimates by habitat type were, by default classified as having moderate uncertainty
- High = species were defined as having high uncertainty if there was limited to no published literature and/or regular survey efforts, and thus, the data used were constrained to incomplete sources like eBird or ACAD

For species with low uncertainty, we had two categories of data - raw comprehensive monitoring data and robust population estimates. For the former, the WWG used the peak annual count then averaged it across the most recent five-year interval to produce a population estimate. For the latter, the WWG simply accepted the robust population estimates as the population size.

For species with moderate uncertainty, the WWG also had two categories of information: incomplete survey data or published literature. For the former, the group estimated the spatial coverage of the surveys; calculated a naive density estimate, i.e., without adjustments for detection, observer bias, or other survey and habitat variables; and increased the population by the proportion of area within the planning boundary left unmonitored. For the latter, the WWG used density estimates by habitat to calculate the JV population by multiplying the density estimates across the amount of available habitat type within the planning area boundary. In some cases, the literature had already estimated population sizes through density estimates and habitat suitability monitoring, and those, when available, were accepted as the population estimates for the planning area.

Seaside Sparrow / Bill Summerour

For species with high uncertainty, the WWG either accepted the ACAD estimates outright or, for American Bittern and Little Blue Heron, used eBird to estimate a raw minimum population number by year for 2018-2023 using a peak count approach. For American Bittern, we constrained the data to November-February of each winter to capture only birds using the planning area for non-breeding use. The data were filtered by location and the highest count for each day for each reported location was used as the peak count for the day. Using the daily peak counts, we then developed monthly and then finally seasonal peak counts for each year. The seasonal peak counts were then averaged across years to arrive at a minimum population for the species. The same approach was used for Little Blue Heron except that the April-July period was used. Unlike trend and relative abundance patterns, which can be estimated with reasonable certainty with eBird data alone, estimating population sizes from eBird data is particularly challenging and generally works well only when paired with targeted, structured surveys (Stuber et al. 2022). Since we used only raw eBird data for some species, the estimates from this data should be considered as minimums rather than population estimates, as the population size for many of these species is likely much larger and there are multiple concerns around the unorganized sampling of the locations across space and time.

Along with conservation efforts directed toward these species and their habitats, we recommend that efforts be taken to refine these population numbers to increase confidence in our management efficacy. For species with both non-breeding and breeding populations within the planning area boundary the population that had a greater area habitat requirement was selected. For instance, while the non-breeding population estimates of American Oystercatchers are significantly greater than breeding population estimates, the breeding population requires more habitat, given the territorial behavior of the species. As such, breeding population size and associated habitat area requirements were used to estimate habitat objectives.

Population Objectives

Population objectives were established using current population estimates and conservation targets set by the WWG. Population objectives are designed to align with 10-year and 30-year conservation target windows as defined in the EGCPJV Landbird Conservation Plan (Greene et al. 2020) and to allow conservation partners, many of which have their own 10-year plans, to track progress at two different time-steps. The WWG divided species into three categories: Coastal Specialists, Interior Critical, and Interior Vulnerable (Table 3-1).

Coastal Specialists

Wilson's Plover / Bill Summerour

The WWG separated Coastal Specialists from interior species or species that use both interior and coastal habitat because of the unique challenges that this species group faces. First, sea level rise is a process that is both on-going, accelerating, and unlikely to be ameliorated in the near-term. Second, the coastal zone is often a thin strand of habitat between the open water and coastal upland habitats and development, and it is subject to large, frequent stochastic events such as hurricanes, which can have both positive and negative population level effects. Given this complexity the WWG set more modest population objectives for the Coastal Specialists, even those with high levels of imperilment (federally listed species, PIF Red and Yellow Watchlist species, etc.). This was done recognizing that simply maintaining current population sizes and habitat amounts is a laudable goal. Further, it was recognized that any growth in these species' populations under current and projected scenarios should be considered a conservation win. Lastly, the WWG also recognized for some migratory and non-breeding coastal species that non-breeding habitat was not thought to be the primary driver of declines. Therefore, maintenance of their non-breeding and migratory habitat, though certainly important, would produce smaller overall population gains.

<u>10-year population objectives</u>

- 15% population increase for species that breed within the planning area AND are federally listed, on the Red or Yellow Watchlists, or are ranked as high-priority Species of Greatest Conservation Need (SGCN; usually S1/S2 or equivalent state ranking) in one or more of the states' wildlife action plans.
- 10% population increase for all other breeding species in the planning area
- 5% population increase for all migratory and non-breeding species

<u>30-year population objectives</u>

- Maintain all populations at the levels of the 10-year gain

Interior Critical

Black Rail / Mike Gray

Interior Critical species were defined as species that are federally listed, on the Red or Yellow Watchlists, or are ranked S1/S2 in one or more state wildlife action plans. Similar to the Coastal Specialists, the WWG recognized that our ability to make gains for our non-breeding species will likely be more limited than our breeding species.

10-year population objectives

- 35% population increase for species that breed within the planning area AND are federally listed, on the Red or Yellow Watchlists, or are ranked as high-priority SGCN in one or more of the states' wildlife action plans
- 30% population increase for all other breeding species in the planning area
- 25% population increase for all migratory and non-breeding species

30-year population objectives

- 100% population increase for species that breed within the planning area AND are federally listed, on the Red or Yellow Watchlists, or are ranked as high-priority SGCN in one or more of the states' wildlife action plans
- 90% population increase for all other breeding species in the planning area
- 75% population increase for all migratory and non-breeding species

Interior Vulnerable

American Bittern / Bill Summerour

Interior Vulnerable species were defined as species that met our criteria for a priority species, may be currently abundant but are declining or have small, but growing populations within the planning boundary, and are recognized as of concern but not listed at higher levels. The WWG established a short-term objective of simply halting declines for these species and a long-term objective of population growth.

10-year population objectives

- Maintain populations at current levels and/or halt current population declines

30-year population objectives

- 10% population growth for all species

Final population estimates and objectives are presented in Table 3-1 below.

Table 3-1. Population estimates in number of individuals and 10-year and 30-year population objectives for priority species. Citations for data used can be found in Appendix B, Table B-7. Population numbers with the * symbol represent population minimums, rather than current population estimates.

Species	Current Population	Uncertainty	Breeds in JV	Watchlist/ Listed	10-year objective	30-year objective	Data Source(s)
Coastal Specialists							
American Oystercatcher	251	Low	Yes	Yes	289	289	Monitoring data, population estimate
Black Tern	1755	High	No	No	1843	1843	Monitoring data
Common Tern	1140	High	No	No	1197	1197	Monitoring data
Gull-billed Tern	206	Low	Yes	No	227	227	Monitoring data
Least Tern	2790	Low	Yes	Yes	3209	3209	Monitoring data, population estimate
Piping Plover	63	Low	No	Yes	66	66	Monitoring data, population estimate
Red Knot	371	Low	No	Yes	390	390	Monitoring data, population estimate
Reddish Egret	20	Moderate	Yes	Yes	23	23	Monitoring data, population estimate
Seaside Sparrow	4831	Moderate	Yes	Yes	5555	5555	Monitoring data
Semipalmated Sandpiper	100	High	No	Yes	105	105	Monitoring data
Snowy Plover	309	Low	Yes	Yes	355	355	Monitoring data, population estimate
Wilson's Plover	290	Low	Yes	Yes	334	334	Monitoring data, population estimate
Interior Critical							
American Bittern	500*	High	No	No	625	875	eBird
Black Rail	70	Moderate	Yes	Yes	95	140	Monitoring data, SME opinion
King Rail	5877	Moderate	Yes	Yes	7934	11754	Published density estimates
Least Bittern	11093	Moderate	Yes	No	14421	21077	Published density estimates
Little Blue Heron	2500*	Moderate	Yes	Yes	3375	5000	Monitoring data, eBird
Wood Stork	470	Low	Yes	Yes	635	940	Monitoring data, population estimate
Yellow Rail	300	Moderate	No	Yes	375	525	Monitoring data, SME opinion
Interior Vulnerable							
Green Heron	54000	High	Yes	No	54000	59400	PIF ACAD
Purple Gallinule	29224	Moderate	Yes	No	29224	32168	Published density estimates
Sandhill Crane	113	Moderate	Yes	No	113	124	Published habitat suitability model
Yellow-crowned Night-Heron	4000	High	Yes	No	4000	4400	PIF ACAD

Habitat Objectives

Once the WWG established population objectives, we calculated the amount of habitat needed for each species and determined which species had the greatest habitat need for each priority habitat. The species with the largest need for a given priority habitat was used to set that habitat's objective. This process involved several steps. First, many species use multiple habitats, so the taxa teams estimated the proportion of each habitat required by a given species to carry-out its annual life cycle. For some species, this reflected an understanding that species' populations may shift seasonal use of habitats and, in other cases for other species, relatively sedentary populations may occur in several habitats. Regardless of the way in which the species allocates its time among available habitats, it was assumed that all the current habitat amounts represented the required amount to maintain the current population, and therefore, each habitat used by a species must increase in amount to observe a functional response to a species' population.

Least Bittern / Robert Smith

For example, Least Bittern uses freshwater herbaceous emergent marsh, fresh and oligohaline tidal marsh, salt and brackish tidal marsh, with limited use of interdunal wetlands on the coast. The secretive marshbird taxa group estimated the amount of each habitat that Least Bitterns use during their annual life cycle; in this case, 30% freshwater herbaceous emergent marsh, 50% fresh and oligohaline tidal marsh, 15% salt and brackish tidal marsh, and 5% interdunal wetlands. The 10-year objective for Least Bitterns is to increase the population by 30%. Thus, the WWG calculated the requisite 10-year increase in habitat by multiplying the current amount of habitat available by the total population increase and the proportion of that habitat required by this species.

Example: 10-year habitat objective for Least Bittern for freshwater herbaceous emergent marsh:

111,093 current acres * 30% population increase * 30% habitat use
= 9,998 *additional* acres

It is important to note that these calculations are directly linked to the current amount of habitat in the planning area, with the assumption that a percent increase in the current amount will produce an equal percent increase in the total bird population. Therefore, it is possible that a species may spend most of its life cycle in one habitat but need a smaller increase in additional acres in that habitat to meet its population goals than in some other habitat. For instance, Least Bitterns spend 50% of their life cycle in fresh and oligohaline tidal marsh, but the current acreage of this kind of marsh is roughly one-quarter of the current acreage of freshwater herbaceous emergent marsh. As the calculation below shows, that means that despite the desired percentage increase in fresh and oligohaline tidal marsh being greater than for freshwater herbaceous emergent marsh, the number of additional acres required to meet the goal is smaller.

Example: 10-year habitat objective for Least Bittern for fresh and oligohaline tidal marsh:

26,916 current acres * 30% population increase * 50% habitat use = 4,037 *additional* acres

The WWG did this for each species and for each habitat type the species used. Where species showed significant habitat shifts between parts of their annual cycle, we used the highest proportional use for each habitat because a species requires both habitats to support itself during different parts of the cycle. The results of these calculations can be seen in Tables B-5 and B-6 of Appendix B.

Once the individual calculations were completed for each species and its associated habitats, the WWG chose the maximum amount required to represent that habitat's objective. For example, American Bittern, Black Rail, King Rail, Least Bittern, Little Blue Heron, Purple Gallinule, Sandhill Crane, Wood Stork, Yellow Rail, and Yellow-crowned Night-Heron all rely on freshwater herbaceous emergent marshes for at least part of their habitat use. Among this group, Wood Stork required the largest increase in this habitat to meet its population objectives and, therefore, the amount it requires was used as the habitat objective for this particular habitat type. The final habitat objectives for the entire Plan are in Table 3-2. The WWG calculated state objectives by determining the percent of current habitat within each state within the planning boundary and multiplying that percent against the overall habitat goal for both the 10-year and 30-year intervals (Table 3-3). A map of the existing habitats can be found below in Figure 3-1.

The mapping of current habitat is imperfect and does not account for the quality of the current acreage. Therefore, the existing acreage almost certainly includes low quality or unsuitable habitat. While the habitat goals are shown as an expansion of current habitat for all priority habitats, it is important to remember that some if not most of the population goals might be achieved by restoration within the existing acreage. This should be considered carefully when moving forward with future conservation actions.

Freshwater Tidal Marsh Mobile-Tensaw Delta / Rob Holbrook

A)

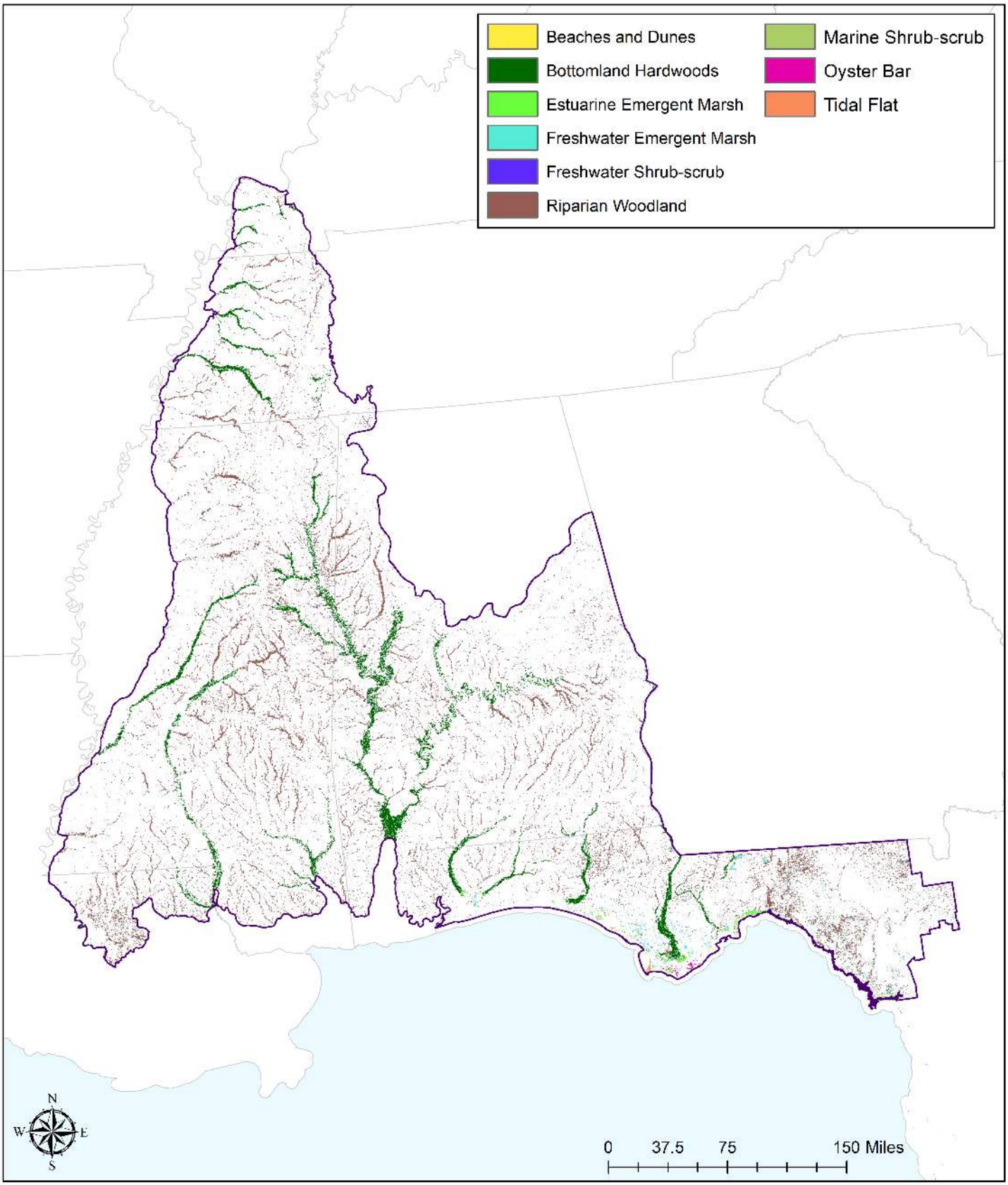
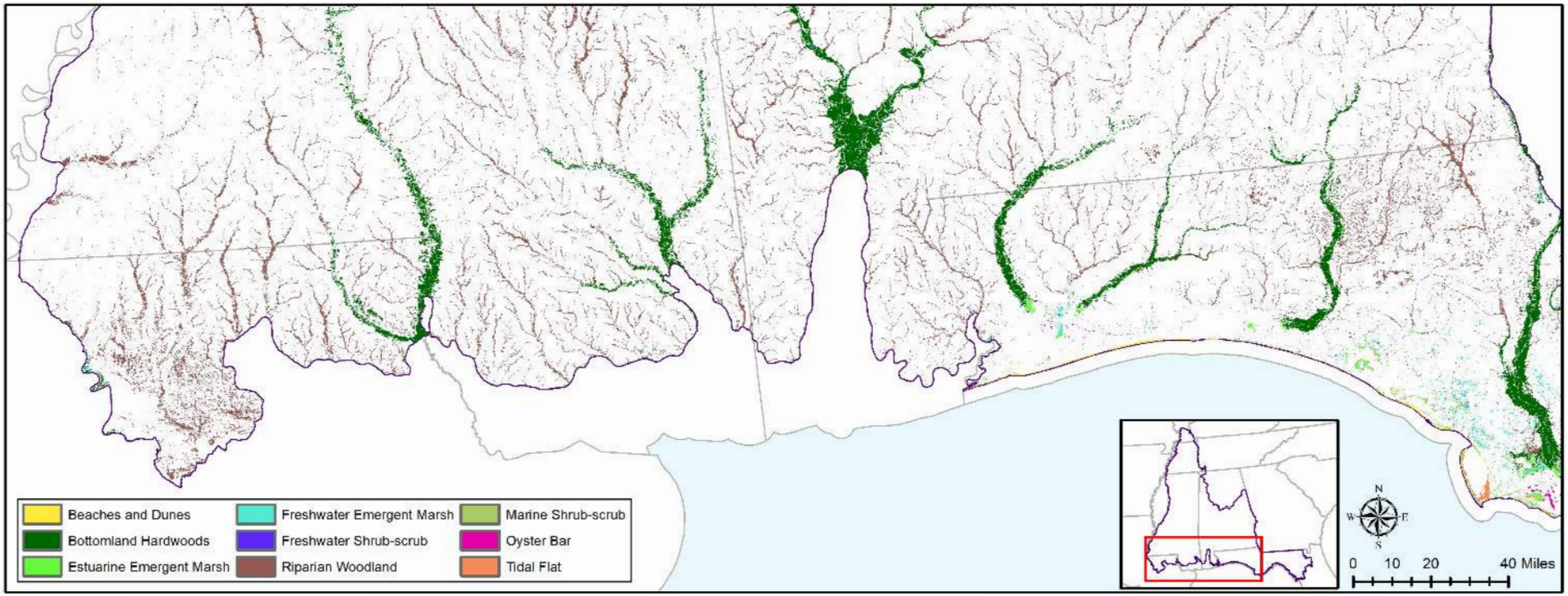
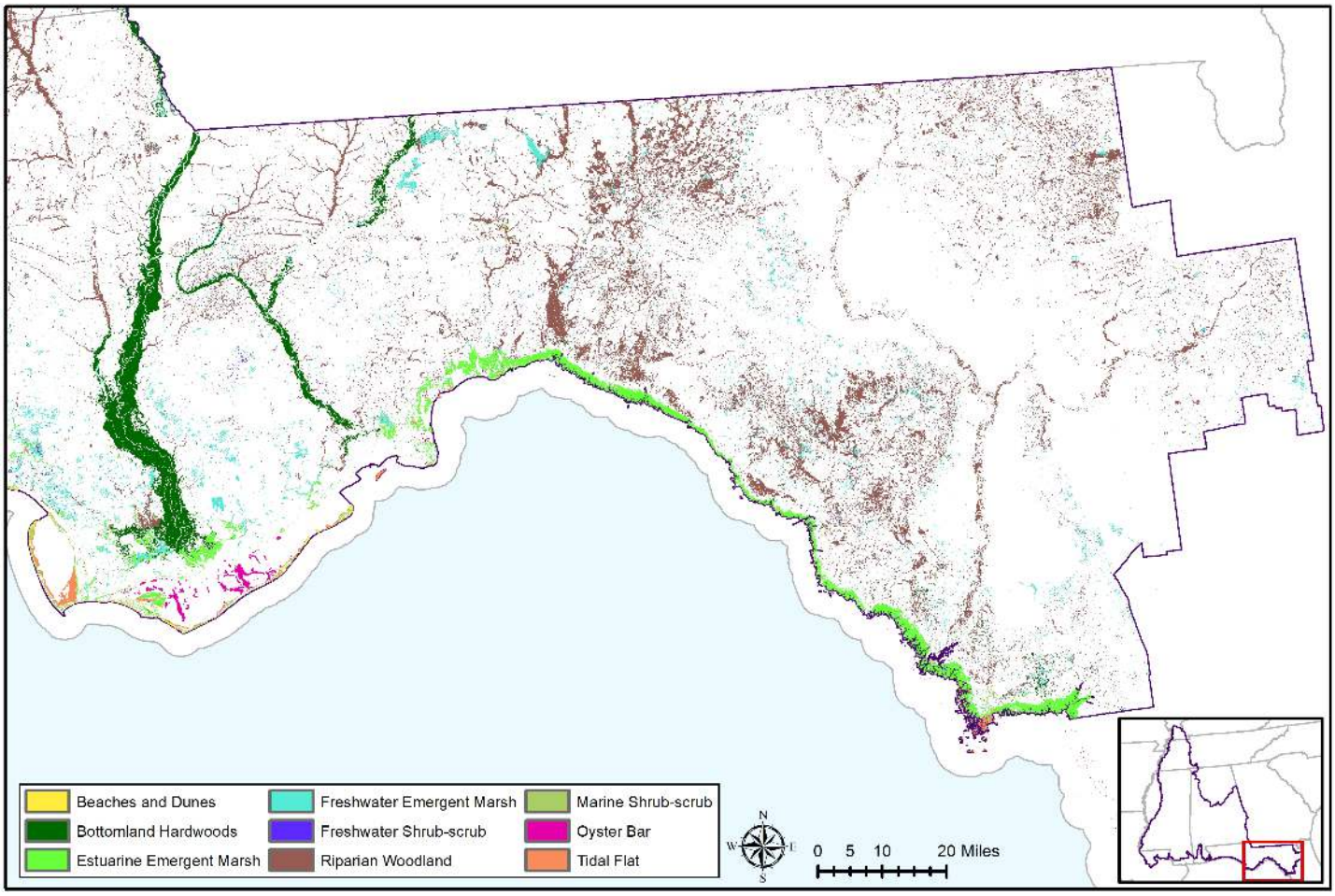


Figure 3-1. Map of the current locations of priority habitats within the EGCPJV waterbird planning boundary. Panel (A) shows the entire planning area, panels B-C show a more detailed look at the coastal habitats of the Florida panhandle, (B) within the EGCP and (C) the Big Bend region of Florida.

(B)


Beaches and Dunes
Bottomland Hardwoods
Estuarine Emergent Marsh
Freshwater Emergent Marsh
Freshwater Shrub-scrub
Riparian Woodland
Marine Shrub-scrub
Oyster Bar
Tidal Flat
N
W
E
S
0 10 20 40 Miles

(C)



The WWG was not able to incorporate habitat quality into the Plan processes. For some species, what constitutes high quality habitat is poorly understood. In other cases, the existing remote sensing data is not suitable to differentiate between high- and low-quality habitat, or such an analysis would be overly burdensome given the current scope of this planning process.

Yellow Rail in 1-day old prescribed fire savanna / Mark Woodrey

Table 3-2. Objectives by habitat type for 10 years and 30 years for the entire EGCPJV waterbird planning area. The 10- and 30- year objectives are the amounts of additional acres needed to be added to the planning area to meet priority species population objectives.

	Current Amount (ac)	10-year objective: additional acres	30-year objective: additional acres	Total acres (current + max objective)
Freshwater Herbaceous Emergent Marsh	111,093	27,218	77,765	188,858
Freshwater Shrub-scrub	17,862	625	1,786	19,648
Bottomland Hardwood	1,762,281	123,360	352,456	2,114,737
Riparian Woodland	3,725,218	130,383	372,522	4,097,740
Savanna	91,485	13,723	41,168	132,653
Fresh and Oligohaline Tidal Marsh	26,916	6,594	18,841	45,757
Marine Shrub-scrub	6,044	453	453	6,497
Salt and Brackish Tidal Marsh	119,388	37,607	47,755	167,143
Beaches and Dunes	20,072	2,559	2,559	22,631
Tidal Flats	9,184	827	827	10,011

Table 3-3. Objectives by habitat type for 10 years and 30 years within the EGCPJV waterbird planning area, broken down by state.

	Alabama		Florida		Kentucky		Louisiana		Mississippi		Tennessee	
Priority Habitat	10-year goal (ac)	30-year goal (ac)	10-year goal (ac)	30-year goal (ac)	10-year goal (ac)	30-year goal (ac)	10-year goal (ac)	30-year goal (ac)	10-year goal (ac)	30-year goal (ac)	10-year goal (ac)	30-year goal (ac)
Freshwater Herbaceous Emergent Marsh	3,266	9,332	18,780	53,658	272	778	544	1,555	3,538	10,109	817	2,333
Freshwater Shrub-scrub	206	589	281	804	0	0	31	89	100	286	6	18
Bottomland Hardwood	46,877	133,933	22,205	63,442	2,467	7,049	3,701	10,574	35,774	102,212	12,336	35,246
Riparian Woodland	37,811	108,031	27,380	78,230	1,304	3,725	7,823	22,351	48,242	137,833	7,823	22,351
Savanna	3,705	11,115	6,312	18,937	0	0	549	1,647	3,156	9,469	0	0
Fresh and Oligohaline Tidal Marsh	0	0	6,594	18,841	0	0	0	0	0	0	0	0
Marine Shrub-scrub	0	0	453	453	0	0	0	0	0	0	0	0
Salt and Brackish Tidal Marsh	0	0	37,607	47,755	0	0	0	0	0	0	0	0
Beaches and Dunes	0	0	2,559	2,559	0	0	0	0	0	0	0	0
Tidal Flats	0	0	827	827	0	0	0	0	0	0	0	0

Critical Assumptions

Underpinning the population and habitat objectives are key assumptions and limitations that need to be considered in future bird population monitoring efforts (e.g., to evaluate the efficacy of on-the-ground habitat delivery):

1. All participating WWG members had similar or equal influence over the processes and decisions made as part of this Plan.
2. The WWG assumes that the Plan will result in better, more efficient, and effective conservation decisions and on-the-ground actions (i.e., implementation), thereby leading to improvements in habitat quantity and/or quality. The WWG assumes that the Plan will be used by the partnership to inform on-the-ground conservation delivery. Outcome-based and effects monitoring can be used to evaluate this assumption and determine the return-on-investment of human and financial capital.
3. The selection of priority species is inherently subjective. Species prioritization was influenced, unintentionally and otherwise, by numerous factors: existing bird conservation plans available and used herein and the associated weights assigned to each plan to calculate average weighted scores; criteria for species removal and inclusion; and the inherent biases of individual WWG members.
4. The species with the greatest habitat-area requirements is a reasonable proxy for other species assigned to a given habitat type and is broadly representative of the avian community.
5. The WWG assumes that species proportion of use assignments to one or more habitat types, based on literature and expert opinion, are reasonable and are representative of habitat use for a given species.

Yellow-crowned Night-Heron / Tim Keyes

6. Current population estimates and the USGS Gap Analysis Project (GAP) species distribution maps are assumed to be accurate, and thus, suitable for planning processes.
7. Population objectives for Piping Plover, Red Knot, and Wood Stork are established by their respective recovery plans, while Black Rail, Reddish Egret, and many of the shorebird and seabird species have population objectives set by species-specific regional or national conservation plans. For the most part, the WWG assumed that these plans include more regionally appropriate and rigorous standards than were used here in setting population objectives. In most cases, if the population objectives in the respective source plans were higher than our own, then we deferred to the higher value. However, our goals for Least Tern and Snowy Plover differ from the Florida Fish and Wildlife Conservation Commission Imperiled Beach-Nesting Bird Species Action Plan because the WWG felt the goals set out in that plan were too aspirational.

8. Population objectives are stated in terms of abundance without regard to population demographics. Thus, rates of population loss or increase disproportionately affecting one demographic group (e.g., breeding adults versus juveniles) are not accounted for in the population objective calculations.

9. Density estimates used to calculate habitat objectives are representative of both the quantity of various land cover types and the quality of habitat across the EGCP geography. Density can be a misleading indicator of habitat quality (Van Horne 1983); isolated patches of habitat with high density of breeding pairs and nests can have low productivity (i.e., population sink). In addition, while we assume that habitats within the EGCP were of the same quality as that reported in published literature for the sake of standardizing calculations, we recognize that habitat quality data and literature were not available for many of the priority species.

10. Increasing habitat availability on the landscape will, by default, result in realized population responses (i.e., increase in density or abundance), leading to corresponding population increases (see Ahlering and Faaborg 2006). Habitat objectives do not incorporate populations' reproductive potential (or among-species variation), barriers to dispersal (e.g., isolation of populations, habitat connectivity, environmental permeability), density-dependent mechanisms, source-sink population dynamics, habitat, and community saturation points, or factors that influence populations during migration or while on the non-breeding grounds.

***Common Tern* / Alex M. Shepherd**

Priority Habitats: Current Condition and Considerations

In this chapter, we review the overarching communities of which the specific priority habitats are a part. The acreages presented are derived from the total of priority habitats found within the community within the EGCPJV planning boundary, and they were derived from the Landfire Existing Vegetation Type (EVT; Landfire 2022) and the Florida Cooperative Land Cover Map (CLC; Florida Fish and Wildlife Conservation Commission and Florida Natural Areas Inventory, 2022) GIS layers. Most land cover types were calculated from the EVT, but the CLC was used to calculate coastal resources that are not adequately captured by the EVT, namely Marine Shrub-scrub and Tidal Flats. We present some features of each of the priority habitats, priority species using the respective community, and taxa-specific considerations that address habitat quantity and quality.

Wood Stork rookery / Christy Hand

FRESHWATER HERBACEOUS EMERGENT MARSHES

COMMUNITY AT-A-GLANCE

Priority Habitats: Large Floodplain and Littoral Marshes

Current estimated acres: 111,093 ac

10-year objective: +27,218 ac

30-year objective: +77,765 ac

Freshwater Herbaceous Emergent Marsh, Floodplain Marsh, Tensaw River, AL / Eric Soehren

Habitat Description and Current Status

Freshwater herbaceous emergent marshes refer specifically to inland, non-tidal wetlands that include several distinct plant assemblages. This wetland type includes marshes along rivers and the edges of lakes, bogs, seeps, and fens, as well as depressional and ephemeral wetlands. The planning area includes 111,093 acres of freshwater herbaceous emergent marshes. Large Floodplain and Littoral Herbaceous Marshes are of high importance to the priority bird species, while smaller, more isolated wetlands typically serve fewer species and individuals. During the 1900s, non-forested wetlands rapidly declined, up to 50% reduction in some systems (Dahl 1990, Hefner et al. 1994, Johnston 1994), and wetlands in the southeast U.S. accounted for 89% of the wetlands lost in the entire country through the mid-1980s (Hefner et al. 1994).

Freshwater emergent marshes are found throughout the planning area, though a significant concentration occur along the non-tidal portions of large river systems such as the Suwannee, Apalachicola, Escambia, Alabama, and Tombigbee River systems and some of the larger tributaries of the Mississippi River. Currently, most large wetlands have some level of regulatory protection provided by federal and state legislation. However, protection of smaller, isolated wetlands is more complicated given recent interpretations of the Clean Water Act (Sackett v. EPA; 25 May 2023), which stripped away federal protections from many smaller, isolated wetlands. Though smaller, collectively these wetlands are critical to wildlife and ecosystem functions (Singh 2015).

Priority Species

Freshwater herbaceous emergent marshes support 11 of the 23 priority species. These species include breeding, non-breeding, and year-round residents. The list of birds includes

American Bittern, Black Rail, Green Heron, King Rail, Least Bittern, Little Blue Heron, Purple Gallinule, Sandhill Crane, Wood Stork, Yellow Rail, and Yellow-crowned Night-Heron. Of these species, Wood Stork required the largest increase in acreage within this community to achieve the 10- and 30-year species population objectives. Therefore, the Wood Stork was used to set the habitat objectives for this habitat. While Wood Storks currently do not occur or occupy wetland habitat throughout the entirety of the EGCPJV boundary, it is important that gains be made in all states included in the JV boundary for the benefit of other focal species that also use these wetlands.

Species or Taxa-Specific Considerations

While large contiguous marshes are ideal for many species, herbaceous wetlands often occur within a matrix of other wetland types, which can also be important to priority species. For instance, many of the long-legged waders that use herbaceous wetlands as foraging habitat also require shrubby or woody substrate for nesting and roosting. Management of wetland herbaceous sites should consider the presence and needs of these species before planning the removal of woody species. Specifically, while removing shrubby and woody species can be vital to maintaining healthy herbaceous wetlands, managers should consider leaving a small proportion of woody and shrubby vegetation, especially in cases with known nesting and roosting sites. The federally listed Black Rail is considered a habitat specialist (U.S. Fish and Wildlife Service 2018) that requires very shallow marshes (moist soil to up to 1.5 in. of water) and dense cover to hide. Subsequently, they often occur along the edges between wetland and upland communities. Managers can encourage the occurrence of Black Rails by avoiding mowing wetland vegetation at the edges of lakes and waterways, removing woody vegetation in the transition zone, and implementing management practices that encourage the establishment and growth of dense stands of grasses or species with similar structural characteristics. Dense herbaceous upland cover just outside the wetland margin can provide Black Rails and other secretive marshbird species refugia during flooding and other high-water events while also providing protection from predators.

Freshwater Herbaceous Emergent Marsh, Littoral Marsh, FL / Tim Dellinger

FRESHWATER FORESTED WETLANDS

COMMUNITY AT-A-GLANCE

Priority Habitats: Bottomland Hardwood, Riparian Woodland, Shrub-scrub

Current estimated acres: 5,505,361 ac

10-year objective: +254,368 ac

30-year objective: +726,764 ac

Bottomland Hardwood, Clarke Co., AL / Rob Holbrook

Habitat Description and Current Status

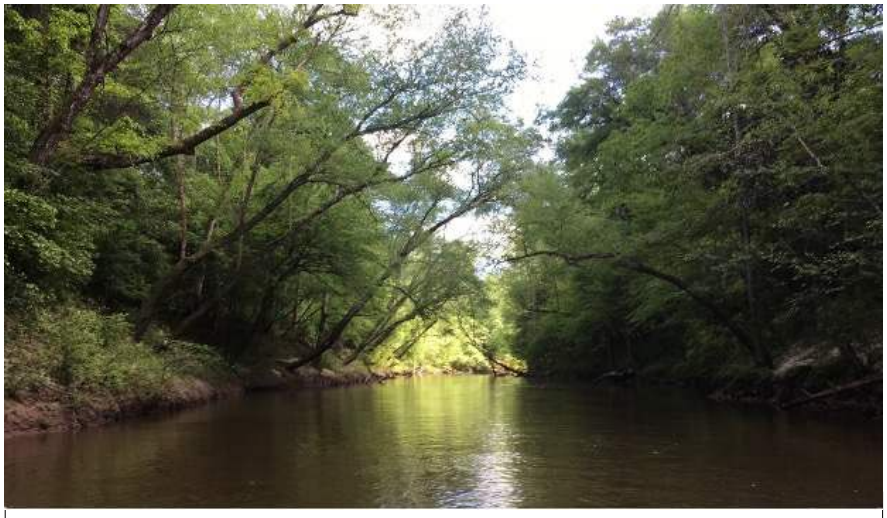
Freshwater forested wetland refers to any inland, non-tidal wetland dominated by an 'overstory' of primarily woody species. Such wetlands include Bottomland Hardwoods, Cypress-Tupelo, Bay Swamps, as well as Depressional Wetlands, Shrub-scrub Swamp, and Beaver Ponds and associated Wet Meadows (EGCPJV 2008). The planning area includes 6,687,253 acres of freshwater forested wetlands and 5,505,361 acres of priority forested wetland habitats. Bottomland Hardwood, Riparian Woodland, and Shrub-scrub Swamps are of high importance to priority bird species, particularly for nesting wading birds. Bottomland Hardwoods are riverine wetlands, frequently occurring in broad floodplains that are often dominated by tree species such as gum (*Liquidambar styraciflua*), oaks (*Quercus* sp.), and Bald Cypress (*Taxodium distichum*). Riparian Woodlands are also dominated by deciduous species, but generally, these tend to occur on smaller streams and waterways with tree species such as maples (*Acer* spp.), oaks, and American sycamore (*Platanus occidentalis*). Shrub-scrub Swamps are often intermixed with the others or occur as a matrix with herbaceous wetlands. Shrub-scrub wetlands are frequently dominated by species such as Buttonbush (*Cephalanthus occidentalis*) and willows (*Salix* spp.).

Over 3.1 million acres of forested wetlands were lost in the southeastern United States from the mid-1970s to the mid-1980s (Hefner et al. 1994), including a significant decline within the current EGCP geography. The regional loss persisted into the mid-1990s (Dahl 2000), with losses continuing in some areas even later (McCauley et al. 2013). Coastal forested wetlands continue to be lost due to climate change (White et al. 2022). Bottomland Hardwood is found throughout the planning area along the large river systems from the Suwannee, Apalachicola, Escambia, Alabama, Tombigbee, Pascagoula, and Pearl River systems in the south to the Obion, Wolf, Hatchie, Forked Deer, and Big Black River systems

in the north. Riparian Woodlands often occur along smaller tributaries and streams throughout the JV geography. Shrub-scrub Swamp can also be found throughout the planning area along small and large river systems and edges of lakes and reservoirs. Currently, most large wetlands are protected by both federal and state laws. Forested wetlands of the southeastern U.S. have received additional attention with respect to protection and restoration, as well as for bird conservation (e.g., Elliott et al. 2020).

Priority Species

Freshwater forested wetlands support 4 of the 23 priority species, all in the long-legged wader group. These species include breeding, non-breeding, and year-round residents. The list of birds includes Green Heron, Little Blue Heron, Wood Stork, and Yellow-crowned Night-Heron. Of these species, Wood Stork required the largest increase in bottomland hardwood acreage to achieve its 10- and 30-year species objectives. Therefore, the Wood Stork was used to set the habitat objectives for this habitat. Little Blue Heron required the largest increase in both Riparian Woodland and Shrub-scrub Swamps and was therefore used to set the 10- and 30-year objectives for these respective habitats.



Riparian Woodland, Covington Co., AL / Rob Holbrook

Species or Taxa-Specific Considerations

Forested wetlands are used almost exclusively by wading birds for both nesting and roosting. While the EGCPJV geography includes large amounts of forested wetlands, conservation and restoration should be prioritized specifically in those areas with known nesting colonies or in areas where suitable but unoccupied nesting habitat occurs. Another consideration is that while large contiguous forests are important for water quality, flood control, and animal and plant diversity, forested wetlands located closer to herbaceous marsh or a mixed matrix of marshes are preferable to wading birds, as most long-legged waders tend to rely on marshes in proximity to their nesting colonies for foraging (Kushlan 1981, Smith 1995, Bereens et al. 2015).

Freshwater Shrub-scrub, Tensaw River, AL / Eric Soehren

COMMUNITY AT-A-GLANCE

Current estimated acres: 91,485 ac

10-year objective: +13,723 ac

30-year objective: +41,168 ac

Savanna in central Florida / Tim Dellinger

Habitat Description and Current Status

Savanna in the EGCP is part of the longleaf pine (*Pinus palustris*) ecosystem that historically dominated the upland ecosystem in the southeastern U.S. (e.g., Oswalt et al. 2012). The longleaf pine ecosystem has declined significantly (Smith et al. 2000, Coyle et al. 2015, Hanberry et al. 2023), and in many areas, it was converted to a loblolly (*Pinus taeda*) or slash pine (*Pinus elliottii*) system. However, nearer to the coast, slash pine is a native component of wet pine savanna systems (Harper 1928) and sometimes co-occurs with longleaf pine and pond cypress (*Taxodium ascendens*) based on the hydrology and microtopography of the savanna. When maintained properly, pine savannas are mixed woodland-grasslands with sparse overhead canopy and minimal shrubby cover. The EGCPJV geography includes 91,485 acres of savanna, but there is high uncertainty related to the quality of the remaining habitat.

Logging, clearing, and conversion to other types of pine plantations reduced the longleaf pine ecosystem by ≥90% since colonial settlement (Hanberry et al. 2023). In many cases, the remaining habitat often consists of fragmented habitat patches that are deprived of fire at the optimal frequency and intensity. Such sub-optimal management of longleaf habitats has resulted in encroachment by other tree species and shrubby plants such as saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), *Aronia* spp., *Morella* spp., *Vibernum* spp., and vines such as *Smilax* spp., which dominate this community in some places. The system is fire-dependent and requires frequent (2-3 years), low-intensity fires to remain healthy and to reduce shrubby ground cover. Most of the suitable savanna occurs in the southern coastal plain portion of the JV planning area, including southern Alabama and Mississippi, southeastern Louisiana and a relatively small portion of the Florida Panhandle.

Priority Species

Savanna supports only 2 of the 23 priority bird species, Black and Yellow Rail. However, Black Rails are federally threatened, and Yellow Rails are a declining species of conservation concern across their range (U.S. Fish and Wildlife Service 2021). Savanna provides a significant portion of the non-breeding habitat for migratory populations of both species (e.g., Soehren et al. 2018, Morris et al. 2020, Johnson and Lehman 2021). Of the two species, Yellow Rail required the largest increase in savanna for its 10- and 30-year species objectives; as such, it was used to set the habitat objectives for this habitat.

Yellow Rail / Billy Pope

Species or Taxa-Specific Considerations

Both Black and Yellow Rails use the wetter and grassier areas within the savanna ecosystem while avoiding drier and shrubbier areas. Thus, when conserving and managing savanna for these birds, efforts should be made to create and maintain open moist to wet areas with thick cover comprised primarily of grassy vegetation. Frequent application of prescribed fire, including in wetter habitats, is necessary, and in some places, other management tools (i.e., mechanical treatment, chemical treatment, or both) may be required to remove shrubs and palms/palmettos if such species have become a dominant component on the landscape.

Longleaf Pine / Kristine Evans

TIDAL MARSHES

COMMUNITY AT-A-GLANCE

Priority habitats: Fresh/Oligohaline and Salt/Brackish Tidal Marshes

Current estimated acres: 146,304 ac

10-year objective: +44,201 ac

30-year objective: +66,596 ac

Salt Marsh, North Rigolets Bayou, MS / Mark Woodrey

Habitat Description and Current Status

Tidal marshes include two main types: Salt and Brackish Marshes and Fresh and Oligohaline Tidal Marshes. Salt and Brackish Marshes in the planning area are dominated by smooth cordgrass (*Spartina alterniflora*) in the lower, saltier portions of the marsh and by black needlerush (*Juncus roemerianus*), saltgrass (*Distichlis spicata*) and/or saltmeadow cordgrass (*Spartina patens*) in the higher and/or less salty areas of the marsh (NatureServe 2018). The aptly named high marsh represents the transition between salt marsh and upland communities and is generally dominated by saltgrass/saltmeadow/needlerush matrix with open pannes and sometimes occasional low, shrubby species such as sea oxeye (*Borrichia frutescens*). Hydrologically speaking, low marsh sees regular daily tidal inundation with the saltiest water; high marsh generally is only tidally inundated at the highest of high tides and rarely sees daily tidal inundation, though the inundation it receives can also be salty, and brackish marshes receive regular daily tidal inundation but with a higher freshwater influence. Brackish and high marsh is more likely to be dominated by needlerush in the eastern part of the planning area, whereas large saltmeadow cordgrass marshes become more common in the central Panhandle of Florida (NatureServe 2018). In certain river estuaries, salt and brackish marshes also play host to intertidal oyster beds, which are an important feature for birds, humans, and the ecosystem more broadly. Within the planning area, Salt and Brackish Tidal Marshes are largely found in the deltas of the large and medium river systems in the western portion of the Florida Panhandle, while the area east of the Apalachicola River has significant expanses of marsh all along the coastline. Some additional salt marshes occur on the mainland side of barrier islands.

Fresh and Oligohaline Tidal Marshes are essentially freshwater riverine marshes that are influenced by the daily tidal cycles. Thus, the plant species present are adapted to not only large shifts in water levels, but also varying salinity levels. Fresh and Oligohaline Tidal

Marshes are generally dominated by grasses, rushes, and sedges (NatureServe 2018). In the EGCPJV geography, there is a large diversity of plants in Fresh and Oligohaline Tidal Marshes, though some can be dominated by native Phragmites near the coast and cattails (*Typha* spp.) further inland. Fresh and Oligohaline Tidal Marshes tend to occur along major river systems, such as Suwannee, Apalachicola, Choctawhatchee, and Escambia Rivers.

In the 20th century and early 2000s the area of both fresh and salt tidal marshes declined (Dahl 1990, Stedman and Dahl 2008). However, most of the tidal marshes within the EGCPJV planning boundary are currently relatively well protected, as the coastal area of the Big Bend in Florida is mostly undeveloped, and large portions of the marshes are already under some form of conservation status (e.g., National Wildlife Refuge, National Estuarine Reserve). Despite this, reduced freshwater flows in several riverine systems have significantly altered most of these systems, leading to oyster reef reduction and die-offs (Seavey et al. 2011). While sea level rise is predicted to increase the amount of salt marsh along the eastern Gulf Coast (Raabe and Stumpf 2015), it is likely that high marsh will be squeezed between the expanding low marsh and upland communities. In addition, sea level rise will drive saltier water further upriver leading to changes in both the vegetation and faunal communities. Northward and westward expansion of mangroves (Sheffel et al. 2013, 2018) may also accelerate, which would negatively impact saltmarsh-dependent species while likely benefiting some of the priority long-legged wading birds such as Reddish Egret and Little Blue Heron.

Freshwater Tidal Marsh, Tensaw River, AL / Rob Holbrook

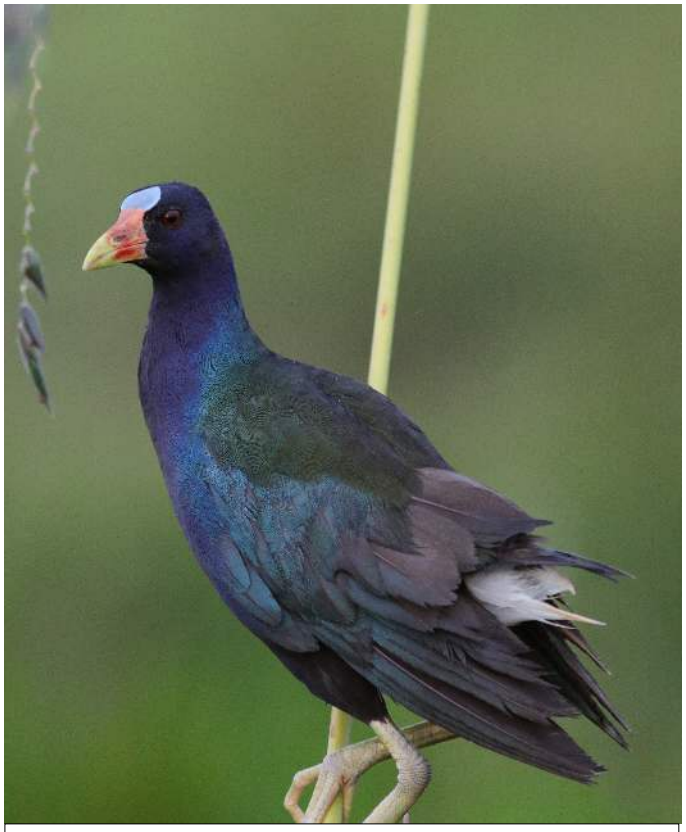
Priority Species

Salt and Brackish Marshes support 15 of the 23 priority species and Fresh and Oligohaline Tidal Marshes support 8 total and 3 additional priority species, for a total of 18 species. Both habitats are of high importance to priority species. These species include breeding, non-breeding, and year-round residents. The list of birds includes American Bittern, American Oystercatcher, Black Rail, Black Tern, Common Tern, Green Heron, Gull-billed Tern, King Rail, Least Bittern, Least Tern, Little Blue Heron, Reddish Egret, Sandhill Crane, Seaside Sparrow, Wilson's Plover, Wood Stork, Yellow Rail and Yellow-crowned Night-Heron. Of these species, Little Blue Heron required the largest increase in Salt and Brackish Marshes to achieve its 10- and 30-year species objectives. Therefore, this species was used to set the habitat objectives for this habitat. King Rail required the largest increase in Fresh and Oligohaline Tidal Marshes and was therefore used to set the 10- and 30-year goals for this habitat.

Species or Taxa-Specific Considerations

Tidally influenced marshes are diverse and structurally complex systems, and given the high number of priority species dependent on these habitats, it is important to consider the needs of all species under this umbrella; not simply using acres as the benchmark metric for defining "success." High marsh is critical to Black and Yellow Rails, while the low marsh is essentially unusable for breeding Black Rails due to nest flooding. The grassy areas of the high and brackish marshes make good foraging habitat for non-breeding Sandhill Cranes. Wilson's Plovers often use salt pannes with open and sparsely vegetated features and shell rakes associated with emergent oyster bars for breeding and foraging. American Oystercatchers breed and forage on marsh and shell islands. Marsh island breeding habitat includes areas of elevated sand or tidal wrack along salt marsh fringes. Shell island nesting habitat consists of low islands of accumulated oyster shell, often created by wind or boat wakes (Sanders et al. 2008). Additionally, adjacent living oyster bars provide foraging habitat for Oystercatcher adults and their flightless young. Likewise, Least Terns will sometimes also use oyster bars for nesting while foraging in tidal creeks. Meanwhile, some species (American Bittern, King Rail, and Purple Gallinule) only use Fresh and Oligohaline Tidal Marshes, making conservation and management of these marshes critical as well. Sea level rise will pose a threat particularly to those species that rely on high marsh (Reece et al. 2018, Taillie and Moorman 2019). Thus, it is important to prioritize conservation of salt marshes that are structurally diverse and potentially resilient to sea level rise. Increased high-tide height has been linked to lower survival in at least one species (Griffin et al. 2023). Specifically, allowing for and potentially even encouraging marsh migration could be the key to success for many of these bird species in tidal marshes (Thompson et al. 2014, Osland et al. 2017).

King Rail with chick / ***Andy Reago & Chrissy McClellan***



Purple Gallinule / Sam Boatman

A Land of Opportunity and Trade Offs

The Big Bend region of Florida is a diverse and largely undeveloped area made up of a patchwork of habitats that contain both possibilities and challenges. Salt and Fresh Tidal Marshes, Marine Shrub-scrub, oyster bars, and Tidal Flats are peppered with a small number of open sand islands and shell rakes on the coast, while Bottomland Hardwood, Riparian Woodlands, and Fresh Herbaceous Emergent Marsh can be found farther inland. Most of the Big Bend coastline is under conservation management by state and federal partners, allowing for close coordination of conservation efforts, especially for fostering climate resilience. Salt Marsh migration can be actively encouraged with an eye to protecting bird species dependent on high marsh. There is plenty of room for innovative projects, such as building wading bird nesting islands and seabird and shorebird nesting habitat. However, the gain for some birds may prove to be a loss for others. Mangrove expansion into the marshes and on seaward islands may prove to be a boon for wading birds, yet may have negative outcomes for secretive marshbirds, shorebirds, and seabirds. Sea level rise will push saltwater into previously freshwater habitats. This combination of habitat diversity and conservation challenges make the Big Bend a prime example to highlight the critical balance and careful planning that will need to be achieved to provide gains for all waterbirds.

Big Bend, FL / Doug McGrady

COMMUNITY AT-A-GLANCE

Priority habitats: Marine Shrub-scrub, Beaches and Dunes, Tidal Flats

Current estimated acres: 35,300 ac

10-year objective: +3,839 ac

30-year objective: maintain 10-year acreage objective across existing areas

Beach, Horn Island, MS / Don McKee

Habitat Description and Current Status

For the purposes of this Plan, the WWG defined coastal habitats as those occurring on the margin between permanently inundated areas and upland communities excluding tidal marshes. Marine Shrub-scrub is any mix of woody, shrubby species that grow along the coast and may include tree species which are size-limited or constrained due to wind and salt spray. Marine Shrub-scrub can be part of the transition zone from coastal to uplands or can occur in isolated patches on islands or interdunally. In the EGCP geography, Marine Shrub-scrub often contains saw palmetto, myrtle oak (*Quercus myrtifolia*), sand live oak (*Q. geminata*), Chapman's oak (*Q. chapmanii*), Florida rosemary (*Ceratiola ericoides*), sand pine (*Pinus clausa*), and yaupon (*Ilex vomitoria*; Kawula and Redner 2018). Marine Shrub-scrub as defined by the Plan can include elements of coastal scrub and maritime hammock as described in Guide to the Natural Communities of Florida (Florida Natural Areas Inventory 2010) and the gradation and intermix zones between the two. Marine Shrub-scrub does not include mangroves, and mangrove forests are considered to be a different habitat, albeit one that will likely play a larger role in the planning area in the future.

Beaches, Dunes, and Tidal Flats all represent aspects of the same system of sand movement in coastal areas, with tidal flats being periodically exposed by the dropping tides, beaches defined as the emergent land above the normal high tide line, and dunes being the vertical build-up of sand due to the combined effects of wind and water. Coastal habitat includes the swash zone, defined as the area along which breaking waves meet the shore carrying sediment and nutrients, and the rest of the intertidal area. This swash zone is important to a number of foraging shorebirds. Coastal habitats are highly dynamic, but healthy systems support Dunes with ridges stabilized by vegetation alongside blowouts and pockets that are sparsely vegetated and Beaches with areas of vegetative regrowth alongside shell and sand flats, sand spits, and a variety of embedded foraging wetland

features (e.g., ephemeral tidal pools, lagoons, overwash fans). Dunes may also include coastal dune lakes and interdunal swales, which are semi-permanent to permanent wetlands fed by lateral ground water seepage from the surrounding dunes, rather than direct inflow or outflows from fresh or saltwater sources (Florida Natural Areas Inventory 2010). Interdunal swales can be open, but are often dominated by herbaceous, grassy, and shrubby species, while coastal dune lakes are often open with either no vegetation or a small fringe of vegetation. All of these embedded wetland features are the primary driver of plover breeding habitat selection (Pruner 2011) and foraging habitat selection by nonbreeding shorebirds (Colwell 2010). They are also important to foraging wading birds, and interdunal swales with sufficient vegetation may also be used by smaller breeding secretive marshbirds, such as Least Bittern.

Tidal Flat, Grand Battures, MS / Mark Woodrey

The coastal habitats are dependent on sand transportation and undergo frequent restructuring by stochastic events, such as storms and hurricanes, which can flatten or scour some areas while building-up others, creating a matrix of successional conditions. Storms can clear vegetation and open habitat that priority coastal species rely on. For example, after Hurricane Sandy hit NY, areas overwashed by the hurricane contained the most suitable plover habitat (Walker et al. 2019). However, sea level rise and increased frequency and intensity of major storms can also lead to loss of habitat in coastal areas and reduce availability of tidal flats (Geselbracht et al. 2015). In addition, human development near or on the coasts can, and in some places has, disrupted the sand transportation cycle, while human activities such as beach driving and supplementation of predators have disrupted either directly or indirectly the nesting areas and survival of beach-dependent bird species (Engeman et al. 2010, Pruner et al. 2011, Florida Fish and Wildlife Conservation Commission 2013). All priority coastal habitats within the JV boundary are found within Florida.

Priority Species

Coastal habitats support 13 of the 23 priority species. The list of birds includes American Oystercatcher, Black Tern, Common Tern, Gull-billed Tern, Least Bittern (in small numbers in interdunal wetlands), Least Tern, Piping Plover, Red Knot, Reddish Egret, Semipalmated Sandpiper, Snowy Plover, Wilson's Plover, and Yellow-crowned Night-Heron. Some are year-round residents, while others may spend one or more of the breeding, migratory, and non-breeding periods within the JV

Piping Plover / AL Audubon

boundary. Reddish Egrets required the largest increase in Marine Shrub-scrub and Tidal Flats and Snowy Plover required the largest increase in Beaches and Dunes to meet their 10- and 30-year species objectives respectively, and therefore these species were used to set the habitat objectives for these habitats.

Species or Taxa-Specific Considerations

Anthropogenic habitat loss and degradation and sea level rise are the biggest threats to most of the priority species and their associated habitats. Coastal resilience and dune stabilization initiatives are also potential threats. These initiatives may lead to changes in vegetation densities, leading to levels that are incompatible, reducing habitat availability for priority species. Snowy Plovers require barren to sparsely vegetated Beaches and Dunes to meet their needs, and planting projects to stabilize dunes would reduce habitat availability for the species. Making and maintaining significant conservation gains for these habitats in the long-term will be extremely challenging. Therefore, for these habitats and species, prioritization of existing resources and conservation actions, especially in known-use areas (whether nest/colony sites, foraging areas, and/or non-breeding roost areas) will be critical. Mapping and tracking known use areas will be an important component to any future conservation strategy for these priority species. Conservation of these species and their habitats requires not only additional acreage, but investment of resources in implementation of active management. Active management can include partial or full beach closures (e.g., posts and rope around nests or breeding habitat), predation management, habitat improvement/restoration strategies (e.g., vegetation reduction, foraging feature creation, shell debris placement), and beach nesting bird outreach programs which can reduce human impact on nesting birds (e.g., Mengak et al. 2019, Hunt et al. 2019). Beach renourishment is another potential active management action. However, renourishment can also be a detriment to embedded beach foraging features that shorebirds and their young rely on. Sand placement can suppress prey availability at the swash zone and alter coastal processes, reducing the likelihood of ephemeral tidal pool and overwash formation.

Coastal Dune Lake, Walton County, FL / Sammy King

NEAR-SHORE OPEN WATERS

COMMUNITY AT-A-GLANCE

Current estimated acres: ~83,000 ac

10-year objective: NA

30-year objective: NA

Grand Bay National Estuarine Research Reserve / Toby Gray

Habitat Description and Current Status

For the purposes of the Plan, the WWG defined Near-Shore Open Waters as the permanently submerged habitats adjacent to the coastal habitats described above and extending out to the continental slope (200-2,000 m depending on location) as defined by Michael et al. (2023). This habitat contains both substrate without vegetation and 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 Fish and Wildlife Conservation Commission 2019). They provide food and shelter for a large number of plant and animal species (Florida Fish and Wildlife Conservation Commission 2019). Connection of inland waters with coastal waters through natural or man-made inlets creates nutrient rich zones that can be hot spots of biodiversity (Florida Fish and Wildlife Conservation Commission 2019). Shoals are raised areas of (typically) sand that result in shallower water. Both shoals and inlets can be important foraging habitats for the priority species when tidal action concentrates forage fish in certain areas (Florida Natural Areas Inventory 2010).

In areas with vegetation, seagrasses such as turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), and widgeongrass (*Ruppia maritima*) are the dominant species, forming thick monospecific or multi-species stands. These grasses stabilize the sediments, producing higher water clarity (Florida Fish and Wildlife Conservation Commission 2019). 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 Fish and Wildlife Conservation Commission 2019).

There are approximately 83,000 acres of open waters within the EGCPJV administrative boundary, and most are thought to be in poor and declining condition (Florida Fish and Wildlife Conservation Commission 2019). Principal threats to this habitat include pollution, dredging and filling, and recreational impacts to submerged aquatic vegetation. Off-shore energy production may become more of an issue in the future, especially with wind farms, as the nation moves toward more renewable energy sources.

Priority Species

Near-shore Open Waters support 4 of the 23 priority species, all of them tern species. The list of birds includes Black Tern, Common Tern, Least Tern, and to a lesser degree Gull-billed Tern. Least Terns and Gull-billed Terns breed within the planning boundary, Common Terns are largely non-breeding, and Black Terns pass through the JV primarily during the migratory seasons (Heath et al. 2020), though small numbers of all species may spend one or more of the breeding, migratory, and non-breeding periods within the JV boundary. The WWG recognizes the importance of high quality Near-Shore Open Waters to these priority species but did not set habitat objectives for Near-shore Open Waters because the JV has little ability to make habitat gains.

Least Tern / Larry Goodman

Species or Taxa-Specific Considerations

Although the JV has not historically engaged in habitat management of nearshore open waters, working with other partners interested in similar goals, such as the National Estuary Programs, Florida Aquatic Preserve Program, and Sea Duck Joint Venture (Sea Duck Joint Venture 2022) can be an important action to help elevate the profiles of priority species with groups and agencies responsible for making decisions about such things as placement of new energy production. Some species, such as Black Tern, have a higher vulnerability to events such as oil spills due to their foraging behavior (Michael et al. 2022). On-shore activities can also influence near-shore waters. For instance, on-shore development has been shown to reduce nekton production in near-shore waters (Bilkovic and Roggero 2008) which can then lead to declines in the bait fish species on which the priority species feed. Nutrients and other pollutants from on-shore sources can either directly or indirectly (through overgrowth of algae which shades out seagrass) lead to seagrass death. Declines in seagrass beds can in turn lead to declines in waterbird food resources as well. JV efforts to restore and manage important coastal habitats for Coastal Connections species could also positively affect the near-shore habitat adjacent to these areas. Additionally, spatially explicit foraging data for some of these species exist, and it may be possible to map which adjacent pieces of the coast need additional protection or management.

Conservation Delivery and Measuring Success

Overview

The WWG defined conservation delivery as actions taken to protect, restore, and enhance habitat. It is vital to any successful conservation initiative and a central tenet of the EGCPJV's mission (EGCPJV 2008). Objective setting plays a critical role in supporting successful conservation efforts by joint venture partners, and this Plan presents priority bird species, population objectives, and habitat objectives for the EGCPJV. Defining measurable population objectives is an important step in meeting the ultimate goal of sustaining populations by addressing ecological requirements of the birds (U. S. Fish and Wildlife Service 2008). While science planning efforts are critical to defining priorities and objectives, conservation delivery translates objectives into tangible habitat improvements in both quantity and quality to support bird populations. The role of population objectives in bird conservation is explored and presented in a Partners in Flight technical series document (Andres et al. 2020). Population objectives can be used to:

Support conservation delivery by serving as biological targets (Andres et al. 2020). These targets support efficient and effective conservation delivery by providing a biological foundation for strategic planning and often entail additional conservation design efforts and development of products such as decision support tools.

Communicate and market the demonstrated needs for conservation (Andres et al. 2020). Audiences include internal and external JV partners, the general public, funding entities, and other organizations making decisions about the amount of funding available for bird conservation.

Measure success by serving as a performance metric for assessing conservation accomplishments (Andres et al. 2020). Measuring success is critical in evaluating conservation implementation and adapting methods and processes as needed. Within partnerships, population objectives allow partners to determine their responsibility and measure their contributions to the larger joint venture's objectives.

In recent years, there has been an increased focus on accountability and measuring conservation success (U. S. Fish and Wildlife Service 2008). Setting objectives with transparent and defensible methods and delivering results is critical and maintains confidence in the ability to communicate likely outcomes (U. S. Fish and Wildlife Service 2008). A solid scientific foundation provides measurable objectives, focuses conservation delivery, communicates likely and actual conservation outcomes, and measures success. The objectives presented in this Plan serve as a foundation for measuring success, increasing the likelihood our partnership meaningfully contributes to the efforts of the larger bird conservation community.

Supporting Conservation Delivery

This Plan provides a list of prioritized species and 10- and 30-year population and habitat objectives. Species prioritization efforts result in broad agreement across the EGCPJV for organizations, including state wildlife agencies, that have approved State Wildlife Action Plans. For example, priority species can be central to single or multi-state proposals for habitat management and can also serve as target species for monitoring and research programs addressing information gaps or assumptions made during planning (see Chapter 3, Critical Assumptions). Species monitoring is a way to evaluate the effectiveness of habitat delivery and other conservation actions.

Population objectives are foundational to conservation planning and the development of decision support tools. While the WWG has developed broad habitat objectives to meet population objectives, both objectives can be refined and improved. Future needs may include more detailed identification of population-limiting factors for identified priority species and the application of population-habitat relationship models to facilitate the development of tools directing the 'what' and the 'where' of conservation delivery (U. S. Fish and Wildlife Service 2008). Decision support tools often identify priority conservation areas and support decisions through:

Salt Marsh Restoration Project, Bayou la Batre, AL / Rob Holbrook

1. Identification of focal areas where conservation can be directed by funding through State Wildlife Grants, the National Fish and Wildlife Foundation, Farm Bill programs, etc.

2. Development of geographic-based criteria, which can be used to rank projects against each other ensuring implementation of the most beneficial projects.

3. Justification of funds requested in proposals by indicating how restoration or management of a certain number of acres will support a given number of birds and contribute to population objectives.

4. Prioritized work planning to ensure efficient use of limited resources including work capacity and monetary funding tied to specific conservation outcomes (USFWS 2008).

5. Provision of targets allowing multiple partners to 'own' their portion of objectives, develop plans to meet them, and roll up successes across agencies and the geography to increase success at scale.

When on-the-ground actions are based on biological planning and conservation design, managers have improved conservation success (U. S. Fish and Wildlife Service 2008). Managers constantly decide what conservation treatments to apply and where to apply them, and conservation design products can focus implementation in areas that have the greatest potential to achieve desired outcomes. Managers have access to a variety of tools developed from the best available data and information to make those decisions.

Managers are familiar with conservation issues on lands that they manage and are often best suited to develop appropriate conservation strategies. Depending on the habitat, current land ownership, and management history, land managers might consider a myriad of potential conservation delivery actions: land acquisition or easements, restoration, and outreach programs (Brush et al. 2019, Frederick and Green 2019, Jodice et al. 2019, Woodrey et al. 2019). Restoration can include hydrological management to maintain appropriate water levels for birds that more closely approximate natural cycles, thinning of woody vegetation in herbaceous marshes, prescribed burning, beneficial use of dredge material and beach renourishment, invasive species removal, etc. The EGCPJV partnership relies on the expertise and local knowledge of land managers to implement needed conservation actions at the local scale, which when applied at the scale of the JV by multiple partners can result in effective conservation delivery at the landscape-scale.

Prescribed burn St. Vincent NWR, FL / US Fish and Wildlife Service

Lastly, broad habitat objectives presented in this Plan indicate the number of acres needed to support bird population objectives. These habitat objectives can be used to assess the ability and desire of conservation partners and the public to achieve objectives as they are stated. Communicating the objectives with internal and external partners is also useful and provides an opportunity for feedback about feasibility and potential tradeoffs inherent in achieving these goals (U. S. Fish and Wildlife Service 2008).

Marketing and Communicating Conservation Goals

Joint Venture partners must agree on priorities, objectives, and ultimately on how partners contribute individually to the collective goals. Partners use objectives to gauge the ability, willingness, and openness of their organization to making decisions in ways that help meet identified population and habitat objectives. Open dialogue among JV management board organizations is critical because a commitment and understanding of how each partner can contribute to the collective goals is important. For example, a state or county agency may be better prepared to provide education programs to engage the public, whereas a federal agency like the U.S. Department of Agriculture Natural Resources Conservation Service generally has far more resources to work on private lands in collaboration with landowners.

"This plan provides the critical first step by developing habitat objectives with the question 'how much is needed?'. How to achieve those objectives requires both planning and clear, open communication."

This plan provides the critical first step by developing objectives with the question 'how much is needed?'. How to achieve those objectives requires both planning and clear, open communication. Accountability, agreement, and buy-in to organizational contributions also requires transparent communication among and within partner agencies, among JV partners, and more broadly across the conservation community and public.

Measuring Success

Success inherently depends on the mission, goals, organizational structure, metrics used to evaluate outcomes, and the spatial and temporal scales of interest. The goal of the EGCPJV partners is the restoration and maintenance of healthy bird populations. Here, we define success relative to the population and habitat objectives in the Plan and aspirational goals outlined in the Implementation Plan (EGCPJV 2008).

"A commitment to tracking habitat and population changes will be required to determine success."

This Plan provides quantitative waterbird population and habitat objectives for the EGCPJV. A commitment to tracking habitat and population changes will be required to determine success. Ultimately, the EGCPJV will evaluate its success by determining how conservation action affects the ability of our landscapes to sustain species (U. S. Fish and Wildlife Service 2008). Successful waterbird conservation is achieved when habitat in the EGCPJV planning boundary is no longer the factor limiting priority species from reaching population objectives and when habitat gains meet or exceed habitat losses.

This Plan was developed with the expectation that individual EGCPJV partners use objectives to plan and implement programs and projects that contribute to the larger partnership's biological objectives. Monitoring by partners allows for evaluation of how contributions of acquired, managed, and restored acres support biological population objectives. Monitoring can also allow evaluation of assumptions made during biological planning and when assessing management impacts on bird populations. Aggregation and analysis of monitoring data by the JV will allow all partners to understand progress across the JV geography.

Regular monitoring, field studies, and feedback from managing agencies are central to tracking bird populations. Advances in satellite imagery can track additional metrics related to habitat condition and bird migration patterns. Further, tracking habitat gains and losses will be central to assessing and refining future objectives. While the EGCPJV Technical Advisory Team calls for this Plan to be revisited every 10 years, population and habitat objectives should be tracked at shorter intervals, at minimum every 5 years, and likely at even shorter intervals for federal or state listed species.

This Plan is intended to be re-evaluated every 10 years, and it will include additional conservation considerations in subsequent iterations. The WWG will evaluate the success of the partners in meeting population and habitat objectives and will adjust objectives as needed to meet the 30-year population goal for the EGCPJV. Three areas of particular focus in subsequent iterations are: (1) addressing critical assumptions within this Plan; (2) evaluating information gaps and data needs for priority waterbird species; and (3) assessing the overall challenges to conservation delivery.

***Semipalmated Sandpiper* / Alan Schmierer**

Critical Information Needs

In addition to evaluating critical assumptions outlined in Chapter 3, major information gaps exist for many priority waterbird species. Specific critical gaps identified by the WWG are:

1. Baseline monitoring for several of the species that do not already have existing monitoring.
2. Data on distribution of the species within the EGCPJV boundary.
3. Evaluation of the proportion of habitats used by individual species.
4. Identification of key concentration areas for non-coastal colonial nesting species and migratory and non-breeding flocking species throughout the EGCPJV geography.
5. Identification of specific features and metrics that define high quality habitat for certain priority species.

Unlike many landbird species, data are sparse for many of the priority waterbird species considered herein. Existing standardized range-wide bird monitoring efforts like the Breeding Bird Survey (Sauer et al. 2019) and Christmas Bird Count (Butcher et al. 2005, Niven and Butcher 2011) generally do a poor job of sampling waterbird habitats and thus, waterbird numbers tend to be biased low. In addition, much of the waterbird habitat is simply not accessible to volunteers and citizen scientists (e.g., eBird). Developing strategies to fill information gaps and better understand how habitat quality influences waterbird distribution and abundance is critically important to conserving these species.

“Developing strategies to fill information gaps and better understand how habitat quality influences waterbird distribution and abundance is critically important to conserving these species.”

As remote sensing technology and its derivative datasets improve and increase in diversity, condition indices of priority habitat types may be developed. In addition, ground-truthing exercises, fine-scale mapping of certain features within broader habitat categories (e.g., the classification of high marsh habitats within salt marsh, Enwright et al. 2023), and feedback from managing agencies can address knowledge gaps and verify the effectiveness of using habitat condition indices to estimate habitat types and potential or real habitat deficits.

The WWG anticipates future iterations of this Plan will address in greater detail the habitat conditions required for population growth across the suite of priority waterbird species. Bird populations are under increasing pressures from habitat loss and fragmentation, degradation and conversion to other land cover types and uses, negative effects of climate change and associated habitat loss and shifts, and a myriad of other stressors (e.g., Rosenberg et al. 2019). Updates to this Waterbird Conservation Plan will identify conservation challenges and system-specific threats, including those the partnership can influence to conserve waterbirds in the EGCPJV geography. The EGCPJV continues to face many challenges and will continue to serve as a resource and forum for its partners to assess the efficacy of conservation methods and coordinate conservation to address the myriad conservation challenges facing priority waterbird species in the EGCP.

***Black Terns all plumages* / "Under the same moon"**

Banded Red Knot, winter plumage / Bobbi Carpenter

Green Heron / Sam Boatman

Gull-billed Tern / AL Audubon

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Appendix A
The East Gulf Coastal Plain Joint Venture: Purpose and History

The EGCPJV is a public-private partnership seeking to advance the sustainable conservation of bird habitat. Formed as a strategic approach to conservation at an ecoregional scale rather than a jurisdiction formed by political boundaries, the EGCPJV convenes Federal, State, non-governmental agency, university, and private stakeholders to address bird conservation in response to regional opportunities and threats within the EGCP.

The formation of a joint venture in the EGCP was first discussed in 2002. A Management Board and Technical Advisory Team, in collaboration with partner organizations, established the partnership's administrative, organizational, and technical responsibilities. These responsibilities and the strategic approach to conservation are articulated in the Implementation Plan, published in 2008 (EGCPJV 2008). It established the EGCPJV's mission to protect and restore bird populations of this geography by coordinating the effective conservation of key habitats. The Implementation Plan articulated the EGCPJV's commitment to a science-based approach to conservation strategically implemented at the landscape-scale to maximize conservation benefits and to leverage human and financial resources. The Implementation Plan positioned the JV as a key communicator and platform for alignment of bird conservation priorities for partner organizations and the broader regional conservation community.

The Implementation Plan also established the EGCPJV's mission and strategic conservation framework. To advance the mission of sustainably protecting and restoring bird populations of the EGCP, management goals for priority species and their habitats are necessary. The partnership has devoted its past resources to decision support (e.g., Open Pine Decision Support Tool), which serves as the basis for subsequent conservation planning and delivery. The partnership is currently pivoting to the identification of taxonomic priorities and the quantification of bird population and habitat objectives. The EGCPJV builds upon the NABCI, PIF's North American Landbird Conservation Plan, the National Bobwhite and Grassland Initiative, and numerous species recovery plans that contribute to the growing body of knowledge pertaining to priority bird species' ecology, population status, threats, response to management, and paths to recovery.

Historically, evergreen forest was prevalent in the EGCP physiographic region with the most common evergreen forest types dominated by longleaf pine (*Pinus palustris*), slash pine (*P. elliotti*), and loblolly pine (*P. taeda*), often with a co-dominant oak species (Landfire 2014). Current composition of pine has shifted toward loblolly and shortleaf pine due to their economic importance to modern silvicultural practices. Ranked from greatest to least abundance by basal area, the current ratio of loblolly, shortleaf, slash, and longleaf pines is 4:2:1:1, respectively (Wilson et al. 2013).

Deciduous forest is concentrated along the Tennessee River and the loess hills and floodplain forests adjacent to the Mississippi Alluvial Valley. Mixed pine-hardwood forest is distributed throughout the region. Agriculture has substantially affected the EGCP landscape with approximately 5.04 million ha (12.45 million ac) in agricultural (hay, pasture, and cultivated crops) production, an area nearly equivalent to the EGCP's evergreen forests. Cultivated crops, of which corn (*Zea mays*), cotton (*Gossypium*

hirsutum), soybeans (*Glycine max*), wheat (*Triticum aestivum*), and peanuts (*Arachis hypogaea*) are of central importance (USDA 2019), are relegated almost exclusively to western Tennessee and Kentucky and along the Alabama-Florida state line.

The EGCP includes three ecological subregions (from McNab et al. 2007):

1. Coastal Plains—Middle Section (Subregion 231B): Strongly rolling to hilly terrain with soils ranging from sands and silt to chalk and clays. Vegetation is variable and historically included oak-pine, loblolly-shortleaf pine, and oak hickory cover types.

    a. This subregion also includes the Blackland Prairie Ecoregion, a mosaic of prairie, shrubland, and forest that is named for its soil's dark, rich coloration. Prairies occurred in two distinct areas: the Black Belt, which runs in a narrow strip from east-central Mississippi to Georgia and northward in discrete fragments into Tennessee, and the smaller, more southerly Jackson Prairie Belt. Surveys from the General Land Office in the 1830s show approximately 144,000 ha of prairies occurring in the Black Belt of Alabama and Mississippi and an additional 19,500 ha in the Jackson Prairie Belt (Barone 2005a, b). Because of its historic soil fertility, the Blackland Prairie Ecoregion has undergone major, agriculture-related shifts in land use, including the growth of cotton plantations beginning in the late eighteenth century and more recent increases in wheat, corn, soybeans, peanuts, and pine plantings (Webster and Bowman 2008). These prairie belts have been reduced significantly from their pre-1830 extent (e.g., perhaps only 200 hectares of prairie remaining in Mississippi; Schotz et al. 2014) with the remnant fragments often occurring on drier or heavy clay soils less conducive to agriculture (Barone and Hill 2007). The loss of prairie and shrubland in this subregion has ramifications for numerous disturbance-dependent birds (Gilbert and Ferguson 2019).

2. Coastal Plains—Loess Section (Subregion 231H): Irregular plains and gently rolling hills with deep, fine-textured loess soils. Historic cover included oak-pine, loblolly-shortleaf pine, oak-hickory, and oak-gum-cypress forest types.

3. Gulf Coastal Plains and Flatwoods Section (Subregion 232B): Flat landscape of irregular or smooth plains on sand and clay soils. Longleaf-slash pine, loblolly-shortleaf pine, and oak-hickory forest types have historically dominated this section with oak-gum-cypress forests occurring along rivers.

Disturbance regimes are key in maintaining many vegetative communities in the EGCP. Natural and anthropogenic fire has shaped much of the EGCP's uplands and flatwoods into a pyric landscape (Stanturf et al. 2002). The EGCP also hosts a diverse array of coastal, riverine, and non-alluvial wetlands moderated by hydroperiod, soils, and relatively infrequent fire. Tornadoes, hurricanes, and ice storms also provide isolated, seasonal disturbances that reset the forest succession process (Peterson 2000).

The EGCP's climate, topography, frequent lightning strikes, and early anthropogenic management converged to sustain a pyric landscape that gave rise to the dominance of floristically diverse longleaf pine ecosystems in the Lower and Middle Coastal Plains (Van Lear et al. 2005, Frost 2006, White et al. 2016). Longleaf pine ecosystems occupied as much as 24 million ha (60 million ac) in the southeastern U.S. prior to European settlement (Outcalt and Sheffield 1996). The frequent fire regime of the Coastal

Plain was characterized by low-intensity fire occurring predominantly during the growing season at a biannual to 3-year fire return interval (Frost 2006, Huffman 2006, Stambaugh et al. 2011, White et al. 2016). The resulting vegetative composition and structure promoted fire adaptations in numerous wildlife species, including many high-profile species at risk [e.g., Gopher Tortoise (*Gopherus polyphemus*), Pine Snake (*Pituophis melanoleucus*), Bachman's Sparrow (*Peucaea aestivalis*), and Red-cockaded Woodpecker (*Picoides borealis*)].

Due to demand for longleaf pine timber and turpentine, grazing practices, clearing for row crops, and disruption of the frequent-fire regime, the extent of longleaf pine ecosystems declined to 8.1 million ha (20 million ac) by 1935 (Landers et al. 1995, Outcalt and Sheffield 1996, Frost 2006). Large-scale fire suppression continued through the 1980s until concerns about declining fire-adapted wildlife [e.g., Northern Bobwhite (*Colinus virginianus*), Wild Turkey (*Meleagris gallopavo*)] and a modernized understanding of ecosystem processes and wildfire fuel mitigation strategies led to a renewed interest in managing land with fire (Van Lear et al. 2005, Frost 2006). By this time, longleaf pine ecosystems had been reduced to less than 1.2 million ha (3 million ac), with remnants concentrated in the panhandle of Florida, southern Alabama, and the Red Hills region of southwestern Georgia (Landers et al. 1995, Outcalt and Sheffield 1996). A fragmented landscape, establishment of shade-tolerant, fire-sensitive tree species [e.g., maple (*Acer* spp.) and hickory (*Carya* spp.)], landowner practices, smoke management concerns, and cost remain obstacles to the restoration of a pyrogenic landscape (Ryan et al. 2013, Wonkka et al. 2015).

While fire shaped the EGCP's uplands and piney flatwoods, the additional influence of hydroperiod and soils defined the EGCP's various forested and non-forested coastal, riverine, and non-alluvial wetlands. Wetland hydroperiods may be derived from seasonal rainfall, riverine flooding, groundwater, or deep groundwater sources (Winger 1986), and fire can be moderately infrequent (Wade et al. 2000).

Coastal wetlands have been greatly reduced from their historical extent (Folkerts 1982, Dahl 1990, Olea and Coleman 2016). According to analysis of historical survey, aerial, and satellite data, Louisiana has lost 4,833 km—equivalent to a 25% decrease—of its coastal wetlands between 1932 and 2016 (Beck et al. 2017). Some wetland sites have seen additional drastic losses. The Central Wetlands Unit of southeastern Louisiana (part of the Mississippi Gulf River Outlet Ecosystem Restoration Study) lost virtually all of its forested wetlands by 1974 (Saltus et al. 2012). In addition to losses along the coastline, bald cypress-tupelo (*Taxodium distichum-Nyssa* spp.) forested wetlands on the Mississippi River deltaic plain are experiencing degradation at the freshwater-saltwater transition due to alterations in flooding, salinity, and subsidence (Edwards et al. 2017).

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Appendix B
Focal Species and Habitat Methodology and Background Information

Table B-1. Complete Waterbird Species List

Species	Scientific Name	Taxa Group
American Avocet	*Recurvirostra americana*	Coastal Connections
American Oystercatcher	*Haematopus palliatus*	Coastal Connections
American White Pelican	*Pelecanus erythrorhynchos*	Coastal Connections
Black Skimmer	*Rynchops niger*	Coastal Connections
Black Tern	*Chlidonias niger*	Coastal Connections
Black-bellied Plover	*Pluvialis squatarola*	Coastal Connections
Black-necked Stilt	*Himantopus mexicanus*	Coastal Connections
Bonaparte's Gull	*Chriococephalus philadelphia*	Coastal Connections
Brown Pelican	*Pelecanus occidentalis*	Coastal Connections
Caspian Tern	*Hydroprogne caspia*	Coastal Connections
Common Loon	*Gavia immer*	Coastal Connections
Common Tern	*Sterna hirundo*	Coastal Connections
Double-crested Cormorant	*Phalacrocorax auritus*	Coastal Connections
Dunlin	*Calidris alpina*	Coastal Connections
Forster's Tern	*Sterna forsteri*	Coastal Connections
Franklin's Gull	*Leucophaeus pipixcan*	Coastal Connections
Greater Yellowlegs	*Tringa melanoleuca*	Coastal Connections
Gull-billed Tern	*Gelochelidon nilotica*	Coastal Connections
Herring Gull	*Larus argentatus*	Coastal Connections
Horned Grebe	*Podiceps auritus*	Coastal Connections
Killdeer	*Charadrius vociferus*	Coastal Connections
Laughing Gull	*Leucophaeus atricilla*	Coastal Connections
Least Sandpiper	*Calidris minutilla*	Coastal Connections
Least Tern	*Sternula antillarum*	Coastal Connections

Table B-1. Complete Waterbird Species List continued

Species	Scientific Name	Taxa Group
Lesser Yellowlegs	*Tringa flavipes*	Coastal Connections
Northern Gannet	*Morus bassanus*	Coastal Connections
Piping Plover	*Charadrius melodus*	Coastal Connections
Red Knot	*Calidris canutus*	Coastal Connections
Reddish Egret	*Egretta rufescens*	Coastal Connections
Ring-billed Gull	*Larus delawarensis*	Coastal Connections
Royal Tern	*Thalasseus maximus*	Coastal Connections
Ruddy Turnstone	*Arenaria interpres*	Coastal Connections
Sanderling	*Calidris alba*	Coastal Connections
Sandwich Tern	*Thalasseus sandvicensis*	Coastal Connections
Semipalmated Plover	*Charadrius semipalmatus*	Coastal Connections
Semipalmated Sandpiper	*Calidris pusilla*	Coastal Connections
Short-billed Dowitcher	*Limnodromus griseus*	Coastal Connections
Snowy Plover	*Anarhynchus nivosus*	Coastal Connections
Spotted Sandpiper	*Actitis macularius*	Coastal Connections
Western Sandpiper	*Calidris mauri*	Coastal Connections
Whimbrel	*Numenius phaeopus*	Coastal Connections
Willet	*Tringa semipalmata*	Coastal Connections
Wilson's Plover	*Anarhynchus wilsonia*	Coastal Connections
Wilson's Snipe	*Gallinago delicata*	Coastal Connections
Anhinga	*Anhinga anhinga*	Long-legged Waders
Black-crowned Night-Heron	*Nycticorax nycticorax*	Long-legged Waders
Cattle Egret	*Bubulcus ibis*	Long-legged Waders
Glossy Ibis	*Plegadis falcinellus*	Long-legged Waders
Great Blue Heron	*Ardea herodias*	Long-legged Waders
Great Egret	*Ardea alba*	Long-legged Waders
Green Heron	*Butorides virescens*	Long-legged Waders
Limpkin	*Aramus guarauna*	Long-legged Waders
Little Blue Heron	*Egretta caerulea*	Long-legged Waders
Roseate Spoonbill	*Platalea ajaja*	Long-legged Waders
Sandhill Crane	*Antigone canadensis*	Long-legged Waders
Snowy Egret	*Egretta thula*	Long-legged Waders

Table B-1. Complete Waterbird Species List continued

Species	Scientific Name	Taxa Group
Tricolored Heron	*Egretta tricolor*	Long-legged Waders
White Ibis	*Eudocimus albus*	Long-legged Waders
White-faced Ibis	*Plegadis chihi*	Long-legged Waders
Whooping Crane	*Grus americana*	Long-legged Waders
Wood Stork	*Mycteria americana*	Long-legged Waders
Yellow-crowned Night-Heron	*Nyctanassa violacea*	Long-legged Waders
American Bittern	*Botaurus lentiginosus*	Secretive Marshbirds
American Coot	*Fulica americana*	Secretive Marshbirds
Black Rail	*Laterallus jamaicensis*	Secretive Marshbirds
Clapper Rail	*Rallus crepitans*	Secretive Marshbirds
Common Gallinule	*Gallinula galeata*	Secretive Marshbirds
King Rail	*Rallus elegans*	Secretive Marshbirds
Least Bittern	*Ixobrychus exilis*	Secretive Marshbirds
Marsh Wren	*Cistothorus palustris*	Secretive Marshbirds
Nelson's Sparrow	*Ammospiza nelsoni*	Secretive Marshbirds
Pied-billed Grebe	*Podilymbus podiceps*	Secretive Marshbirds
Purple Gallinule	*Porphyrio martinica*	Secretive Marshbirds
Seaside Sparrow	*Ammospiza maritima*	Secretive Marshbirds
Sora	*Porzana carolina*	Secretive Marshbirds
Virginia Rail	*Rallus limicola*	Secretive Marshbirds
Yellow Rail	*Coturnicops noveboracensis*	Secretive Marshbirds

Table B-2. Excluded Species

Species	Scientific Name	Reason Excluded
American Black Duck	*Anas rubripes*	Waterfowl
American Golden Plover	*Pluvialis dominica*	Not In Range / Rarely Occurs
American Wigeon	*Mareca americana*	Waterfowl
Audubon's Shearwater	*Puffinus iherminieri*	Not In Range / Rarely Occurs
Band-rumped Storm-petrel	*Hydrobates castro*	Not In Range / Rarely Occurs
Belted Kingfisher	*Megaceryle alcyon*	Common species with needs not
Bermuda Petrel	*Pterodroma cahow*	Not In Range / Rarely Occurs
Black Scoter	*Melanitta americana*	Waterfowl
Black-capped Petrel	*Pterodroma hasitata*	Not In Range / Rarely Occurs
Blue-winged Teal	*Spatula discors*	Waterfowl
Brant	*Branta bernicla*	Waterfowl
Bridled Tern	*Onychoprion anaethetus*	Not In Range / Rarely Occurs
Brown Booby	*Sula leucogaster*	Not In Range / Rarely Occurs
Brown Noddy	*Anous stolidus*	Not In Range / Rarely Occurs
Buff-breasted Sandpiper	*Calidris subruficollis*	Not In Range / Rarely Occurs
Bufflehead	*Bucephala albeola*	Waterfowl
Canada Goose	*Branta canadensis*	Waterfowl
Canvasback	*Aythya valisineria*	Waterfowl
Common Goldeneye	*Bucephala clangula*	Waterfowl
Common Merganser	*Mergus merganser*	Waterfowl
Cory's Shearwater	*Calonectris diomedea*	Not In Range / Rarely Occurs
Eared Grebe	*Podiceps nigricollis*	Not In Range / Rarely Occurs
Gadwall	*Mareca strepera*	Waterfowl
Great Black-backed Gull	*Larus marinus*	Not In Range / Rarely Occurs
Greater Scaup	*Aythya marila*	Waterfowl
Great Shearwater	*Ardenna gravis*	Not In Range / Rarely Occurs
Hooded Merganser	*Lophodytes cucullatus*	Waterfowl
Hudsonian Godwit	*Limosa haemastica*	Not In Range / Rarely Occurs
Iceland Gull	*Larus glaucoides*	Not In Range / Rarely Occurs
Lesser Black-backed Gull	*Larus fuscus*	Not In Range / Rarely Occurs
Lesser Scaup	*Aythya affinis*	Waterfowl
Little Gull	*Hydrocoloeus minutus*	Not In Range / Rarely Occurs

Table B-2. Excluded Species continued

Species	Scientific Name	Reason Excluded
Long-billed Curlew	*Numenius americanus*	Not In Range / Rarely Occurs
Magnificent Frigatebird	*Fregata magnificens*	Not In Range / Rarely Occurs
Mallard	*Anas platyrhynchos*	Waterfowl
Manx Shearwater	*Puffinus puffinus*	Not In Range / Rarely Occurs
Marbled Godwit	*Limosa fedoa*	Not In Range / Rarely Occurs
Masked Booby	*Sula dactylatra*	Not In Range / Rarely Occurs
Mottled Duck	*Anas fulvigula*	Waterfowl
Neotropic Cormorant	*Nannopterum brasilianum*	Not In Range / Rarely Occurs
Northern Pintail	*Anas acuta*	Waterfowl
Pectoral Sandpiper	*Calidris melanotos*	Not In Range / Rarely Occurs
Purple Sandpiper	*Calidris maritima*	Not In Range / Rarely Occurs
Razorbill	*Alca torda*	Not In Range / Rarely Occurs
Red Phalarope	*Phalaropus fulicarius*	Not In Range / Rarely Occurs
Red-throated Loon	*Gavia stellata*	Not In Range / Rarely Occurs
Redhead	*Aythya americana*	Waterfowl
Ring-necked Duck	*Aythya collaris*	Waterfowl
Roseate Tern	*Sterna dougallii*	Not In Range / Rarely Occurs
Saltmarsh Sparrow	*Ammospiza caudacuta*	Not In Range / Rarely Occurs
Sedge Wren	*Cistothorus stellaris*	Uses pine-savanna and maritime
Snow Goose	*Anser caerulescens*	Waterfowl
Solitary Sandpiper	*Tringa solitaria*	Not In Range / Rarely Occurs
Sooty Shearwater	*Ardenna grisea*	Not In Range / Rarely Occurs
Sooty Tern	*Onychoprion fuscatus*	Not In Range / Rarely Occurs
Stilt Sandpiper	*Calidris himantopus*	Not In Range / Rarely Occurs
Trumpeter Swan	*Cygnus buccinator*	Waterfowl
Tundra Swan	*Cygnus columbianus*	Waterfowl
Upland Sandpiper	*Bartramia longicauda*	Not In Range / Rarely Occurs
White-rumped Sandpiper	*Calidris fusciollis*	Not In Range / Rarely Occurs
White-tailed Tropicbird	*Phaethon lepturus*	Not In Range / Rarely Occurs
White-winged Scoter	*Melanitta deglandi*	Waterfowl
Wilson's Phalarope	*Phalaropus tricolor*	Not In Range / Rarely Occurs

Factors Considered When Choosing A Focal Species

1. Relatively high continental or regional conservation concern – This was determined by reviewing the Partners in Flight (PIF) Continental and Regional Conservation Scores. We also reviewed a multitude of plans (see Table 2-1 for a complete list) and added up a raw, unweighted score to determine how often species emerged as of conservation concern, i.e., a species received a point for each plan in which it was mentioned, for up to a total of 16 points.
2. Trend – North American and regional trends (if known) were considered. We examined the best data sets available, and the sources varied from species to species. For example, Breeding Bird Survey analyses might provide the most accurate trend data for one species, while state data sets might provide the best trend data for another.
3. Proportion of regional range compared to continental range – Calculated by using GAP range maps and determining what percentage fell within JV boundaries.
4. Characteristics of a wetland community type or complex of cover types important to a guild of waterbird species and that can be described by regional spatial data – First, each species was assigned to a habitat or suite of habitat types by taxa SMEs. A list of co-occurring species in each habitat was generated, and SMEs then selected a single species as appropriate to be the focal species for that habitat. Where two or more taxa groups identified species that represented a single habitat, a cross-taxa discussion occurred to determine if one focal species was appropriate and, if so, which one. Where it was inappropriate, each species remained a focal species for that habitat.
5. Factors limiting populations are relatively well understood – Taxa SMEs discussed known threats for each species and discussed which species had more information. Sources of uncertainty were also captured.
6. A population monitoring system has been or can easily be established – Where possible, taxa experts selected species with existing monitoring programs. If no species had adequate monitoring, the most easily monitored species were identified.

Formula Used to Help Rank Focal Species

The formulae used to rank species within each taxa group were similar across all three taxa groups. All three used the PIF Regional Conservation Scores (CS) for breeding species and year-round residents and the PIF Continental Conservation Score for non-breeding species (ACAD, accessed, 2023), a score based on the number of plans in which the species was represented, and the PIF Regional Trend for breeding species and year-round residents and PIF Continental Trend for non-breeding species. In addition, our Long-legged Wading Bird and Secretive Marshbird Teams used the GAP analysis to determine the proportion of estimated species habitat within the planning boundary to help determine the "amount" of responsibility the EGCPJV had for each species. The GAP analysis did not represent the coastal species well and was therefore excluded from consideration for that group. All factors in the formulae were given equal weight, and all scores were adjusted to a 0-5 scale. Thus, a species in the Coastal Connections (CC) group could hypothetically have a score from 0-15, while a species in the Long-legged Wading Bird (LLW) or Secretive Marshbird (SMB) groups could have a score from 0-20. Category and final scores are listed in the table below.

Formulae used:

1. CC: Regional CS + Plan Score + Regional Trend
    a. All non-breeding species use Continental CS and Continental Trend
2. LLW: Regional CS + Plan Score + Regional Trend + GAP proportion
3. SMB: Regional CS + Plan Score + Regional Trend + GAP proportion
    a. All non-breeding species use Continental CS and Continental Trend

Table B-3. Waterbird species with their PIF regional or continental conservation score (CS), raw plan score (i.e., the number of plans in which the species is included), PIF regional or continental trend, the proportion of estimated habitat for the species within the EGCPJV waterbird planning boundary, and the final score based on scaling each variable on a scale of 0-5 and then adding them together. The final priority species are highlighted in rose.

Coastal Connections Breeding	Regional CS	Raw Plan Score	Regional Trend	GAP Proportion	Final Score
American Oystercatcher	16	9	3	NA	10.66
Black Skimmer	*16*	12	4	NA	12.73
Black-necked Stilt	*9*	2	1	NA	4.21
Brown Pelican	*13*	10	1	NA	8.18
Caspian Tern	*12*	4	2	NA	6.76
Double-crested Cormorant	*10*	4	1	NA	5.21
Forster's Tern	*13*	7	2	NA	8.11
Gull-billed Tern	*16*	13	4	NA	13.09
Herring Gull	*11*	4	3	NA	7.48
Killdeer	*10*	1	1	NA	4.13
Laughing Gull	*11*	3	1	NA	5.13
Least Tern	*17*	14	4	NA	13.72
Royal Tern	*16*	9	3	NA	10.66
Sandwich Tern	*15*	10	4	NA	11.74
Snowy Plover	*17*	10	4	NA	12.29
Willet	*16*	5	4	NA	10.23
Wilson's Plover	*18*	10	4	NA	12.57
Coastal Connections Non-Breeding	**Continental CS**	**Raw Plan Score**	**Continental Trend**	**GAP Proportion**	**Final Score**
American Avocet	*11*	4	2	NA	7.06
American White Pelican	*10*	8	1	NA	7.78
Black Tern	*12*	8	5	NA	12.33
Black-bellied Plover	*12*	3	5	NA	9.83
Bonaparte's Gull	*9*	5	2	NA	7.00
Common Loon	*10*	5	2	NA	7.28
Common Tern	*12*	10	5	NA	13.33
Dunlin	*12*	7	5	NA	11.83
Franklin's Gull	*14*	4	5	NA	10.89

Table B-3 continued. Waterbird species with their PIF regional or continental conservation score (CS), raw plan score (i.e., the number of plans in which the species is included), PIF regional or continental trend, the proportion of estimated habitat for the species within the EGCPJV waterbird planning boundary, and the final score based on scaling each variable on a scale of 0-5 and then adding them together. The final priority species are highlighted in rose.

Greater Yellowlegs	11	2	2	NA	6.06
Horned Grebe	11	8	4	NA	11.06
Least Sandpiper	9	3	2	NA	6.00
Lesser Yellowlegs	13	6	5	NA	11.61
Northern Gannet	10	5	1	NA	6.28
Piping Plover	18	11	5	NA	15.50
Red Knot	13	10	5	NA	13.61
Ring-billed Gull	6	2	1	NA	3.67
Ruddy Turnstone	13	4	5	NA	10.61
Sanderling	12	5	5	NA	10.83
Semipalmated Plover	11	2	2	NA	6.06
Semipalmated Sandpiper	14	7	5	NA	12.39
Short-billed Dowitcher	14	7	4	NA	11.39
Spotted Sandpiper	10	3	4	NA	8.28
Western Sandpiper	12	7	3	NA	9.83
Whimbrel	13	7	5	NA	12.11
Wilson's Snipe	9	4	2	NA	6.50
Long-legged Waders Breeding	**Regional CS**	**Raw Plan Score**	**Regional Trend**	**GAP Proportion**	**Final Score**
Anhinga	11	6	2	NA	7.58
Black-crowned Night-Heron	12	9	3	0.05633	11.37
Cattle Egret	11	4	5	0.08342	11.95
Glossy Ibis	11	7	3	0.08034	10.95
Great Blue Heron	11	5	1	0.03796	7.17
Great Egret	8	8	1	0.14205	9.91
Green Heron	15	4	5	0.08701	13.29
Limpkin	14	5	5	0.20205	16.21
Little Blue Heron	14	14	5	0.13003	17.63
Reddish Egret	16	11	3	0.00071	11.95

Table B-3 continued. Waterbird species with their PIF regional or continental conservation score (CS), raw plan score (i.e., the number of plans in which the species is included), PIF regional or continental trend, the proportion of estimated habitat for the species within the EGCPJV waterbird planning boundary, and the final score based on scaling each variable on a scale of 0-5 and then adding them together. The final priority species are highlighted in rose.

Roseate Spoonbill	10	7	2	0.00000	7.63
Sandhill Crane	15	12	5	0.03441	14.83
Snowy Egret	10	9	2	0.14188	11.89
Tricolored Heron	14	8	4	0.02501	11.86
Wood Stork	12	12	1	0.13591	12.43
Yellow-crowned Night-Heron	15	10	5	0.14935	16.99
Secretive Marshbirds Breeding	**Regional CS**	**Raw Plan Score**	**Regional Trend**	**GAP Proportion**	**Final Score**
Black Rail	20	14	5	0.02519	16.73
Clapper Rail	18	9	3	0.02204	12.26
Common Gallinule	11	8	3	0.08829	10.97
King Rail	18	16	4	0.01279	15.58
Least Bittern	16	15	4	0.02960	14.92
Marsh Wren	12	6	3	0.02309	9.33
Pied-billed Grebe	13	7	4	NA	10.56
Purple Gallinule	14	9	4	0.26118	16.55
Seaside Sparrow	19	9	3	0.02230	12.58
Secretive Marshbirds Non-Breeding	**Continental CS**	**Raw Plan Score**	**Continental Trend**	**GAP Proportion**	**Final Score**
American Bittern	12	13	4	0.03339	14.50
American Coot	8	6	2	NA	6.97
Nelson's Sparrow	12	7	1	0.01735	8.47
Sora	9	7	2	0.00791	8.05
Virginia Rail	9	8	1	0.00633	7.36
Yellow Rail	15	13	3	0.11719	18.27

Habitat Evaluated

EGCPJV Communities

The communities and habitats from the EGCPJV Implementation Plan (2008) considered by the Coastal Connections and Long-Legged Wader taxa groups for inclusion as focal habitats.
* = selected LLW habitats, + = selected CC habitats, *+ = habitat that is important to both LLW and CC species

Freshwater Emergent

- Herbaceous Freshwater*
- Fresh Shrub-scrub*
- Bogs/Seepage marshes/ephemeral ponds
- Mudflats/Sandbars/shoals

Freshwater Forested

- Bottomland Hardwood*
- Cypress-Tupelo
- Bay Swamps
- Shrub-scrub*
- Beaver Ponds

Riparian

- Riparian Woodland*
- Riparian Scrub*
- Open Water

Coastal

- Maritime Shrub-scrub*
- Estuarine Marsh*+
- Beaches+
- Tidal Flats+
- Near Shore Open Water+

Landfire Land Cover Classes

Table B-4. The cover classes and umbrella groups from the Landfire vegetation cover class data set (2022) considered by the Secretive Marshbird taxa group for inclusion as focal habitats. Selected umbrella cover classes are highlighted in rose.

Umbrella Class	Landfire (Natureserve) Cover Class
Depression Pondshore	East Gulf Coastal Plain Depression Pondshore
	Southern Atlantic Coastal Plain Depression Pondshore
Dunal Community	Southeastern Coastal Plain Interdunal Wetland
	East Gulf Coastal Plain Dune and Coastal Grassland
Large Floodplain (Herbaceous)	East Gulf Coastal Plain Large River Floodplain Herbaceous
	Mississippi River High Floodplain (Bottomland) Herbaceous
	Florida River Floodplain Marsh
	South-Central Interior Large Floodplain Herbaceous
	Southern Piedmont Large Floodplain Herbaceous
Savanna	East Gulf Coastal Plain Savanna and Wet Prairie
	Southern Atlantic Coastal Plain Wet Pine Savanna and Flatwoods
Small Stream	East Gulf Coastal Plain Small Stream and River Floodplain
	South-Central Interior Small Stream and Riparian Herbaceous
Aquaculture	Eastern Warm Temperate Aquaculture
Fresh/Oligohaline Tidal	Florida Big Bend Fresh and Oligohaline Tidal Marsh
	Mississippi Delta Fresh and Oligohaline Tidal Marsh
	Mississippi Sound Fresh and Oligohaline Tidal Marsh
Salt/Brackish Tidal	Florida Big Bend Salt and Brackish Tidal Marsh
	Mississippi Sound Salt and Brackish Tidal Marsh
Large Littoral	Floridian Highlands Freshwater Marsh
Ruderal	Northern & Central Ruderal Meadow
	Southeastern Ruderal Grassland
	Southeastern Ruderal Wet Meadow & Marsh
Seepage	Southern Coastal Plain Herbaceous Seep and Bog
	Piedmont Seepage Wetland
	Southern Ridge and Valley Seepage Fen

Table B-5. 10-year habitat increases needed by species. Some species have no habitat objectives listed because they rely entirely on Nearshore Open Waters, for which no habitat objectives were set.

	Freshwater Herbaceous Emergent	Fresh Shrub-scrub	Bottomland Hardwood	Riparian Woodland	Savanna	Marine Shrub-scrub	Fresh/ Oligohaline Tidal Marsh	Salt/ Brackish Tidal Marsh	Beaches and Dunes	Tidal Flats
Current habitat in acres	111,093	17,862	1,762,281	3,725,218	91,485	6,044	26,916	119,388	20,072	9,184
American Bittern	20,830						1,682			
American Oystercatcher								12,536	602	138
Black Rail	1,944				1,601			37,607		
Black Tern										
Common Tern										
Green Heron	maintain	maintain		maintain			maintain	maintain		
Gull-billed Tern								5,969	1,004	
King Rail	15,553						6,594			
Least Bittern	9,998						4,037	7,163	602	
Least Tern								895	1,656	
Little Blue Heron	15,553	625		130,383			1,413	16,714		
Piping Plover									602	184
Purple Gallinule	maintain						maintain		maintain	
Red Knot									803	92
Reddish Egret						453		3,582	301	827
Sandhill Crane	maintain							maintain		
Seaside Sparrow								17,908		
Semipalmated Sandpiper									502	230
Snowy Plover									2,559	413
Wilson's Plover								7,163	1,505	138

Table B-5. 10-year habitat increases needed by species, continued.

	Freshwater Herbaceous Emergent	Fresh Shrub-scrub	Bottomland Hardwood	Riparian Woodland	Savanna	Marine Shrub-scrub	Fresh/ Oligohaline Tidal Marsh	Salt/ Brackish Tidal Marsh	Beaches and Dunes	Tidal Flats
Current habitat in acres	111,093	17,862	1,762,281	3,725,218	91,485	6,044	26,916	119,388	20,072	9,184
Wood Stork	27,218		123,360					8,357		
Yellow Rail	1,389				13,723		336	8,954		
Yellow-crowned Night-Heron	maintain	maintain				maintain	maintain	maintain		
MAX BY HABITAT	**27,218**	**625**	**123,360**	**130,383**	**13,723**	**453**	**6,594**	**37,607**	**2,559**	**827**

Table B-6. 30-year habitat increases needed by species. Some species have no habitat objectives listed because they rely entirely on Nearshore Open Waters, for which no habitat objectives were set.

	Freshwater Herbaceous Emergent	Fresh Shrub-scrub	Bottomland Hardwood	Riparian Woodland	Savanna	Marine Shrub-scrub	Fresh/ Oligohaline Tidal Marsh	Salt/ Brackish Tidal Marsh	Beaches and Dunes	Tidal Flats
Current habitat in acres	111,093	17,862	1,762,281	3,725,218	91,485	6,044	26,916	119,388	20,072	9,184
American Bittern	62,490						5,047			
American Oystercatcher								12,536	602	138
Black Rail	55,546				9,149			47,755		
Black Tern										
Common Tern										
Green Heron	4,444	179					807	2,388		
Gull-billed Tern								5,969	1,004	
King Rail	44,437						18,841			
Least Bittern	29,995						12,112	21,490	1,806	
Least Tern								895	1,656	

Table B-6. 30-year habitat increases needed by species, continued.

	Freshwater Herbaceous Emergent	Fresh Shrub-scrub	Bottomland Hardwood	Riparian Woodland	Savanna	Marine Shrub-scrub	Fresh/ Oligohaline Tidal Marsh	Salt/ Brackish Tidal Marsh	Beaches and Dunes	Tidal Flats
Current habitat in acres	111,093	17,862	1,762,281	3,725,218	91,485	6,044	26,916	119,388	20,072	9,184
Little Blue Heron	44,437	1,786		372,522			4,037	47,755		
Piping Plover									602	184
Purple Gallinule	7,221						1,615			
Red Knot									803	92
Reddish Egret						453		3,582	301	827
Sandhill Crane	9,998							1,194		
Seaside Sparrow								17,908		
Semipalmated Sandpiper									502	230
Snowy Plover									2,559	413
Wilson's Plover								7,163	1,505	138
Wood Stork	77,765		352,456					23,878		
Yellow Rail	4,166				41,168		1,009	26,862		
Yellow-crowned Night-Heron	2,222	357				121	807	4,776		
MAX BY HABITAT	**77,765**	**1,786**	**352,456**	**372,522**	**41,168**	**453**	**18,841**	**47,755**	**2,559**	**827**

Table B-7. Sources and citations for data used to estimate bird populations.

Species	Data Sources	Data Type(s)
American Bittern	eBird	Encounter data
American Oystercatcher	FWC Florida Shorebird Database (breeding 2019-2021, non-breeding 2019-2023)	Breeding and non-breeding population estimates
Black Rail	NOAA Firebird Project unpublished data, Heather Levy	Count data and expert opinion
Black Tern	FWC unpublished data (supplied by Raya Pruner)	Count data
Common Tern	FWC unpublished data (supplied by Raya Pruner)	Count data
Green Heron	PIF ACAD	Population estimate
Gull-billed Tern	FWC unpublished data (supplied by Raya Pruner)	Count data
King Rail	Enloe et al. 2017, Rush et al. 2019	Count data, published density estimates
Least Bittern	Enloe et al. 2017, Rush et al. 2019	Count data, published density estimates
Least Tern	FWC Florida Shorebird Database (breeding 2019-2021, supplied by Raya Pruner)	Breeding population estimate
Little Blue Heron	FWC Colony Database, Alabama DCNR, Mississippi Museum of Natural Science, Tennessee Wildlife Resources Agency – all unpublished data; eBird	Colony counts, encounter data
Piping Plover	FWC Florida Shorebird Database (non-breeding 2019-2023, supplied by Raya Pruner)	Non-breeding population estimate
Purple Gallinule	Enloe et al. 2017	Count data, published density estimates
Red Knot	FWC Florida Shorebird Database (non-breeding 2019-2023, supplied by Raya Pruner)	Non-breeding population estimate
Reddish Egret	FWC Colony Database unpublished data, Cox et al. 2019	Colony counts, population estimate
Sandhill Crane	Downs et al. 2020	Breeding population estimate
Seaside Sparrow	FWC unpublished data (supplied by Andrew Cox)	Count data, naïve density estimate
Semipalmated Sandpiper	FWC unpublished data (supplied by Raya Pruner, supplied by Raya Pruner)	Non-breeding count data
Snowy Plover	FWC Florida Shorebird Database (breeding 2019-2021, non-breeding 2019-2023, supplied by Raya Pruner)	Breeding and non-breeding population estimates
Wilson's Plover	FWC Florida Shorebird Database (breeding 2019-2021, non-breeding 2019-2023, supplied by Raya Pruner)	Breeding and non-breeding population estimates
Wood Stork	Billy Brooks (USFWS), FWC Colony Database unpublished data	Colony counts
Yellow Rail	NOAA Firebird Project unpublished data, Heather Levy	Count data and expert opinion
Yellow-crowned Night-Heron	PIF ACAD	Population estimate

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Appendix C
Members and Processes of the Waterbird Working Group

This appendix outlines the timeline and processes for the Waterbird Working Group. The first meeting of the WWG was held on March 2, 2021. Between March of 2021 and March of 2024, the full WWG met 14 times, the Coastal Connections Team met 7 times, the Long-legged Wading Bird Team met 9 times, and the Secretive Marshbird Team met 8 times. Each meeting typically lasted 1.5 hours for a cumulative total of 57 regularly scheduled meeting hours. Additional meetings with partners took place as needed. Amy Schwarzer wrote each chapter individually. Rob Holbrook edited the first drafts. Revised first drafts of each chapter were sent to the whole WWG for review. Based on WWG comments and edits, a second full draft was produced and sent to the full WWG as well as two outside reviewers for additional review. A third and final draft went through the layout and publication process.

Table C-1. All members of the Waterbird Working Group and the taxa teams they participated in. C = Coastal Connections, F = full WWG, L = Long-legged Wading Bird, and S = Secretive Marshbirds

Name	Organization	Teams
Abby Powell	Florida Cooperative Fish & Wildlife Research Unit	C, F, L
Amy Schwarzer	Florida Fish & Wildlife Conservation Commission	All
Anne Mini	Lower Mississippi Valley Joint Venture	F, L
David Hanni	Tennessee Wildlife Resources Agency	F, S
Eric Soehren	Alabama Department of Conservation and Natural Resources	F, S
Jeff Gleason	USFWS Migratory Birds	All
Jennifer Manis	National Park Service	C, F
Kristine Evans	Mississippi State University	All
Lianne Koczur	Alabama Audubon	F, L
Mark Woodrey	Mississippi State University	F, S
Raya Pruner	Florida Fish & Wildlife Conservation Commission	C, F
Rob Dobbs	Louisiana Dept of Wildlife & Fisheries	F
Rob Holbrook	EGCPJV	All
Ron Bielefeld	Florida Fish & Wildlife Conservation Commission	F, L
Sammy King	Louisiana Cooperative Fish & Wildlife Research Unit	F, S

Key decision and progress points

- Exclusion of waterfowl from the waterbird plan (3/2/21)
- Need for taxa specific teams and recruitment of experts with knowledge of specific species and groups (3/2/21) and to meet concurrently as the various teams worked on the same steps of the plan rather than sequentially (3/30/21)
- Decision to focus on only breeding/resident birds for the Long-legged Wading Bird Team (9/27/21)
- Decision to include Big Bend as part of the planning area (11/12/21)
- WWG decided to use different scoring system from Landbird Plan – left plans unweighted (unlike Landbird Plan which gives more weight to national and SWAP plans than other plans) (12/7/21)
- Reviewed various land cover sources and decided to use Landfire Existing Vegetation data supplemented with Florida Cooperative Land Cover data (2/23/22)
- Adopted focal species approach and decided to rank both breeding and non-breeding birds, though some flexibility for doing so left up to taxa teams – see previous decision by Long-legged Wading Bird Team to only look at resident species (3/28/22)
- Decided to use ACAD regional conservation score and population trend score, along with proportion of possible habitat from GAP analysis and raw plan score to help rank possible priority species (3/28/22)
- Secretive Marshbird team chose to use finer scale habitat classifications than Coastal Connections and Long-legged Wading Bird Teams (5/25/22)
- Taxa teams assigned species to various habitat associations (August-October 2022)
- Adopted 10- and 30-year timeframes for bird population goals (1/18/23)
- WWG approved method to extrapolate habitat goals from population goals based on habitat association percentages (2/15/23)
- WWG agreed that coastal goals are limited by climate change issues (specifically sea level rise) and decide to incorporate that explicitly into the plan (2/15/23)
- Population data gathered from multiple sources and population/habitat goals calculated (March-July 2023)