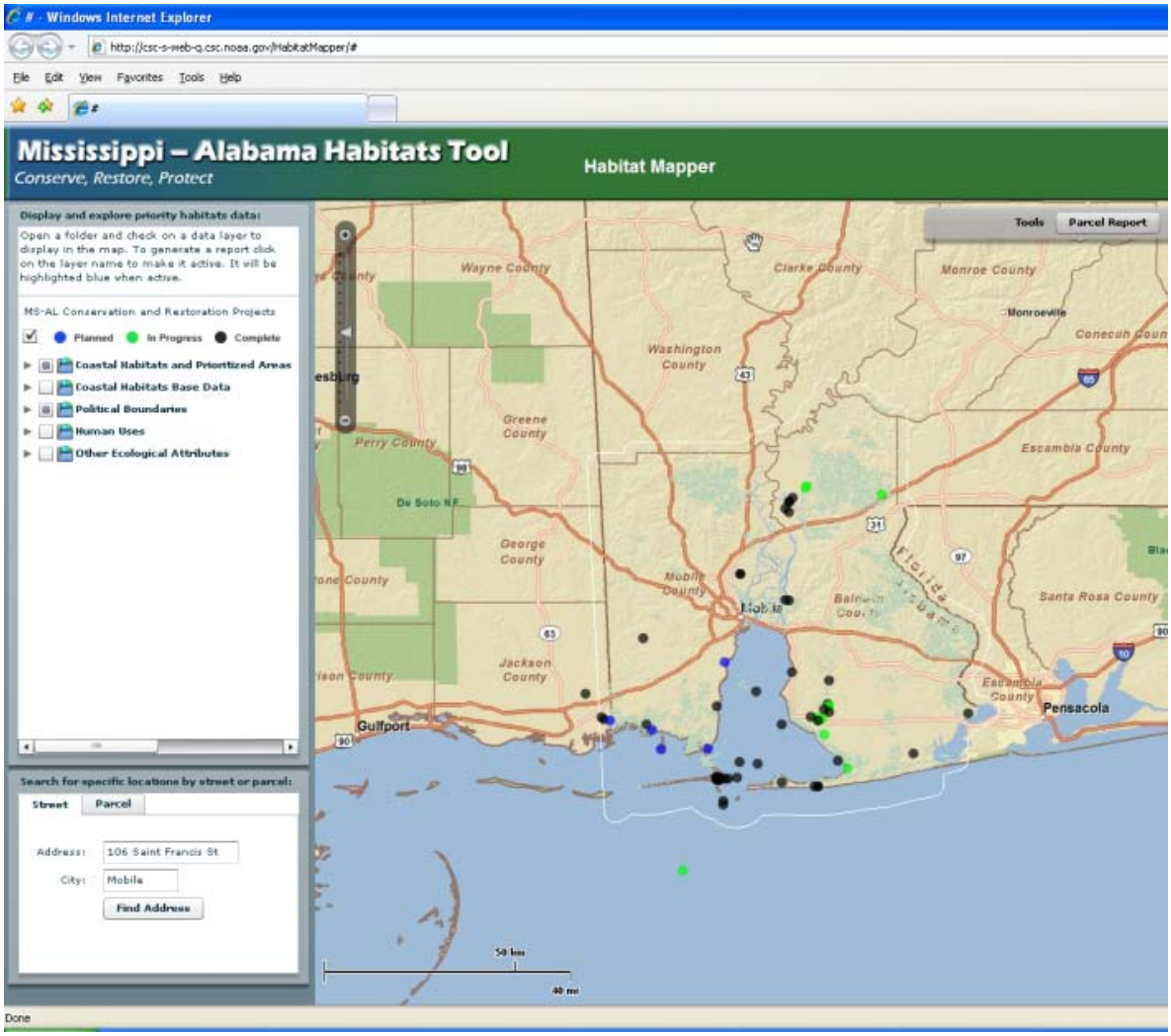
PRIORITIZATION GUIDE FOR COASTAL HABITAT PROTECTION AND RESTORATION IN MOBILE AND BALDWIN COUNTIES, ALABAMA



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Prepared by The Nature Conservancy in collaboration with the National Oceanic and Atmospheric Administration and the Mobile Bay National Estuary Program

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I. INTRODUCTION

The *Prioritization Guide for Coastal Habitat Protection in Mobile and Baldwin Counties, Alabama* (the "Guide") has been developed throughout 2008-2009 as part of a collaborative project undertaken by the Mobile Bay National Estuary Program (MBNEP), The Coastal Habitats Coordinating Team (CHCT), The Nature Conservancy (TNC), and the Coastal Services Center (CSC) and Office of Habitat Conservation (OHC) of the National Oceanic and Atmospheric Administration (NOAA). The project team has worked with federal, state and local entities to expand, improve and update the 2004-2005 Mobile Bay acquisition and restoration plan, *Conserving Alabama's Coastal Habitats: Acquisition and Restoration Priorities for Mobile and Baldwin Counties*.

In April 2002, the MBNEP established an objective in its Comprehensive Conservation Management Plan (CCMP) to "provide optimum fish and wildlife habitat in the Mobile Bay system by effectively preserving, restoring, and managing resources to maintain adequate extent, diversity, distribution, connectivity and natural functions of all habitat types."

The CCMP highlighted many high-quality coastal habitats within the Mobile Bay National Estuary that were not under protective management. Threats to these habitats are associated with human population growth and include habitat destruction, degradation, fragmentation, water quantity and quality impacts, invasion by non-native species and the suppression of natural ecological processes such as periodic fire. Habitat destruction and change have also recently resulted from the impacts of two of the most destructive hurricanes to strike the United States (Ivan in 2004 and Katrina in 2005). Direct effects of these storms on sensitive habitat and the secondary impacts resulting from recovery and rebuilding efforts must also be considered when seeking to maintain and preserve the sensitive coastal ecology. In response to these concerns, the CCMP included the following habitat management subobjective:

> *Protect, enhance, restore and manage valuable public lands and work with private property owners to accomplish habitat protection goals on important, privately held lands, including the acquisition of 15 additional high priority sites by 2009 through purchase or through other instruments, such as easements.*

This subobjective spurred the CHCT to create this *Prioritization Guide for Coastal Habitat Protection and Restoration in Mobile and Baldwin Counties, Alabama.*

The Guide, among other things, prioritizes specific marine and coastal habitats for protection. Digital spatial data was analyzed through ArcGIS 9.3x, and the analysis process was managed through a spatial data tool called the Habitat Priority Planner (HPP). The Guide is a companion to the Alabama Habitat Mapper, developed as part of the Mobile Bay acquisition and restoration plan. The Habitat Mapper allows users to view prioritized habitats and parcel information based on the needs of users. The Guide includes habitat descriptions, protection options, information regarding the Habitat Mapper, as well as identification of management and maintenance needs of the spatial data over the long term. In addition, the Guide documents the process used to prioritize habitats and provides a review of the project rationale, stakeholder engagement, and data-analysis process used during the course of this project.

II. PURPOSE OF THE GUIDE

This Guide was developed for those engaged in land-use and habitat management decisions in Mobile and Baldwin counties, Alabama. It identifies and prioritizes habitats for protection and restoration as well as provides directions on how to obtain more refined results from the Habitat Mapper.

III. HOW TO USE THE GUIDE

The Guide is to be used in conjunction with the Habitat Mapper to gather extended project detail. Habitats prioritized in the Guide should be considered as good candidates for new and continuing protection activities. Countywide depictions of prioritized habitats in the Guide can be used as a first step in targeting parcels of interest, which can be identified through the Habitat Mapper.

1.0 HABITAT PROTECTION PRIORITIZATION PROCESS

1.1 RATIONALE FOR PROJECT

In 2006, the Mobile Bay National Estuary Program joined with The Nature Conservancy to assess habitats for conservation based on quality of or contributions to ecosystems, stresses to those systems, sources of the stresses, strategies to abate those sources and successful measurement of biodiversity health and threat abatement. This effort resulted in the creation of,

Conserving Alabama's Coastal Habitats: Acquisition and Restoration Priorities for Mobile and Baldwin Counties, commonly called the "Atlas." The Atlas identified 17 priority acquisition sites (or other conservation options) and more than 30 other sites and habitat types where restoration or enhancement were considered viable and necessary. *Conserving Alabama's Coastal Habitats: Acquisition and Restoration Priorities for Mobile and Baldwin Counties* was produced for use by governments and other community organizations to more effectively guide resource management activities in coastal Alabama.

One of the major drawbacks of the original Atlas was the lack of a geospatial, or interactive, component (that is, something more than hard-copy topographic maps). The need for an interactive component was identified in initial discussions when beginning the process of updating the Atlas. The newly developed Habitat Mapper fills that role, creating a more robust and dynamic tool for use by all conservation stakeholders in coastal Alabama. It is hoped that the Habitat Mapper will inform stakeholders' decision making as they plan conservation activities in coastal Alabama and Mississippi. In addition, the Habitat Mapper will provide access to and display of projects in the existing Mississippi-Alabama Conservation and Restoration Projects Database. This database includes conservation activities of various stakeholders in coastal Alabama and Mississippi.

The primary goal of the 2009 project update has been to provide new information and mapping tools to support conservation planning and implementation of the habitat management goals of the Mobile Bay National Estuary Program and its partners. Additional goals include approaching the planning in a manner that informs (1) the Gulf of Mexico Alliance's (GOMA) Ecosystem Integration and Assessment Priorities, and (2) the ongoing, long-range development planning activities being led by the Mobile Chamber of Commerce with support from Michael Gallis and Associates (the approach being used by the chamber explicitly considers environmental systems alongside the economic, transportation, built infrastructure, and other systems). All of these efforts offer an opportunity to make ecosystem-based protection and restoration an integral part of the community's and region's broader development plans.

The current project builds upon previous efforts and includes the following:

- a revised analysis and prioritization process incorporating updated and additional habitat data that were not previously available, as well as consideration of additional habitat stressors;

- an update of the MBNEP's *Acquisition and Restoration Priorities Plan for Mobile and Baldwin Counties, Alabama*; and
- creation of the Habitat Mapper, which has been tailored by the Mobile Bay National Estuary Program and its partners for use in guiding local and regional habitat protection.

1.2 COOPERATING ENTITIES AND ROLES

The NOAA-Coastal Services Center is working with The Nature Conservancy and the NOAA-Office of Habitat Conservation to conduct on-the-ground conservation projects. The current project has been a collaborative effort including partnerships with the Mobile Bay National Estuaries Program and the Coastal Habitats Coordinating Team (CHCT), a stakeholder group that includes more than 60 state and local representatives concerned with habitat management and protection in coastal Alabama. The CHCT, established in 2004 and organized by the Mobile Bay National Estuary Program, was the primary body that developed the original restoration and acquisition plan.

A core group of representatives composed of staff from national, regional and local agencies and organizations including Mobile Bay National Estuary Program, The Nature Conservancy, NOAA-Coastal Services Center, NOAA-Office of Habitat Conservation, NOAA-National Marine Fisheries Service (NMFS), Alabama Department of Conservation and Natural Resources (ADCNR)-State Lands Division, and Geological Survey of Alabama (GSA) make up the Mobile Bay Project Team, which has been responsible for leading the efforts of this project.

The Mobile Bay Project Team members and their geographical affiliation are as follows:

- Local: Roberta Swann (MBNEP), Carl Ferraro (ADCNR), Steve Jones (GSA), and Mary Austill Lott (TNC).
- Regional: Georgia Pearson (TNC), Keith Tassin (TNC), Mark Thompson (South East NMFS), and Tina Sanchez (CSC).
- National: Lauren Long (CSC), Chrissa Stroh (CSC), Danielle Bamford (CSC), Nancy Cofer-Shabica (CSC), Kara Meckley (OHC), and Jay Udelhoven (TNC).

1.3 STAKEHOLDER OUTREACH AND ENGAGEMENT

The Mobile Bay Project Team collaborated with the Coastal Habitats Coordination Team at a series of CHCT stakeholder meetings and through follow-up stakeholder communications. Three CHCT meetings were held in December 2008, April 2009, and January 2010. Several

online presentations, organized by the NOAA-Coastal Services Center, were held to review data and receive input on the Habitat Priority Planner analyses and development of the Habitat Mapper. Members of the CHCT were involved in HPP training, provided by NOAA-Coastal Services Center staff, in order to build local technical capacity for future analysis.

1.4 HABITAT IDENTIFICATION AND PRIORITIZATION

As part of the first meeting in December 2008, the CHCT developed and agreed upon 10 focal habitat types, which were based on similar habitats described in the original Atlas. In addition, the first two CHCT meetings focused on developing prioritization selection criteria for each of the 10 habitat types. These selection criteria were used in the spatial analysis to prioritize habitats for conservation and restoration.

The focal habitat types include 10 distinct ecological systems:

- freshwater wetlands,
- riparian buffers,
- longleaf pine,
- pine savannah,
- maritime forest,
- intertidal marshes and flats,
- beaches and dunes,
- submerged aquatic vegetation,
- oyster reefs, and
- rivers and streams.

1.5 PRIORITIZATION TOOL IDENTIFICATION

During this project, the project team utilized digital spatial data (which depicts natural features, habitats, species and supporting elements) to identify the location of important habitats in need of protection. The project team also evaluated multiple geospatial tools to determine which one would best meet the needs of this project. Also considered were the technical capacity and availability of the project team members, the technical capacity of users and the need to prioritize habitat types for protection at a county and tax parcel scale.

The project team ultimately chose a tool created by the NOAA-Coastal Services Center—the Habitat Priority Planner (HPP)—to help prioritize habitats for protection. The tool, which was

designed with the local planner, coastal conservation group, and coastal manager in mind, assists users in prioritizing important areas in the landscape or seascape for conservation or restoration. What makes this tool special is the ease with which the prioritization scenarios can be displayed and changed, making it especially useful for groups. HPP was successfully used by the project team to conduct habitat analysis and prioritization, and the results of the team's work are available through the Habitat Mapper. Additional information on the HPP can be found at http://www.csc.noaa.gov/digitalcoast/tools/hpp/index.html.

NOAA-Coastal Services Center staff not only guided the habitat prioritization process for the Mobile Bay project, but also provided multiple training opportunities for local stakeholders with Geographic Information Systems (GIS) capabilities. With this training, area GIS resource managers will be able to rerun the HPP analyses in the future when new data becomes available and when goals change.

1.6 DATA GATHERING

Throughout the initial stages of the project, needed data sources were identified based on the 10 focal habitat types, and staff from The Nature Conservancy and the NOAA-Coastal Services Center worked to compile the data from local sources. As a result of this effort, several data gaps were identified. Some desired data sets simply do not exist, while other data sets are out of date or need improvement.

Data gaps have been identified for

- threatened and endangered species, including state species of concern;
- high-resolution salinity regimes;
- armored shorelines; and
- habitat change, among others.

Data updates or improvements are needed for

- protected lands and acquisition boundaries,
- construction control lines that do not extend to the edge of the two county boundaries,
- inshore and offshore sediment,
- bay oysters (only data on commercial or public reefs are available), and
- submerged aquatic vegetation (SAV)

1.7 SELECTION CRITERIA

As part of the first two Coastal Habitats Coordinating Team (CHCT) meetings in December 2008 and April 2009, participants engaged in discussions to develop selection criteria for each focal habitat type. Participants were provided with a set of standardized metrics that could be analyzed for locating the most critical habitat patches for protection in the study area. Selection criteria discussed by breakout groups included

- size of habitat,
- core area,
- perimeter–to-area ratio,
- proximity to other habitat patches,
- nearest neighboring habitat patch,
- distance to areas already protected,
- coincidence with ecologically important areas,
- threatened and endangered species,
- potential migration area, and
- new criteria.

The groups determined whether the criteria were important for each focal habitat type and, if so, what measures or scales should be used for each criterion. The selection criteria developed for each focal habitat type and agreed upon by the CHCT are summarized below. A detailed methodology, describing the step-by-step GIS analysis using HPP, was developed by NOAA staff and is available from the MBNEP.

1.8 ANALYSIS/PRIORITIZATION

After the first CHCT meeting in December 2008, NOAA-Coastal Services Center project team members used the spatial data and the habitat selection criteria to run the first round of Habitat Priority Planner analyses to identify potential prioritized areas, or habitat patches. A subsequent online presentation for partners was held to view the results in preparation for the next CHCT meeting. The results were presented to the CHCT during the April meeting, where input was received. NOAA-Coastal Services Center Project Team members, using feedback from the meeting, ran a second round of HPP analyses with support from The Nature Conservancy. Additional online presentations were held to show the CHCT results of the second HPP analyses. Feedback during the presentations was incorporated into the final round of Habitat

Priority Planner analyses. The NOAA-Coastal Services Center compiled a summary of the feedback, and final map layouts of the HPP results were created. The team created digital layers of the final prioritized habitats and included this information with other critical data sets for display within the Habitat Mapper.

1.9 HABITAT MAPPER DEVELOPMENT

One goal of the Habitat Mapper has been to make the GIS analysis and prioritization results readily accessible for non-GIS users, allowing them to spatially identify habitats in Mobile and Baldwin counties prioritized for protection. The Habitat Mapper delivers the priority habitat information in a format that is interactive, adaptive, useful and engaging. The NOAA-Coastal Services Center led the development of the Habitat Mapper. During development, the project team surveyed partners to assess the needs and technical capacity of the Coastal Habitats Coordinating Team. The NOAA-Coastal Services Center presented examples of technology options for Habitat Mapper to partners. In addition, the NOAA-Coastal Services Center coordinated and led a Habitat Mapper work group, including several partners and CHCT members, that met to discuss survey results and tool functionality. As a result of work group and CHCT input, the NOAA-Coastal Services Center was able to develop an interactive online tool that is dynamic and user friendly and will allow users to enhance conservation planning in coastal communities.

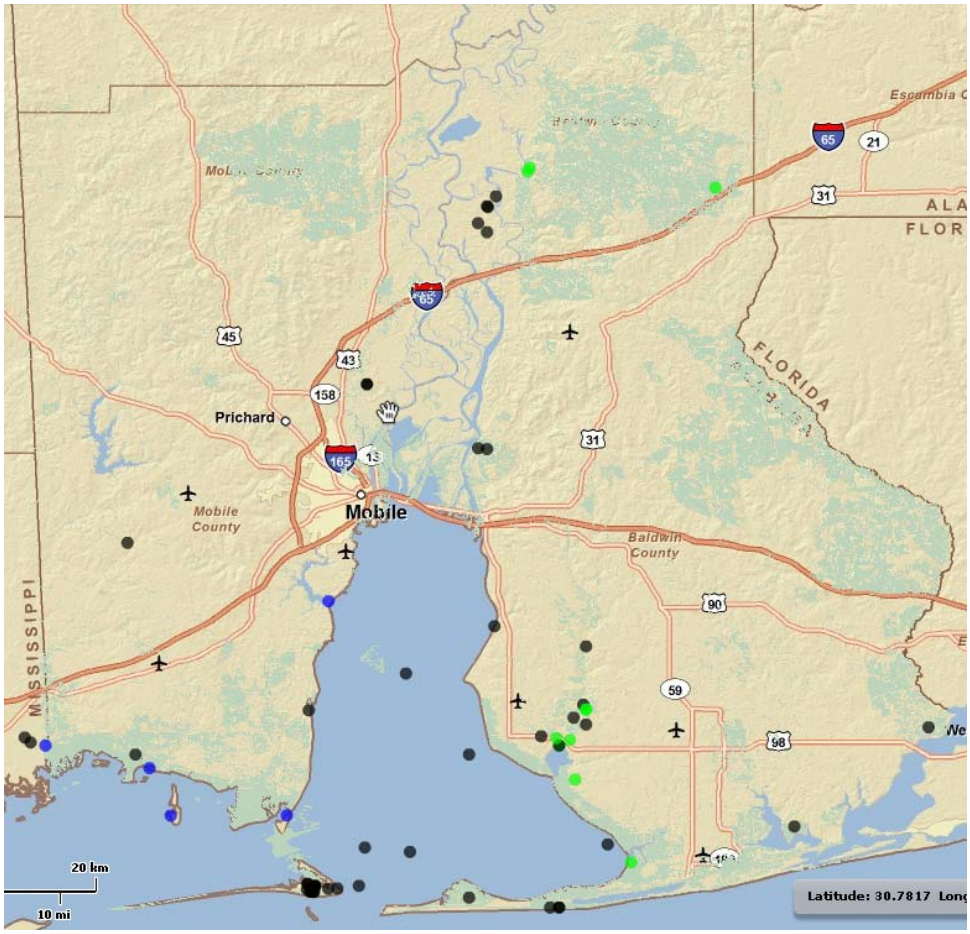
Users of Habitat Mapper include at least two groups:

- nontechnical users who simply want to access the priority habitats and locate important places to protect. This majority group of users will not need GIS skills—only the ability to access the Internet, utilize the Habitat Mapper, interpret mapping results and apply these results to their protection efforts.
- technical users who may want to update data and take part in running new analyses. These users will need to understand how to run HPP, and they are invited and encouraged to work with the MBNEP to help ensure results evolve and are adaptive over time, as well as ensure the long-term effectiveness of the project for local and regional users.

2.0 HABITATS PRIORITIZED FOR PROTECTION

Mobile and Baldwin counties, located in the southern part of the state, are the only coastal counties in Alabama. The counties are characterized by a diversity of habitats, including two prominent aquatic features: Mobile Bay and the Mobile-Tensaw River Delta.

Figure 1: Mobile and Baldwin Counties



2.1 RIPARIAN BUFFERS

For data analysis purposes, riparian buffer habitat includes a 30-meter buffer on either side of a waterway that is categorized as intact (unaltered natural habitat), impaired (able to be restored to natural vegetation), or developed (permanently altered). This buffer includes all ecological systems defined by the Alabama Gap Analysis Project (GAP). See the Southeast Gap Analysis Project Web site for descriptions of these systems (http://www.basic.ncsu.edu/segap/).

While discussing how best to prioritize riparian buffers, the CHCT considered the following for data analysis criteria:

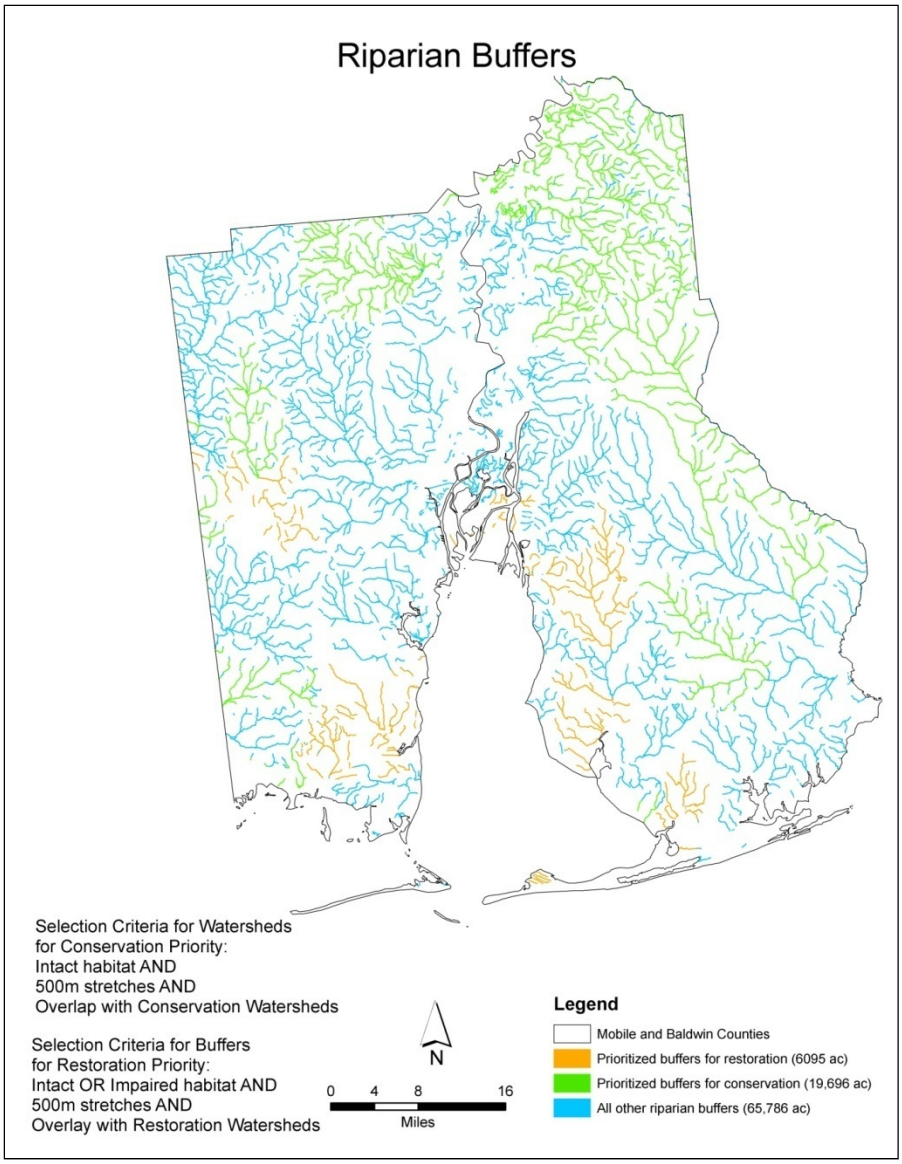
- Priority riparian buffer habitat should have both a conservation and restoration track.
- For both tracks, a 30-meter buffer area on either side of streams and rivers was identified as the focus area.
- For the conservation track, the most important component of stream buffers was to have intact vegetation to prevent erosion, sedimentation, and warmer water temperatures. Intact vegetation includes all classes of the GAP land cover data that are naturally vegetated. The CHCT wanted to identify long stretches of this intact habitat (which is 500 meters long), as well as identify 30-meter buffer areas associated with watersheds identified as priorities for conservation.
- For the restoration track, the CHCT sought intact or impaired 30-meter buffer areas at least 500 meters long. These riparian buffer habitats should be associated with watersheds identified as priorities for restoration.
- Additional data sets identified as important for using alongside the prioritized riparian buffers in the Habitat Mapper include currently protected lands and impaired streams.

The final selection criteria for prioritization of Riparian Buffers for Conservation includes buffers (30 meters long) that contain 500 meter stretches of intact habitat and 50 percent or more overlap with the Prioritized Watersheds for River and Stream Conservation data layer.

The final selection criteria for prioritization of Riparian Buffers for Restoration includes buffers (30 meters long) that contain 500 meter stretches of intact or impaired habitat and 50 percent or more overlap with the Prioritized Watersheds for River and Stream Restoration data layer.

A results data layer and map were produced for prioritized riparian buffers (see Figure 2). The results of this analysis have been included in the Habitat Mapper.

Figure 2: Prioritized Riparian Buffers



2.2 FRESHWATER WETLANDS

This habitat type encompasses several wetland categories, including blackwater river floodplain forests, freshwater tidal swamps, small stream and river floodplains, large river floodplains, nonriverine cypress dome and basin swamps, and nonriverine freshwater wetlands.

Blackwater river floodplain forests occur only along certain river and stream drainages of Alabama, and their distinctive dark color and high acidity are due to concentrations of tannins, particulates, and other materials derived from drainage through swamps or marshes.

Freshwater tidal wooded swamps are characterized by tidally flooded portions of river floodplains that flow into the northern Gulf of Mexico, east of the Mississippi River. Large outflows of fresh water keep salinity levels at a minimum, and flooding is of short enough duration to allow survival of tree canopies.

The small stream and river floodplains are a predominantly forested system of the East Gulf Coastal Plain associated with small brownwater rivers and creeks. Unlike large river floodplains, there is less obvious vegetational zonation in small stream and river floodplains.

Large river floodplains in the East Gulf Coastal Plain of Alabama are associated with large rivers such as the Alabama and Tombigbee, both of which drain into the Gulf of Mexico. Some of the major geomorphic features associated with different community types of the floodplain include natural levees, point bars, meander scrolls, oxbows and sloughs.

Nonriverine basin swamps occupy large, seasonally inundated basins with peaty substrates in the southern and outermost portions of the Coastal Plain of the southeastern United States. These basins do not receive overbank flooding.

Hydric hammocks are also nonriverine and occupy flat lowlands along the southern and outermost portions of the Coastal Plain of the southeastern United States, usually over limestone substrates (NatureServe, 2009).

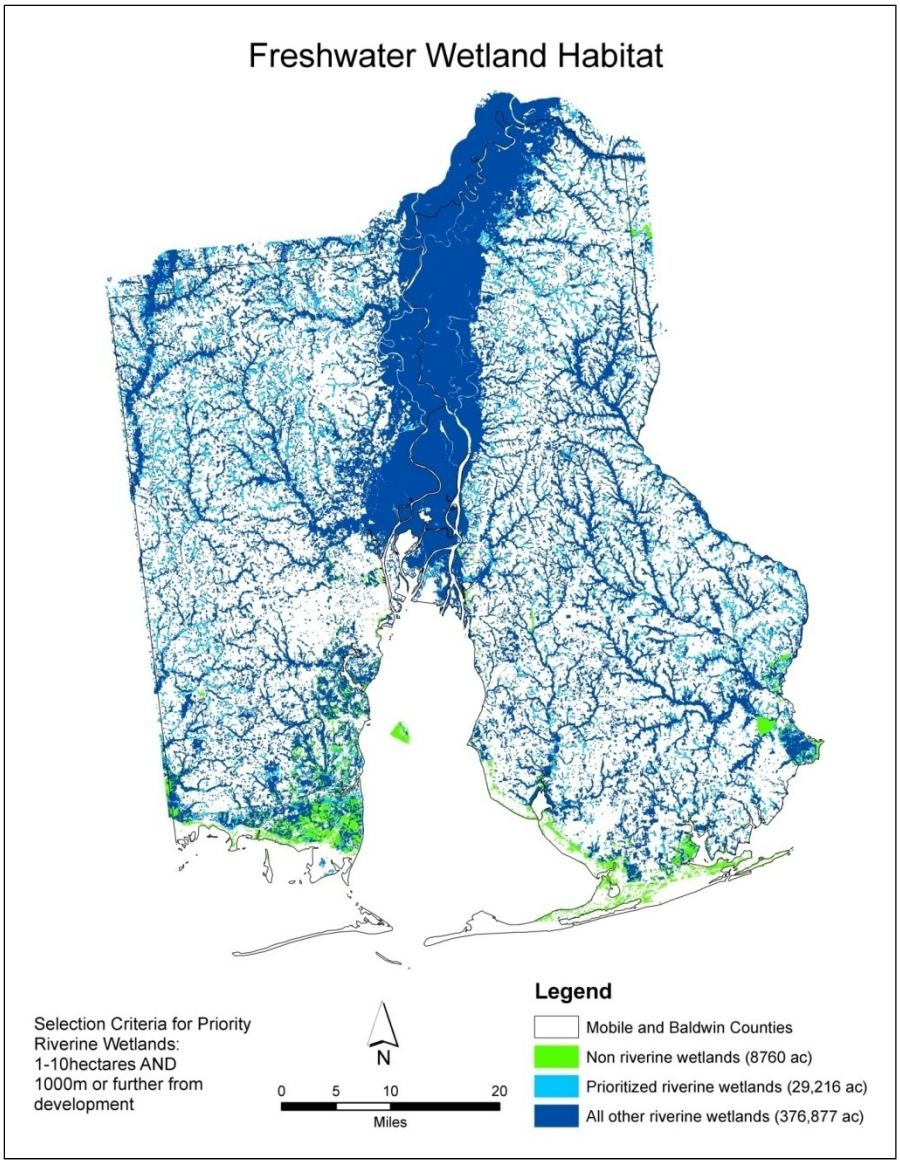
For data analysis purposes, riverine freshwater wetlands include ecological systems defined by the Alabama Gap Analysis Project as Southern Coastal Plain blackwater river floodplain forest and East Gulf Coastal Plain tidal wooded swamp, small stream and river floodplain forest, and large river floodplain forest (herbaceous and forest modifiers). Nonriverine freshwater wetlands include ecological systems defined by the Alabama Gap Analysis Project as Southern Coastal Plain nonriverine cypress dome and basin swamp. Nonriverine freshwater wetlands were not used in the analysis because all nonriverine freshwater wetlands are considered priority habitats.

While discussing how best to prioritize freshwater wetlands, the CHCT considered the following for data analysis criteria:

- Isolate nonriverine freshwater wetlands. These include treeless savannah and wet prairie, cypress domes, and basin swamps. Many of these habitats are small and isolated, and if they were analyzed among larger, more dominant riverine classes, they would have been eliminated. Use a simple classification with these habitats, effectively lumping them together into a single habitat type: nonriverine freshwater wetlands.
- Perform a unique classification on the remaining riverine freshwater wetlands. This includes floodplain forests and tidal swamps. The unique classification allows each wetland type to be preserved individually.
- Highlight riverine wetlands from 1 to 10 hectares. Because many of the very large patches of this habitat are already protected, the focus was shifted to smaller habitats. Based on the scale of the base data (30 meters), 1 hectare was the minimum appropriate size to consider.
- Choose freshwater riverine wetlands at least 1 kilometer from developed areas. These should be the healthiest habitats to conserve.
- Do not include boat ramps and marinas or TNC priority areas in analysis. They could help make decisions about which habitats to choose for a project but should not be used for analysis.

The final selection criteria for prioritization of freshwater wetlands included all riverine freshwater wetlands from 1 to 10 hectares in area and greater than 1,000 meters from medium- or high-intensity developed areas. A results data layer and map were produced for prioritized freshwater wetlands (see Figure 3). The results of this analysis are included in the Habitat Mapper.

Figure 3: Prioritized Freshwater Wetlands



2.3 LONGLEAF PINE

The longleaf pine forests of Mobile and Baldwin counties are found atop the rolling, dissected uplands of the East Gulf Coastal Plain. These forests are inland of the Coastal Flatlands and extend landward into the Upper East Gulf Coastal Plain. The characteristic species is *Pinus palustris* (longleaf pine), although many stands may support only relictual individuals—following a long history of exploitation, harvest, and stand conversion, primarily to *Pinus taeda* (loblolly pine). Under natural conditions, fire is believed to have been frequent enough to limit development of intolerant species of hardwoods. Species specific to this habitat type that are

federally listed as threatened or endangered include the *Drymarchon couperi* (eastern indigo snake) and *Picoides borealis* (red-cockaded woodpecker) (NatureServe, 2009).

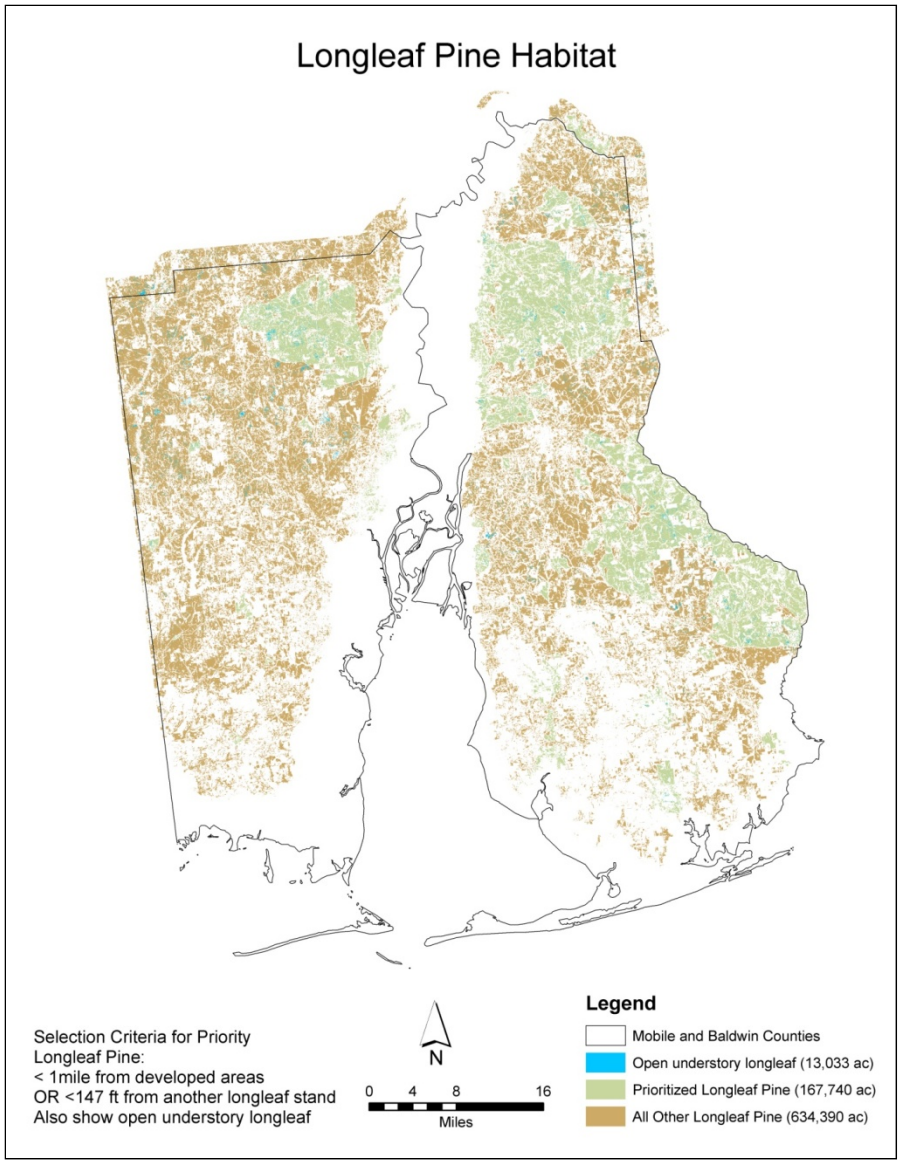
For data analysis purposes, longleaf pine habitat includes ecological systems defined by the Alabama GAP Analysis Project as East Gulf Coastal Plain interior upland longleaf pine woodland (loblolly, offsite hardwood, and open understory modifiers)—including the East Gulf Coastal Plain interior upland longleaf pine woodland (open understory modifier).

While discussing how best to prioritize longleaf pine, the CHCT considered the following for data analysis criteria:

- Isolate longleaf pine habitat with open understory. All of this classic longleaf pine habitat is considered priority. Other longleaf pine habitat identified in the GAP data may contain mixed hardwoods or mixed pine.
- Include patches 1 mile or less from protected areas or 147 feet or less from a like habitat.
- Of the mixed longleaf habitat, identify habitat within 1 mile of currently protected lands, to expand these lands in the future and for the purposes of fire management. In addition, locate mixed longleaf pine habitat 150 feet or less from other longleaf habitat.

The final selection criteria for prioritization of Longleaf Pine included patches 1 mile or less from protected areas or 147 feet or less from a like habitat. All longleaf pine open understory was considered priority habitat and was not included in the prioritization analysis. A results data layer and map were produced for prioritized longleaf pine (see Figure 4). The results of this analysis are included in the Habitat Mapper.

Figure 4: Prioritized Longleaf Pine



2.4 PINE SAVANNAH

Pine savannah habitat of Alabama may be considered a lush grassland (Kindell et al., 1997), grass-sedge savannah (Clewell, 1981), wet prairie (FNAI, 1990), or wet savanna (Collins et al., 2001). As implied by these names, this system consists of primarily herbaceous vegetation with relatively thick cover of grass and sedge species. Examples occupy low, flat plains on poorly drained soils, often saturated for 50 to 100 days per year. Frequent fires, including growing-season burns, are essential for maintenance of this system (NatureServe, 2009).

For data analysis purposes, pine savannah habitat includes ecological systems defined by the Alabama GAP Analysis Project as East Gulf Coastal Plain near-coast pine flatwoods (offsite hardwood and open understory modifiers), Successional shrub/scrub (clear cut), successional shrub/scrub (other), and East Gulf Coastal Plain treeless savanna and wet prairie.

While discussing how best to prioritize pine savannah, the CHCT considered the following for data analysis criteria:

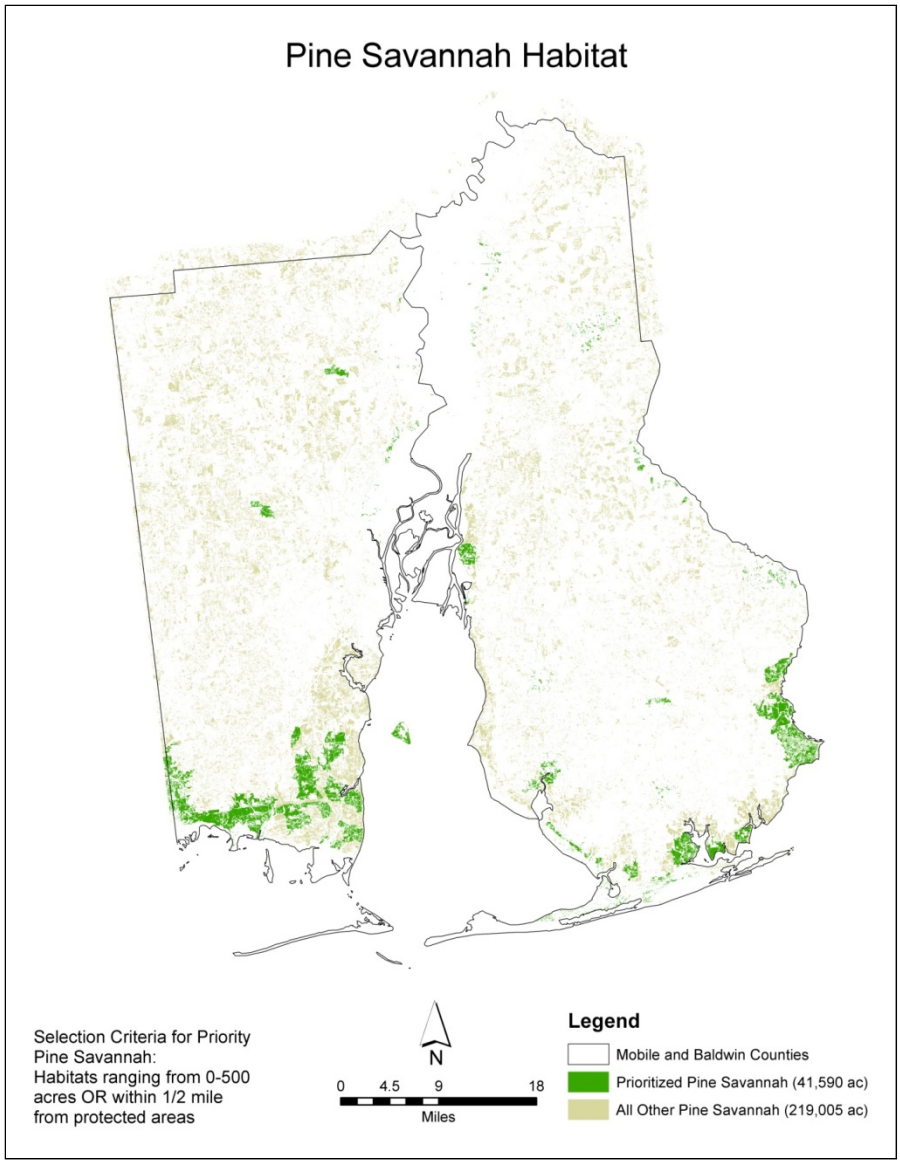
- Include patches of pine savannah that are larger than 500 acres.
- Include patches of pine savannah close to currently protected lands.

The final selection criteria for prioritization of Pine Savannah habitat included patches 500 acres or more in size or 1/2 mile or less from a protected area.

Patches of pine savannah close to known occurrences of G1 or G2 species would give good indication that this was at some point good habitat for these species. However, because the digital data showing G1 and G2 species was determined to be too sensitive for this study, it was not included.

A results data layer and map were produced for prioritized pine savannah (see Figure 5). The results of this analysis are included in the Habitat Mapper.

Figure 5: Prioritized Pine Savannah



2.5 MARITIME FOREST

Maritime forest habitat encompasses a mosaic of woody vegetation present on barrier islands and near-coastal strands. These forests and shrub lands are found in somewhat more protected environments than dune and coastal grassland habitat. Such areas include relatively stabilized coastal dunes, sometimes with a substantial shell component. Vegetation structure and composition are influenced by salt spray, extreme disturbance events, and the distinctive climate of the immediate coast. Stands may be dominated by a variety of needle-leaved and

broad-leaved evergreen trees. The most heavily salt-influenced examples may appear pruned or sculpted (NatureServe, 2009).

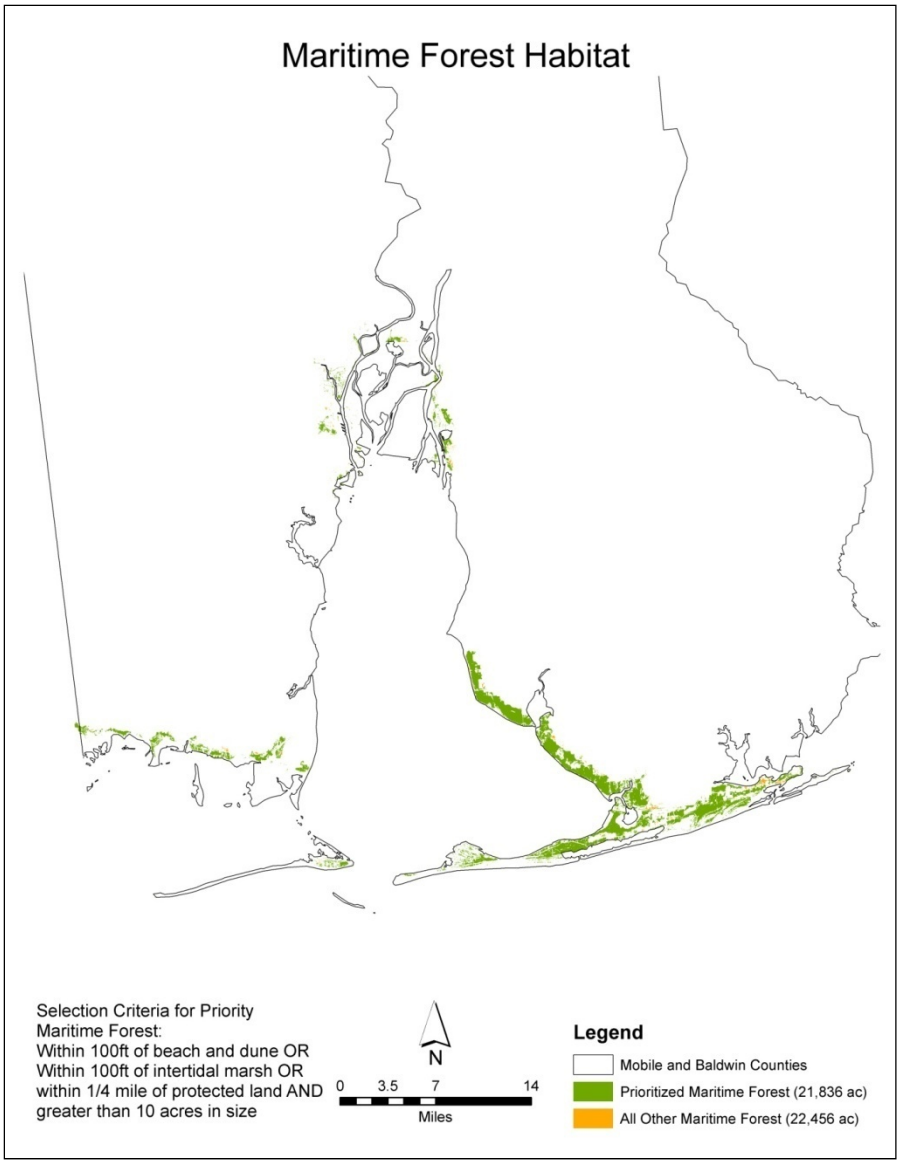
For data analysis purposes, maritime forest includes East Gulf Coastal Plain maritime forest, as defined by the Alabama Gap Analysis Project.

While discussing how best to prioritize maritime forest, the CHCT considered the following for data analysis criteria:

- Include maritime forest adjacent to beach and dune.
- Include maritime forest adjacent to marsh.
- Include maritime forest ≤ one-fourth mile of a protected area.
- Include maritime forest ≥ 10 acres.

The final selection criteria for prioritization of maritime forest included patches adjacent to beach and dune, adjacent to marsh, or one-fourth mile or less from a protected area and 10 acres or larger. A results data layer and map were produced for prioritized maritime forest (see Figure 6). The results of this analysis are included in the Habitat Mapper.

Figure 6: Prioritized Maritime Forest



2.6 INTERTIDAL MARSHES AND FLATS

Intertidal marshes and flats include salt and brackish tidal marshes of southern Alabama. These marshes are typically associated with mud-bottomed bays behind barrier islands. Wind-dominated tides and low tidal fluctuations (less than 1 meter) characterize this habitat. This system includes predominately brackish marshes and supports what is probably the largest zone of *Juncus roemerianus* (black needlerush) in the Atlantic and Gulf Coastal Plain outside of the North Carolina/Virginia Embayed Region estuarine marshes (NatureServe, 2009).

For data analysis purposes, intertidal marshes and flats includes Mississippi Sound Salt and Brackish Tidal Marsh, as defined by the Alabama Gap Analysis Project.

While discussing how best to prioritize intertidal marshes and flats, the CHCT considered the following for data analysis criteria:

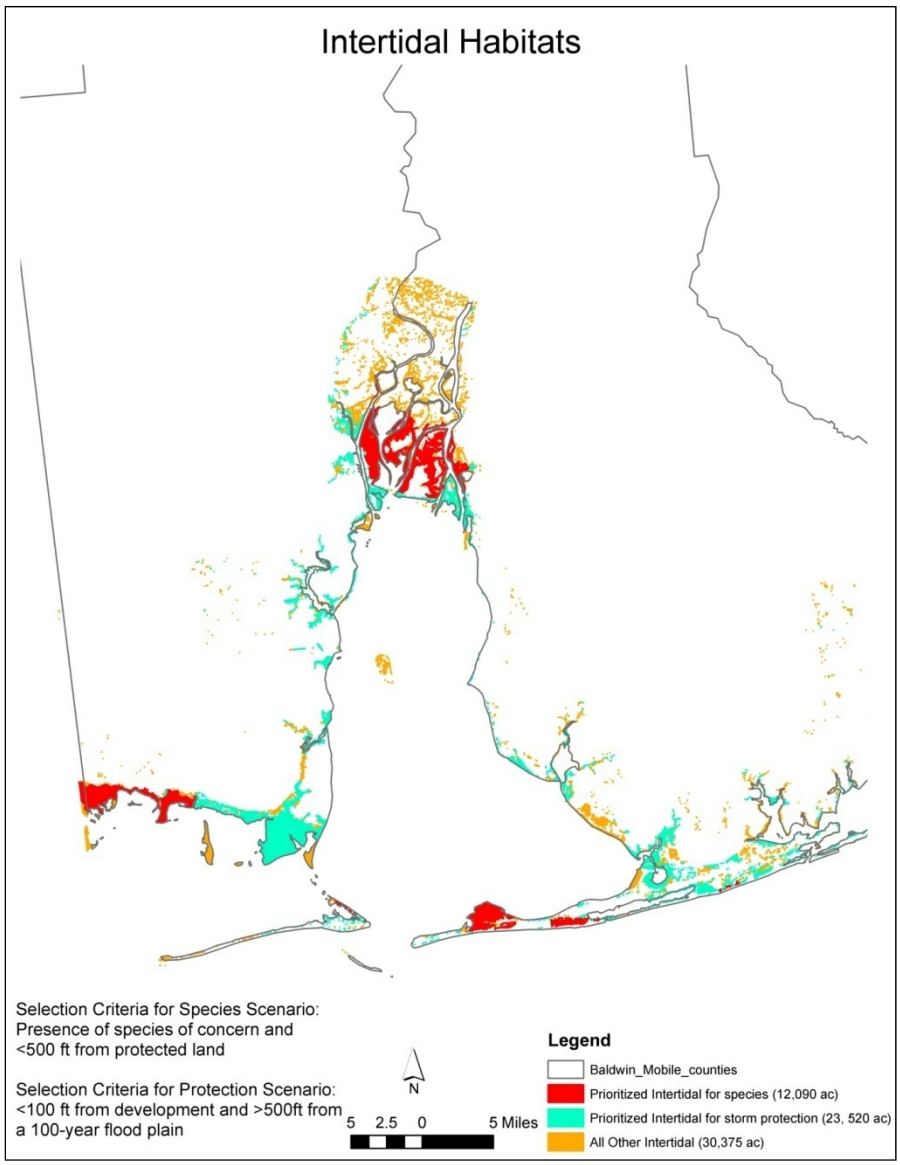
- Focus separately on two important aspects of salt marshes—protection from storms and habitat for important species.
- For the hazard protection track (protection from storms), locate salt marsh close to developed areas, acting as a buffer for flooding and storm surge. Locate salt marsh within 500 feet from the Federal Emergency Management Agency's 100-year floodplain.
- For the species habitat track, identify marsh within 100 feet from species of concern (beach mouse, sea turtle, oysters, and SAV) and close to protected areas in hopes of expanding the acres of protected areas in the future.
- Make available through the Habitat Mapper individual data sets representing species of concern for users to view alongside the prioritized habitats.

The final selection criteria for prioritization of intertidal marshes and flats habitat for hazard protection include patches 30 meters or less from developed areas and 500 feet or less from the 100-year flood zone.

The final selection criteria for prioritization of intertidal marshes and flats habitat for natural resource conservation include patches containing species of concern (Alabama beach mouse, sea turtles, submerged aquatic vegetation, and oysters) and that are 500 feet or less from a protected area.

A results data layer and map were produced for prioritized intertidal marshes and flats (see Figure 7). The results of this analysis are included in the Habitat Mapper.

Figure 7: Prioritized Intertidal Marshes and Flats



2.7 BEACHES AND DUNES

The panhandle beach system ranges from northwestern Florida (Ochlockonee River) to southeastern Mississippi. It includes the outermost zone of coastal vegetation extending seaward from foredunes. The vegetation consists largely of herbaceous and embedded shrub lands on barrier islands and other near-coastal areas where salt spray, saltwater overwash, and sand movement are important ecological forces (Myers et al., 1991)

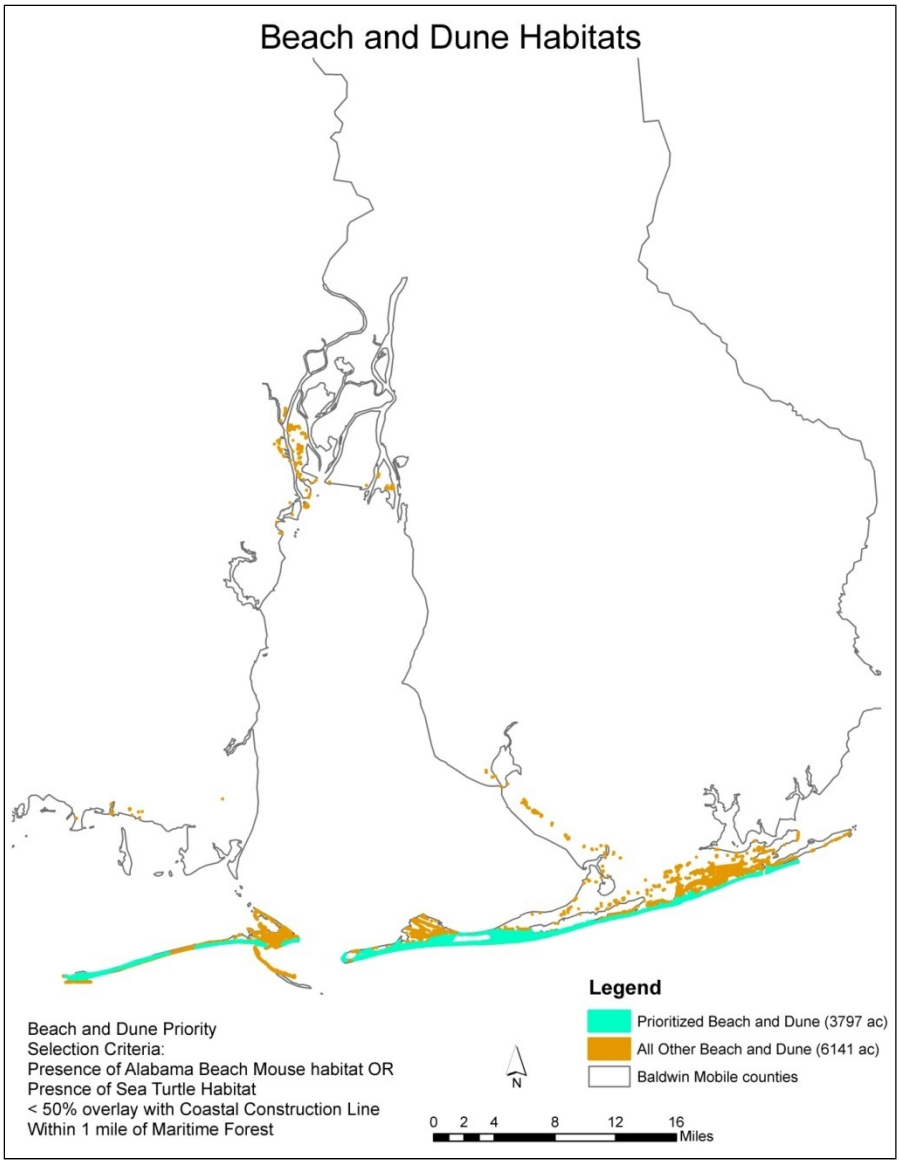
For data analysis purposes, beaches and dunes habitat includes ecological systems defined by the Alabama Gap Analysis Project as East Gulf Coastal Plain dune/coastal grassland, Florida panhandle beach vegetation, and unconsolidated shore.

While discussing how best to prioritize beaches and dunes, the CHCT considered the following for data analysis criteria:

- Identify beaches and dunes habitat adjacent to maritime forest to ensure the stability of the beach and dunes habitat.
- Locate beaches and dunes habitat at least partially beyond construction control lines. Beaches and dunes within these lines are already protected by state regulations.
- Focus on beaches and dunes habitat identified as suitable for species of concern, specifically the Alabama beach mouse, and nesting areas for sea turtles.

The final selection criteria for prioritization of beaches and dunes habitat include patches containing Alabama beach mouse habitat or sea turtle nesting sites that overlap 50 percent or less with construction control lines and are 1 mile or less from maritime forest. A results data layer and map were produced for prioritized beaches and dunes (see Figure 8). The results of this analysis are included in the Habitat Mapper.

Figure 8: Prioritized Beaches and Dunes



2.8 SUBMERGED AQUATIC VEGETATION

Submerged aquatic vegetation (SAV) beds are found behind protective barrier islands and in nearshore areas ranging within about 560 kilometers (350 miles) from the panhandle of Florida (approximately St. Marks National Wildlife Refuge, Lighthouse Point) westward to Mississippi. Within this area, the drowned alluvial plain and barriers protect the sea-grass beds from normal storm surges; such protection is absent in the region immediately to the east. However, such protection alone is insufficient to allow for development of expansive beds. The total acreage of

submerged vegetation in this region is relatively small, and individual patches rarely exceed several thousand acres (NatureServe, 2009).

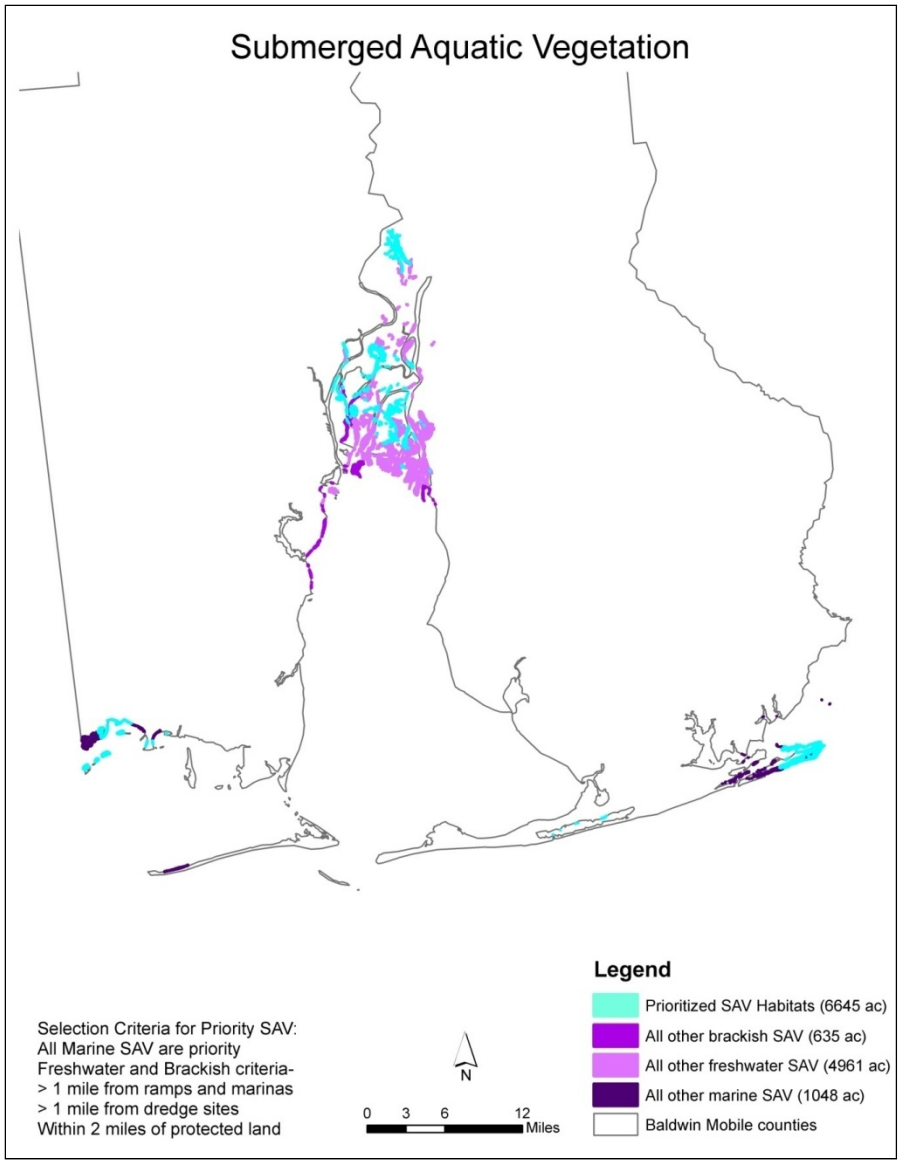
For data analysis purposes, submerged aquatic vegetation includes marine, brackish, and freshwater submerged aquatic vegetation. Marine SAV includes *Halodule wrightii* and *Thalassia testudinum.* Brackish SAV includes *Ruppia maritima* and *Vallisneria neotropicalis*. Freshwater SAV includes all other species of SAV not listed in marine and brackish.

While discussing how best to prioritize submerged aquatic vegetation, the CHCT considered the following for data analysis criteria:

- Marine, freshwater, brackish, and invasive SAV should be parsed out and viewable separately in the Habitat Mapper. Bathymetry should also be available through the Habitat Mapper to help users identify areas of appropriate depth for SAV growth (< 2 m).
- Since there is so little marine SAV, all of this habitat should be considered priority. Analyses should only be performed on brackish and freshwater SAV.
- Locate SAV at least 1 mile from dredge areas and boat ramps and marinas. Habitat closer than 1 mile may be negatively impacted by activities in these areas. Identify SAV within 2 miles of protected areas, in hopes of expanding these areas and locating healthy populations of SAV.

The final selection criteria for prioritization of submerged aquatic vegetation include patches of brackish and fresh SAV 1 mile or less from boat ramps and marinas and 1 mile or more from dredge locations and 2 miles or less from protected areas. Marine SAV was not included in the analysis because all marine SAV is considered priority habitat. The criteria also included invasive submerged aquatic vegetation that includes *Myriophyllum spicatum* and *Hydrilla verticillata.* A results data layer and map were produced for prioritized SAV (see Figure 9). The results of this analysis are included in the Habitat Mapper.

Figure 9: Prioritized Submerged Aquatic Vegetation



2.9 OYSTER REEFS

Oysters reefs, primarily *Crassostrea virginica*, are found along inshore coastal habitats. Predominant habitats include estuaries (especially near mouths of rivers) in areas less than 10 meters deep with firm substrates such as mud or shell bottoms. Spawning occurs in estuarine areas, and planktonic larvae require a firm substrate for further development. Adult oysters are concentrated mainly in inshore areas along the Gulf Coast. Low and varying salinity limits predation on oysters. Oysters are fairly rare in areas of high salinity, in large part because of predation by offshore species and incidence of certain diseases of oysters related to high

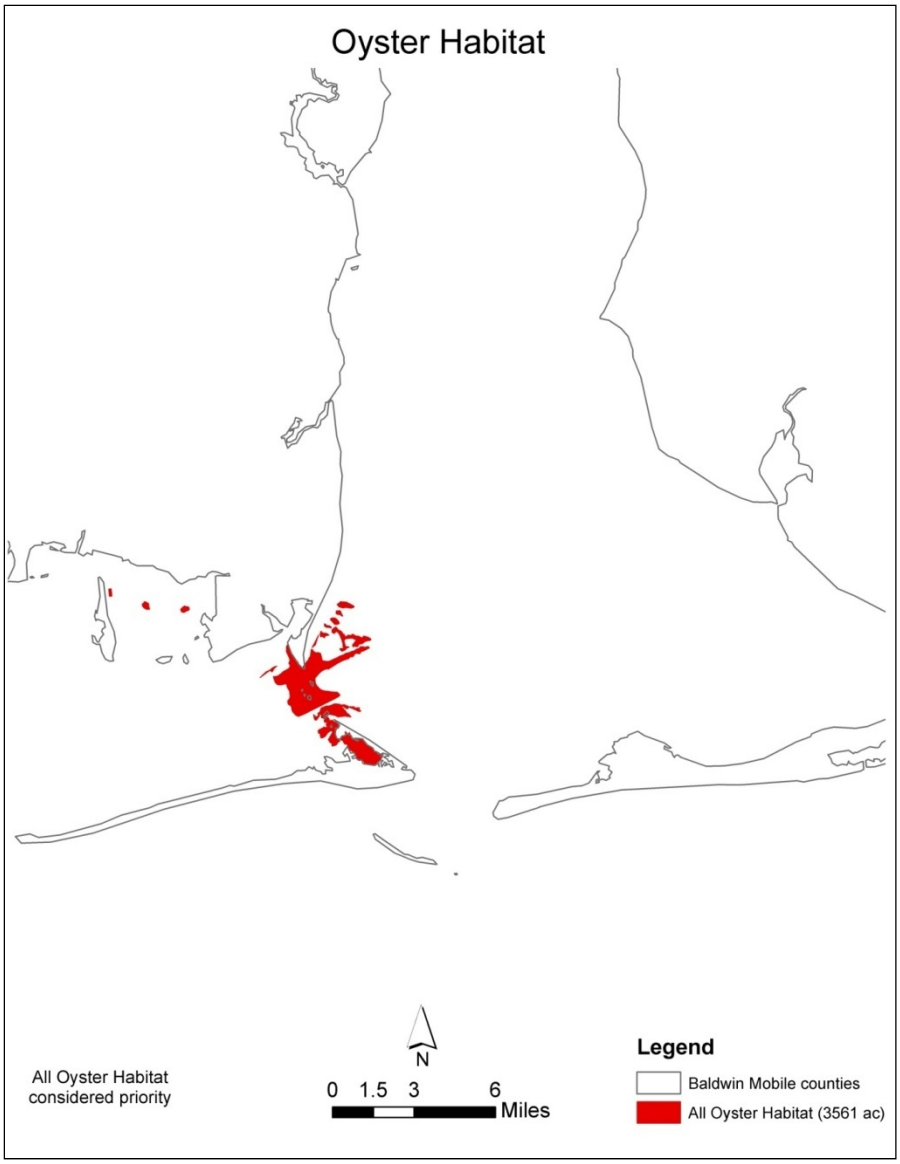
salinities and chronic stress due to pollution. Thus, freshwater runoff not only provides food for oysters, but also allows relief from predation and disease (Myers et al., 1991).

While discussing how best to prioritize Oyster Reefs, the CHCT considered the following for data analysis criteria:

- Very little data on oyster habitat is available; therefore, all oyster habitat should be considered priority.
- To assist users, the Habitat Mapper should contain bathymetry to find areas of the ideal depth for oyster growth (3 to 4 meters), a sediment file to locate appropriate substrate for oysters (hard surfaces), and developed areas. Oyster reefs near developed areas may offer filtration to the runoff there, but may be less healthy than oyster beds further from development.

The data included in the Habitat Mapper represents 2001 and 1995 oyster delineations, as well as historical oyster delineations from 1968. A data layer and map were produced for prioritized Oyster Reefs (see Figure 10). The results of this analysis are included in the Habitat Mapper.

Figure 10: Prioritized Oyster Reefs



2.10 WATERSHEDS

For data analysis purposes, 12-digit hydrologic unit code (HUC) watersheds were used to assess opportunities for river and stream conservation and restoration.

While discussing how best to prioritize Watersheds, the CHCT considered the following for data analysis criteria:

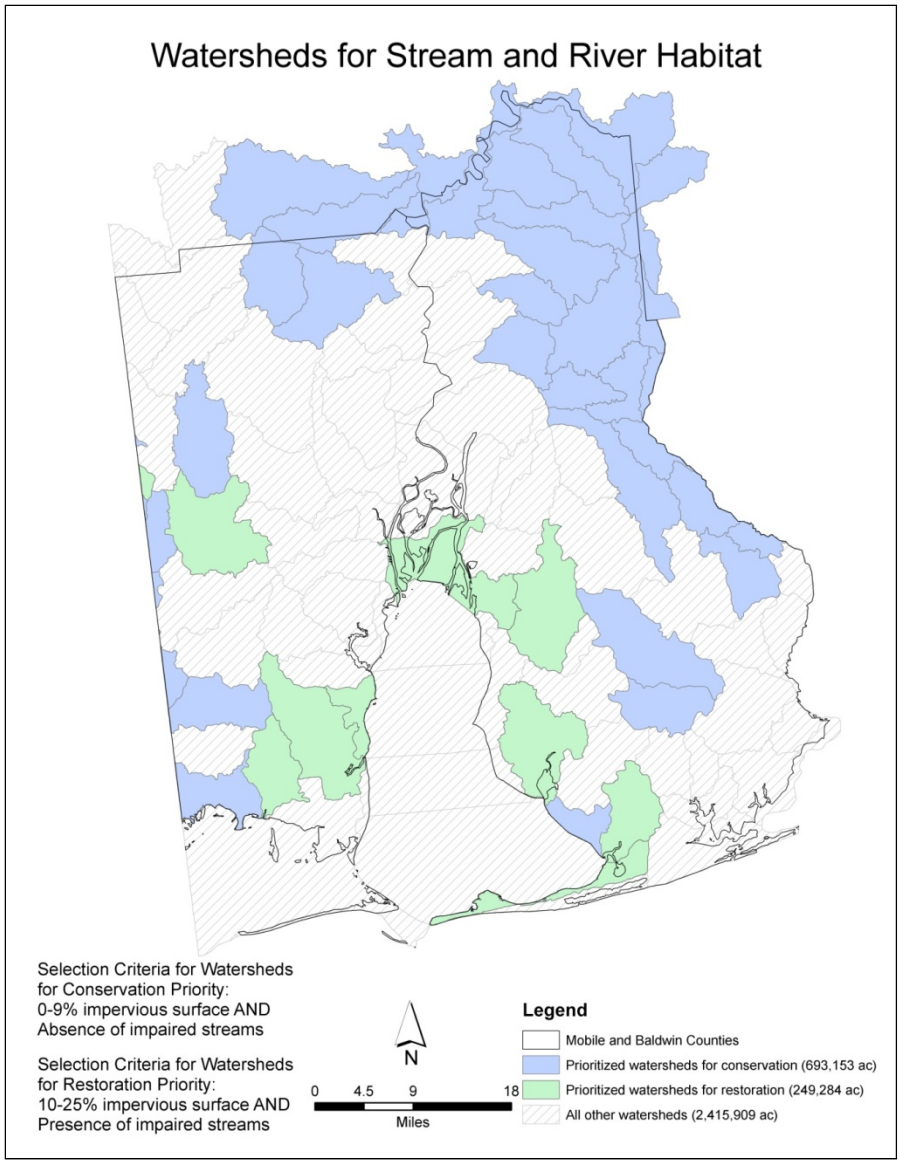
- Use watersheds as a proxy to locate priority streams for habitat protection and restoration. Conditions within the entire watershed impact the health of a stream. Use the 12-digit HUC watershed, a commonly used delineation.
- Look at watershed priorities in two ways: for conservation and restoration.
- For the conservation track, a low impervious surface (0 to 9 percent) throughout the watershed was an important way to identify healthy habitat, translating to healthy streams and rivers. In addition, locate watersheds that do not contain any EPA-identified impaired streams.
- For the restoration track, locate watersheds containing a moderate amount of impervious surface (10 to 25 percent). It is generally accepted that this quantity of impervious surface in a watershed begins to have a negative impact on streams and rivers. Also, identify watersheds that contain impaired streams.
- Additional data sets identified as useful for decision making, but too narrowing for analysis purposes, include location of dams, wellhead protection areas, TNC priority areas, and drinking-water supply sites. These data sets should be available through the Habitat Mapper to examine alongside prioritized habitats.

The final selection criteria for prioritization of Watersheds for River and Stream Conservation include 12-digit HUC watersheds containing less than 10 percent impervious surface and no impaired streams.

The final selection criteria for prioritization of Watersheds for River and Stream Restoration include 12-digit HUC watersheds containing 10 to 25 percent impervious surface and impaired streams.

A results data layer and map were produced for prioritized Watersheds (see Figure 11). The results of this analysis are included in the Habitat Mapper.

Figure 11: Prioritized Watersheds



3.0 ACCESSING THE PRIORITIES

To access the prioritized habitats, visit the Mobile Bay National Estuary Program's Habitat Mapper (http://habitats.disl.org). From there, you not only can access the prioritized habitats, but also can update conservation and restoration projects and view ancillary resources such as parcel data and bathymetry.

4.0 REPORTING OPTIONS

The Habitat Mapper allows users to create reports that can help when planning for conservation or restoration projects. For example, reports can be generated—and saved as PDF documents—containing parcel acreage, prioritized habitat patch type and size, associated prioritized habitats, adjacent protected lands and other information.

5.0 PROTECTION OPTIONS

Many options exist to protect habitat, including proprietary actions, public education and awareness, statutory and regulatory mechanisms, capacity building, and scientific inquiries (see Table 1). When evaluating these options, entities should consider several factors, such as the sensitivity of habitats, the severity of threats, applicable laws and regulations, receptivity of landowners, resource managers and users, availability of funding, and capacity of the entities involved.

Two critical factors to consider are the level of protection provided by the strategy and the certainty that the protection will remain in place over the long term. In general, proprietary actions tend to provide the highest levels of protection with the greatest amount of certainty. Statutory and regulatory mechanisms can also provide high levels of protection when implemented and enforced appropriately, but these mechanisms can change with new political representatives and administrations. Public education and awareness, as well as public agency capacity building, can provide moderate levels of protection, depending on the threats involved. Lastly, while scientific inquiries are important and necessary, by themselves they often do not provide direct long-term protection to habitats. In short, protecting habitat over the long term often requires cooperation between landowners, governments and nonprofit organizations committed to resource protection.

Table 1: Habitat Protection Options

Proprietary Actions
Acquisitions—equipment, boats
Acquisitions—harvest quotas
Acquisitions—fee-simple (terrestrial or submerged land) purchases, exchanges, gifts
Acquisitions—less-than fee-simple (terrestrial or submerged and) purchases, exchanges, gifts

Certifications—sustainable harvest
Partnerships—Memorandum of Understanding/Memorandum of Agreement
Use authorizations—long term (leases, easements, concessions, licenses, assents)
Use authorizations—short term (licenses, rights-of-entry)
Withdrawals from use
Statutory and Regulatory Mechanisms
Marine protected areas
Ocean zoning
Regulatory cleanup/restoration
Regulatory prohibitions
Regulatory permitting and restrictions
Regulatory wetland mitigation
Tax incentives
Public Education and Awareness
Advocacy
Awareness and communications
Formal education
Training
Public Agency Capacity Building
Funding
Staffing
Training
Scientific Inquiries
Monitoring
Research

6.0 MAINTENANCE AND UPDATE OF HABITAT DATA

6.1 MANAGER OF HABITAT MAPPER

The Alabama Habitat Mapper is a product of the MBNEP; it will be housed and maintained by the Dauphin Island Sea Lab, working in conjunction with the MBNEP. For questions or comments, please contact the Mobile Bay National Estuary Program.

Mobile Bay National Estuary Program
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6.2 PROPOSED TIMELINE FOR HABITAT MAPPER UPDATES

The NOAA-Coastal Services Center is providing training on the Habitat Priority Planner to appropriate members of the CHCT. The CHCT and the MBNEP will receive instructions on how the original GIS analyses were performed and how to update the Habitat Mapper. The aim of the training is to build local capacity, so geospatial analyses can be updated as new GIS data is collected and conservation priorities shift. It will be the responsibility of the Mobile Bay National Estuary Program to initiate and oversee regular updating of the tool. It's been proposed that updates occur every two years. The NOAA-Coastal Services Center is also working to build technical capacity in order to promote a long-term local investment in the tool.

6.3 ROLE OF STAKEHOLDERS IN THE UPDATE OF HABITAT DATA

In order to ensure maximum effectiveness of the Habitat Mapper, it is important that CHCT stakeholders take an active role in updating habitat data.

The role of stakeholders may include

- making the Mobile Bay National Estuary Program aware of, or providing the program with, new data (as identified in data gaps) that can be used in future analysis, and
- making the Mobile Bay National Estuary Program aware of, or providing the program with, updated data sets included in the original analysis.

6.4 UPDATING PROTECTION AND RESTORATION PROJECTS

The Habitat Mapper will be tied with the Mississippi/Alabama Habitat Database to improve the process of entering and reviewing protection and restoration project data into the database. In addition to providing a much-needed spatial component to the database, the Habitat Mapper will allow users to access information of projects being conducted by other entities, as well as projects outside the two-county habitat prioritization area.

Stakeholders are encouraged to input information into the database on new conservation and restoration projects, as well as use the database to become informed about other relevant and ongoing conservation projects that may enhance their decision making. The Mississippi/Alabama Project Database can be found at http://restoration.disl.org/www/.

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