Panhandle Longleaf Pine Large-scale Conservation Area

&

Gulf Coastal Plain Ecosystem Partnership

Conservation Action Plan

Summary Report – October 2007

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CONSERVATION ACTION PLAN

October 2007

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The Nature Conservancy's mission is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

To decide where we work and what we do, the Conservancy uses a systematic process called Conservation by Design. Using the best possible science, we identify those areas within each ecological region that must be protected to ensure that the representative diversity of that ecoregion will be adequately preserved. Once a portfolio of high priority conservation areas has been selected through this process of ecoregional planning, we identify the most important strategic actions needed to protect selected conservation targets (species, natural communities, and ecological systems) within a functional landscape by enhancing their viability or abating critical threats. The Conservancy employs a well-tested science-based approach called Conservation Action Planning (a.k.a., the 5-S Framework) for developing and implementing these strategies at priority sites. This document summarizes the Conservation Action Plan for the Panhandle Longleaf Pine Large-scale Conservation Area and the Gulf Coastal Plain Ecosystem Partnership (PLLP LCA / GCPEP).

PROJECT DESCRIPTIONS / OVERVIEW / BACKGROUND

Panhandle Longleaf Pine Large-scale Conservation Area

The Florida Panhandle has some of the largest longleaf pine forests in the world. Here, towering over thousands of acres of wiregrass can be found trees that are hundreds of years old, remnants of a once vast longleaf pine forest that covered more than 60-million acres of the southeastern coastal plain from Virginia to Texas.

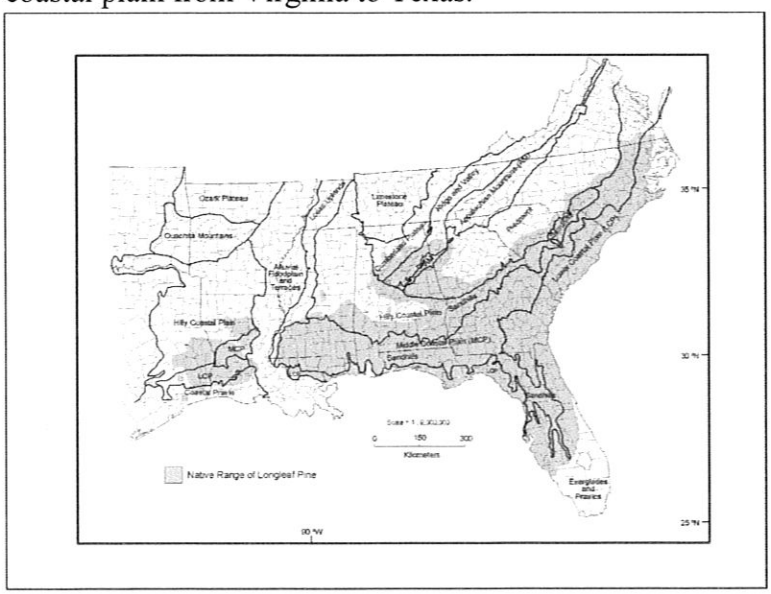

Figure 1. Southeastern Coastal Plain

Though only 2 percent of the original forest of old growth longleaf pines remains in the United States, what is left is part of an incredibly diverse region The Nature Conservancy and our conservation partners are working hard to protect.

To focus protection efforts, The Nature Conservancy has designated a 2-million acre region in the western Panhandle as the Panhandle Longleaf Pine Large-scale Conservation Area (PLLP LCA).

In addition to longleaf pines, the land includes portions of five major river systems, pine plantations and bottomland hardwood forests. Numerous rare and imperiled species are located within its boundaries. Natural communities include sandhills, upland pine forests, pine flatwoods and savannahs, bottomland hardwood forests, barrier island and dune systems, and estuaries. The region's Choctawhatchee, Escambia-Conecuh and Yellow River watersheds have been identified as critical U.S. watersheds.

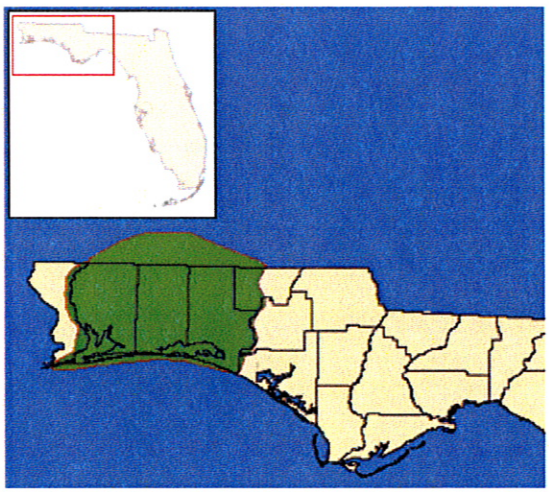

Figure 2. TNC's Panhandle Longleaf Pine LCA

Timber production and agriculture have been part of the traditional way of life in the Panhandle for generations. However, tourism's share of the economy is growing because of the area's abundant natural resources. In addition, the still relatively moderate cost of living in the Panhandle and its attraction as a haven for second homes has led to a population boom. This growth is having a tremendous impact on the area's natural habitats.

Erosion, sedimentation and runoff are lowering water quality and reducing the overall health of aquatic systems. Loss of buffer lands adjacent to public lands is making land management activities like prescribed burning increasingly difficult.

Since 1993, The Nature Conservancy has worked closely with Eglin Air Force Base – the largest single owner of longleaf pine forests. In the 1990s the Conservancy conducted a six-year study at Eglin as part of the base's efforts to restore sandhill areas and habitat for endangered red-cockaded woodpeckers (*Picoides borealis*).

The Nature Conservancy owns and manages two preserves in the region. The Betty and Crawford Rainwater Perdido River Nature Preserve is a 2,331-acre sanctuary along the Perdido River in Escambia County that protects numerous rare plants, including white-topped pitcher plants (*Sarracenia leucophylla*). The preserve was established in memory of Betty and Crawford Rainwater and was a generous gift from the BCR Foundation. The Conservancy also manages the 2,750-acre Choctawhatchee River Delta Preserve in Walton County.

- ✓ The PLLP LCA is a 2-million acre region in the western Florida Panhandle and southern Alabama
- ✓ This region harbors close to 20% of the remaining longleaf pine ecosystem, and over 70% of the remaining old-growth longleaf pine
- ✓ The PLLP LCA encompasses 5 major watersheds, 4 of which are "hotspots" for at-risk fish and mussel species

Future conservation actions include using conservation easements to protect industrial and non-industrial timberlands, continued use of prescribed fire as a land management tool, increasing water-resource protection and improving land management techniques. We will also work on strategies to abate the threat of invasive, non-native species and will pursue ecotourism and sustainable forestry opportunities.

Conservation efforts at Eglin AFB, Conecuh National Forest and Blackwater River State Forest helped create the Gulf Coastal Plain Ecosystem Partnership (GCPEP). GCPEP was formed in 1996 when large landowners came together to conserve and restore the dwindling longleaf pine ecosystem and the unique aquatic resources of northwest Florida and south Alabama.

Gulf Coastal Plain Ecosystem Partnership

The Gulf Coastal Plain Ecosystem Partnership (GCPEP) is an example of a successful partnership that has been able to frequently attain ambitious landscape-scale conservation goals and objectives through respectful, positive, and result-oriented action. Operating under a Memorandum of Understanding since 1996, the strength of the partnership is facilitating cooperative projects among partners of differing missions while overcoming significant challenges. GCPEP has established effective cross-boundary methods for managing and restoring both aquatic and terrestrial systems in northwest Florida and south Alabama.

Initially, the partnership consisted of 850,000 acres with 6 public and private partners enrolled. The goal was to connect adjacent lands for wildlife habitat as well as for addressing other land management issues. The GCPEP partners continue to receive extensive benefits from involvement in the partnership including resource and information sharing, cooperative project support, and leverage of existing funds for each of the partners. Collectively, the partnership now contains over 1,050,000 acres of land and water in one of the most biologically significant regions in North America with the nine partners enrolling lands that are being managed for a wide variety of missions.

Figure 3. GCPEP lands

Contained within the GCPEP connected lands are portions of the PLLP LCA's five major watersheds. Of 87 watersheds identified by The Nature Conservancy as United States "hotspots" for at-risk freshwater fish and mussels, four of them are found within the GCPEP region. Together, these wetlands, bays and rivers support numerous globally rare or imperiled species. Despite being a small percentage of the land and water area within the 47 million-acre East Gulf Coastal Plain (EGCP) Ecoregion, GCPEP lands and waters contain many of the Ecoregion's target species and natural communities identified in the EGCP. The Florida Fish and Wildlife Conservation Commission rated this region as having the greatest concentration of rare and imperiled fish species in Florida, with two federally listed species.

Early on, the partners completed a GCPEP Site Conservation Plan which addressed and prioritized actions to abate identified critical threats to the GCPEP targets in order to provide for protection and restoration of both terrestrial and aquatic ecosystems and species conservation targets. Aquatic systems are especially vulnerable in this region due to increasing threats to the water supply and encroaching incompatible development. Incompatible development has been identified by the GCPEP Steering Committee as a "killer" threat in the GCPEP area. This threat is also increasingly impacting the military mission capacity and management actions of the surrounding Air Force and Navy bases.

Our GCPEP Partners

- ✓ Department of Defense
- ✓ Florida Dept. of Environmental Protection
- ✓ Florida Division of Forestry
- ✓ Florida Fish & Wildlife Cons. Comm.
- ✓ Gulf Islands National Seashore
- ✓ Nokuse Plantation
- ✓ NW Florida Water Management District
- ✓ The Nature Conservancy
- ✓ U.S. Forest Service

In addition to the updated Conservation Action Plan (CAP), the GCPEP staff has completed a GCPEP Aquatic Management Plan. Incompatible/inadequate water management was addressed as a new "killer" threat, increasing the need for science-based, regional water conservation planning. Other threats to aquatic systems include sedimentation, nutrient loading, in-stream woody debris removal, landscape-level fragmentation of riparian buffers, and the incompatible/inadequate management of lands adjacent to the water.

GCPEP's Purpose Statement

To develop a voluntary and cooperative stewardship strategy to sustain the long term viability of native plants and animals, the integrity of ecosystems, the production of commodities and ecosystem services, and the human communities that depend upon them.

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THE CONSERVATION ACTION PLANNING (CAP) AND 5-S PROCESS

This process focuses attention on key biological issues in the study area including the status, degree of threats and progress toward conservation. Such information, when available, empowers people from all walks of life to discuss, interact, and consider alternative ways of acting on behalf of nature. Nothing could be more fundamental to fostering a high standard of sustainable living and successful conservation than having objective status information to inform individual and group decisions.

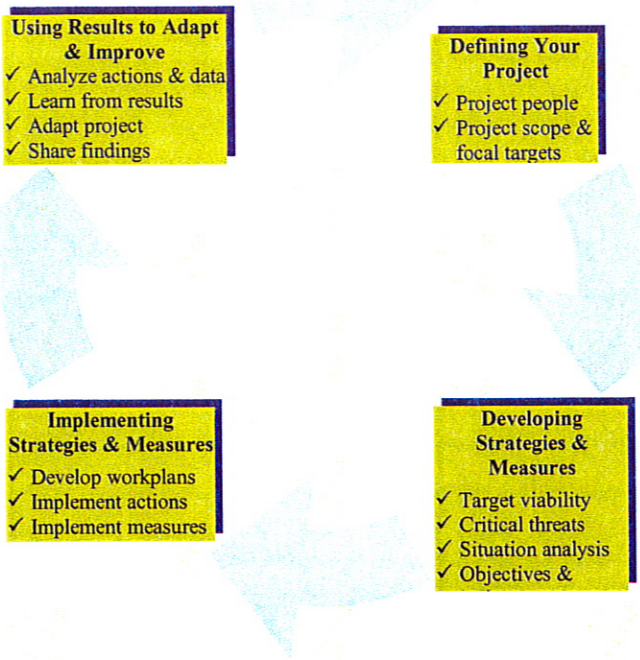
The Conservancy uses conservation plans to develop site-specific conservation strategies and prepare for taking action and measuring success. These plans follow what we call the 5-S Framework:

- SYSTEMS. The conservation planning team identifies the species and natural - communities that will be the focus of conservation for the area. To do so, biodiversity lists developed during the ecoregional assessment are modified to include site-specific priorities.
- STRESSES. The team determines how ecological systems are compromised, by habitat reduction or fragmentation, or by changes in the number or type of species.
- SOURCES. The team will then identify and rank the causes, or sources, of stress for each ecological system. The analysis of stresses and sources together make up the threat assessment.
- STRATEGIES. An important step in the process is finding practical cooperative ways to mitigate or eliminate the identified threats and enhance biodiversity.
- SUCCESS. Each plan outlines methods for assessing our effectiveness in reducing threats and improving biodiversity – usually by monitoring progress toward established biological and programmatic goals.
- SITUATION. An understanding of the cultural, political and economic situation behind the threats is essential for developing sound strategies. This human context is often referred to as the sixth "S".

The Conservancy's Conservation Action Planning (CAP) was used to update the previous Site Conservation Plan and was used to identify the highest priority strategies for conserving biodiversity within the Panhandle Longleaf Pine LCA and within the GCPEP partnership.

The CAP planning framework is a 10 step process:

1. **Identify People Involved in the Project**
   This step asks teams to identify the people who will be involved in designing and implementing the project.
2. **Define Project Scope and Focal Conservation Targets**
   This step defines the extent of the project and selects the specific species and natural systems (targets) that the project will focus on as being representative of the overall biodiversity of the project area.



3. **Assess Viability of Focal Conservation Targets**
   This step looks at each of the focal targets carefully to determine how to measure its "health" over time. And then to identify how the target is doing today and what a "healthy state" might look like.

4. **Identify Critical Threats**
   This step helps to identify the various factors that immediately affect the project's folcal targets and then rank them by priority.

5. **Conduct Situation Analysis**
   This step looks at both the biological issues and the human context in which the project occurs.

6. **Develop Strategies: Objectives and Actions**
   This step describes what success looks like and develops practical and strategic actions to be taken.

7. **Establish Measures**
   This step involves deciding how the project team will measure results and see whether strategies are working as planned.

8. **Develop Work Plans**
   This step takes strategic actions and measures and develops specific plans for doing this work as the project goes forward.

9. **Implement**
   Implementation is the most important step in this entire process.

10. **Analyze, Learn, Adapt, and Share**
    This step provides insight on how actions are working, what may need to change, and what to emphasize next. Teams document what was learned to share it with other people who may benefit from the insight.

This document summarizes the outcomes of these steps, particularly steps 2-7. We will first look at each of the targets, including descriptions, viability, and stresses for each target, and then the overall viability. Next, we'll summarize the threats before examining the objectives and conservation strategies. We'll then look at the indicators that can be used to start measuring success. Finally, we'll conclude with recommendations on how to implement and what next steps should be taken.

FOCAL CONSERVATION TARGETS (A.K.A., SYSTEMS)

At the site level, the appropriate choice of focal conservation targets is perhaps the single most important step. All other conservation-related analyses and resulting management strategies are directed at abating the threats to persistence of these planning targets, and indirectly, the entire suite of conservation targets. The goal is to choose conservation targets that represent multiple levels of biological organization, have different life history requirements, depend on different ecological processes, and encompass a variety of different spatial scales. In effect, planning targets act as conservation umbrellas or surrogates, however imperfectly, for all other similar target species and natural communities occurring in the geographic area. Thus, conservation targets, whether community or species-level, are used to cumulatively address the ecological requirements for all species and communities occurring at a site.

The process of selecting focal conservation targets has several steps. It begins with an assessment of all conservation targets (e.g., all species, communities and ecological systems) that are of conservation concern. The first step groups species and communities that are related by ecologically driven processes into systems. This is known as the coarse-filter approach to conservation. Once systems are identified, one needs to further assess the conservation targets asking the following questions:

1. Do any focal conservation targets need species-specific management?
2. Are any of the focal conservation targets so rare that they need special management attention?
3. Are there regional-scale species that use multiple systems over a wide area?

If species are identified through this process, they are added as focal conservation targets to the planning process.

The focal conservation targets for the Panhandle Longleaf Pine LCA and the GCPEP landscape represent not only species, communities, and systems characteristic of the region's biodiversity, but also capture a range of spatial scales, levels of biological organization, and ecoregional conservation targets.

The PLLP LCA / GCPEP focal conservation targets are:

1. Alluvial Rivers, Streams and Floodplains;
2. Barrier Island Ecosystem;
3. Blackwater Rivers, Streams and Floodplains;
4. Diadromous Fishes;
5. Estuarine Systems;
6. Florida Black Bear;
7. Gopher Tortoise;
8. Pine Flatwoods Matrix with Embedded Wetlands;
9. Red-cockaded Woodpecker;
10. Steephead Systems; and
11. Upland Pine Matrix with Embedded Wetlands.

Target Selection and Rationale

At the beginning of the target selection process, the planning team first reviewed the previous conservation targets selected by the GCPEP Steering Committee during the Site Conservation Planning process. The original conservation targets were selected using personal knowledge of the GCPEP area and the ecological analysis done early on with the establishment of the partnership. In all, 18 primary conservation planning targets were identified. The original GCPEP conservation targets were:

- Alluvial rivers/streams/floodplains;
- Barrier Island Complex;
- Blackwater rivers/streams/floodplains;
- Depression Wetlands;
- Estuarine Systems;
- Fish/Mussel Complex;
- Flatwoods Salamander;
- Florida Black Bear;
- Florida Bog Frog;
- Gulf Sturgeon;
- Longleaf Pine Sandhills Matrix;
- Mainland Sand Pine Scrub;
- Okaloosa Darter;
- Pine Flatwoods Matrix;
- Red-cockaded Woodpecker;
- Seepage Slopes;
- Steephead Stream/Slope Systems; and
- Upland Game Birds

Ideally, the number of targets should be kept relatively low (around eight is a recommended number) in order to be considered manageable. After reviewing the previous targets and keeping in mind that during this iteration there was the capacity to capture and indicate nested targets under focal targets, we selected the seven matrix-forming community types to emphasize the aquatic and terrestrial systems within our area. This adheres to the course-filter approach as mentioned above.

Of the four remaining species-level focal conservation targets, the red-cockaded woodpecker and the gopher tortoise were selected because they pertained to question one above and the Florida black bear and the diadromous fishes relate to question three.

The following section contains descriptions for each of the focal conservation targets. After each description there is a summary table per target that captures the nested targets, the overall viability, the threats, and the stresses.

ALLUVIAL RIVERS, STREAMS AND FLOODPLAINS

Figure 4. Yellow River. Photo credit - NWFWMD

Target Description

Alluvial Streams are characterized as perennial or intermittent seasonal watercourses originating in high uplands that are primarily composed of sandy clays and clayey-silty sands. Surface runoff generally predominates over subsurface drainage and thus its waters are typically turbid. Fluctuations in water depth are dependent upon rainfall patterns and can be separated into two stages: 1) a normal or low flow stage, and 2) a flood or high flow stage. Flooding, which generally occurs once or twice a year, is a controlling factor in the reproductive cycle of many organisms and is also important in providing woody debris, minerals, and nutrients to floodplain communities. Water temperature fluctuates with air temperature. Alluvial Streams construct natural levees because of the significant quantities of suspended sediments. These streams are sparsely distributed in Florida, being primarily restricted to the northern Panhandle. Most of these rivers have been degraded to some degree by disturbances within watersheds, including pollution, dredging, or damming. Main water quality threats are associated with agricultural and woodland runoff, as well as road runoff, wastewater discharges, and urbanization. The adjacent floodplain communities are an essential and interrelated component of a viable Alluvial Stream community. These streams are also known as alluvial river, slow flowing river, deep river, and muddy stream. Key Ecological Processes: hydrology and fire. Florida Natural Areas Inventory (FNAI) Ranking: G4S2.

Floodplain Wetlands are flat, alluvial sand or peat substrates associated with riverine Natural Communities and are subjected to flooding but not permanent inundation. The following are Natural Communities associated with floodplains:

Bottomland Forest: Bottomland Forests are characterized as a low-lying, closed-canopy forest of tall trees with either a dense shrubby understory and little groundcover, or an open understory and groundcover of ferns, herbs, and grasses. This community type occurs on low-lying flatlands that usually border streams with distinct banks, such that water rarely overflows (i.e., not annually) the stream channel to inundate the forest. Air movement and light penetration are generally low, making the humidity high and relatively constant and therefore these areas rarely burn. Tree density and species diversity is relatively high. It is a stable community that requires a hundred years or more to mature. Bottomland Forests are often associated with and grade into Floodplain Forest, Hydric Hammock, Mesic Flatwoods, Upland Mixed Forest, Upland Hardwood Forest, Slope Forest, Maritime Hammock, Baygall, or Wet Flatwoods. Bottomland

Forests are also known as bottomland hardwoods, river bottom, stream bottom, lowland hardwood forest, and mesic hammock. FNAI Ranking: G4S4?

Floodplain Forest: Floodplain Forests are hardwood forests that occur on drier soils at slight elevations within floodplains, such as on levees, ridges, and terraces, and are usually flooded for a portion (2 to 50%) of the growing season. The organic material accumulated on the floodplain forest floor is picked up during floods and redistributed in the floodplain or is washed downriver to provide a critical source of minerals and nutrients for downstream ecosystems, in particular estuarine systems. They are largely restricted to the alluvial rivers of the Panhandle. The dominant trees are generally mixed mesophytic hardwoods and the understory may be open and parklike or dense and nearly impenetrable. Floodplain Forests harbor a diverse array of animals including both temporary and permanent residents. Floodplain Forests are often associated with and grade into Floodplain Swamp, Bottomland Forest, Baygall, or Slope Forest. They are also known as bottomland hardwoods, seasonally flooded basins or flats, oak-gum-cypress, elm-ash-cottonwood, second bottom, levee forest, river terrace, and river ridge. FNAI Ranking: G?S3.

Floodplain Swamp: Floodplain Swamps occur on flooded soils along stream channels and in low spots and oxbows within river floodplains where water stands most of the year. These swamps are usually too wet to support fire. Floods redistribute detrital accumulations to other portions of the floodplain or into the main river channel, which is essential to the functional integrity of downriver ecosystems. Dominant trees are usually buttressed hydrophytic trees and the understory and groundcover are generally very sparse. These areas harbor a diverse array of animals including both temporary and permanent residents. Alteration of the hydroperiod by impoundments or river diversions and the disruption of floodplain communities by forestry or agriculture have devastating consequences to entire river and bay systems. They are often associated with and grade into Floodplain Forest, Bottomland Hardwood Forest, Wet Flatwoods, and Baygall. Floodplain Swamps are also known as river swamp, bottomland hardwoods, seasonally flooded basins or flats, oak-gum-cypress, cypress-tupelo, slough, oxbow, and back swamp. FNAI Ranking: G?S4?

Freshwater Tidal Swamp: Freshwater Tidal Swamps occur on floodplains near the mouths of rivers just inland from salt marshes. They are swamp forests with well-developed trees inland and increasingly dwarfed trees towards the coast, often with an extensive mat of convoluted surface roots. They are flooded by freshwater at least twice daily in response to tidal cycles. These swamps are extremely vulnerable to hydrological modifications, saltwater intrusion, and clearcut logging. They are also known as tidewater swamp, rivermouth swamp, sweetbay-swamp, and tupelo-redbay. FNAI Ranking: G3S3.

Slough: Sloughs are characterized as broad shallow channels, inundated with flowing water except during extreme droughts. They are the deepest drainageways within Strand Swamp systems. The vegetation structure is variable but characterized by Carolina ash, fragrant waterlily, large emergent herbs, and floating aquatic plants. The normal hydroperiod is at least 250 days per year. They are extremely vulnerable to hydrologic disturbance and must have a reliable, quality water source to persist. Sloughs often grade into Stand Swamps and may also occur in Floodplain Swamps and Basin Swamps. FNAI Ranking: G4/S4?

Table 1. Alluvial Rivers, Streams and Floodplains Summary

Nested Targets	Spring-run stream, Seepage (headwater) stream, Bottomland and floodplain forests and swamps, Okaloosa darter, Goldstripe darter, Crystal darter, Harlequin darter, Blackmouth shiner, Southeastern bat, Southern dusky salamander, Seal salamander, Escambia map turtle, Barbour's map turtle, Gulf coast smooth soft shell, Alligator snapping turtle, Say's spiketail, Diminutive clubtail, Gulf moccasinshell, Narrow pig toe, Round ebony shell, Fuzzy pig toe, Choctaw bean, Downy rainbow mussel, Rayed creekshell, Southern sandshell, Tapered pig toe, Southern kidneyshell, River otter, Bog frog						
Overall Viability	**FAIR**						
High Threats	Housing & Urban Areas		Fire & Fire Suppression				
Medium Threats	Commercial & Industrial Areas	Roads & Railroads	Dams & Water Management/ Use	Wood & Pulp Plantations	Invasive Non-Native/ Alien Species	Problematic Native Species	Annual & Perennial Non-Timber Crops
Low Threats	Other Ecosystem Modifications	Logging & Wood Harvesting	Recreational Activities	Household Sewage & Urban Waste Water	Industrial & Military Effluents	Tourism & Recreation Areas	Garbage & Solid Waste
Stresses	Altered fire regime; Altered floodplain / Riparian size & intactness; Altered water quality; Altered hydrologic regime; lack of in-stream woody debris						

BARRIER ISLAND ECOSYSTEM

Figure 5. Santa Rosa Island

Target Description

The natural communities associated with this complex contain substrate and vegetation that is influenced primarily by such coastal (maritime) processes as erosion, deposition, salt spray, and storms. The functional significance of barrier islands is to maintain regional biodiversity and protect the mainland and bays from extreme storm events. Key Ecological Processes: storm overwash, erosion, and wind. The natural communities included in the Barrier Island Complex are as follows:

Beach Dune: Beach Dune is characterized as a wind-deposited foredune and wave-deposited upper beach that is sparsely to densely vegetated with pioneer species. Pioneer species typically include sea oats, beach cordgrass, saltmeadow, and dune or bitter panic grass. It is the primary nesting habitat for numerous marine turtles and shorebirds. It is especially important for snowy plovers and black skimmers because of available habitat. Beach Dunes are also known as sand dune, pioneer zone, upper beach, sea oats zone, and coastal strand. Within the GCPEP area, the general pattern is three lines of dunes parallel to the coast: a low broken embryonic dune just above the beach dominated by sea rocket and evening primrose, behind this a taller sea oats ridge, backed by a third ridge covered by rosemary scrub. Florida Natural Areas Inventory (FNAI) Ranking: G4?S2.

Coastal Grassland: Coastal Grassland is characterized as a treeless flat land or gently undulating land just inward of beach dunes with barren sand or a sparse to dense groundcover of grasses, prostrate vines, and other herbaceous species that are adapted to harsh maritime conditions. If no major storms occur, Coastal Grasslands will often succeed to Coastal Strand or Flatwoods. Coastal Grasslands are also known as overwash plain, deflation plain, salt flat, and coastal savanna. GCPEP's Coastal Grasslands cover only a small area, being generally found only on lee slopes of the foredunes, or occasionally forming patches on the crests of the tall dunes north of the road. FNAI Ranking: G3S2.

Coastal Interdunal Swales: Coastal Interdunal Swales occur in low, periodically flooded areas between secondary and tertiary dunes and are marsh-like in character. Species composition among and within swales is variable, dependent upon salinity, hydroperiod, and colonization conditions. No current FNAI ranking.

Maritime Hammock: Maritime Hammock is a broad-leaved forest that is exposed to chronic salt spray. It is also known as coastal hammock, maritime forest, and tropical hammock. Within

GCPEP, FNAI documented a single Element Occurrence northeast of A-10 on Santa Rosa Island. It consists of several acres of higher land on the sound surrounded by black rush marshes. FNAI Ranking: G4S2.

Barrier Island Scrub: Barrier Island Scrub occupies old stable dunes and consists of dense thickets of stunted scrubs. There are three types of scrub that occur on Santa Rosa Island – open strands of shrubs, mainly woody goldenrod and/or rosemary on the sparsely vegetated dunes in the center of the island, and forests dominated by sand pines with sand live oak and magnolia on the lee slope of the taller dunes toward the north side of the island. There is no FNAI Ranking.

Table 2. Barrier Island Ecosystem Summary

Nested Targets	Coastal interdunal swales, Coastal dune lakes, Beach dune, Coastal berm, Coastal strand, Maritime hammock, Shell mound, *Cladonia perforate*, Loggerhead turtle, Green turtle, Leatherback, Snowy plover, Wilson's plover, Black skimmer, Least tern, Royal tern, Sandwich tern, Choctawhatchee beach mouse, Santa Rose beach mouse, Perdido Key beach mouse, Submerged aquatic vegetation			
Overall Viability	**FAIR**			
Very High Threats	Housing & Urban Areas		Other Ecosystem Modifications	
High Threats	Roads & Railroads	Fire & Fire Suppression	Shipping Lanes	Invasive Non-native/Alien Species
Medium Threats	Utility & Service Lines	Household Sewage & Urban Waste Water	Tourism & Recreation Areas	
Low Threats	Recreational Activities	Excess Energy		
Stresses	Altered fire regime; Habitat fragmentation; Altered community structure & function; Altered natural cycle of accretion/erosion; Altered & increased competition/predation; Altered sand quality; Reduced habitat availability			

BLACKWATER RIVERS, STREAMS AND FLOODPLAINS

Figure 6. Turkey Creek

Target Description

Blackwater Streams are characterized as perennial or intermittent seasonal watercourses originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. The acidic, tea-colored waters are laden with tannins, particulates, and dissolved organic matter. Water temperatures fluctuate with air temperature, but are also dependent upon depth and shading by vegetation. Blackwater Streams generally lack the continuous extensive floodplains and natural levees of Alluvial Streams. Instead, they typically have high, steep banks alternating with Floodplain Swamps. Blackwater Streams are the most widely distributed and numerous Riverine systems in the southeast Coastal Plain. Very few, however, have escaped major disturbances and alterations. Main water quality threats are excessive sedimentation from dirt roads, agricultual fields, and gully erosion, increased biological oxygen demand from agricultural runoff, and growth/development.

Blackwater Streams are also known as blackwater river and blackwater creek. Key Ecological Processes: hydrology and fire. Florida Natural Areas Inventory (FNAI) Ranking: G4S2.

Floodplain Wetlands are flat, alluvial sand or peat substrates associated with riverine Natural Communities and are subjected to flooding but not permanent inundation. The following are Natural Communities associated with floodplains.

Bottomland Forest: Bottomland Forests are characterized as a low-lying, closed-canopy forest of tall trees with either a dense shrubby understory and little groundcover or an open understory and groundcover of ferns, herbs, and grasses. This community type occurs on low-lying flatlands that usually border streams with distinct banks, such that water rarely overflows (i.e., not annually) the stream channel to inundate the forest. Air movement and light penetration are generally low, making the humidity high and relatively constant and therefore these areas rarely burn. Tree density and species diversity is relatively high. It is a stable community that requires a hundred years or more to mature. Bottomland Forests are often associated with and grade into Floodplain Forest, Hydric Hammock, Mesic Flatwoods, Upland Mixed Forest, Upland Hardwood Forest, Slope Forest, Maritime Hammock, Baygall, or Wet Flatwoods. Bottomland Forests are also known as bottomland hardwoods, river bottom, stream bottom, lowland hardwood forest, and mesic hammock. FNAI Ranking: G4S4?

Floodplain Forest: Floodplain Forests are hardwood forests that occur on drier soils at slight elevations within floodplains, such as on levees, ridges, and terraces, and are usually flooded for a portion (2 to 50%) of the growing season. The organic material accumulated on the floodplain forest floor is picked up during floods and redistributed in the floodplain or is washed downriver to provide a critical source of minerals and nutrients for downstream ecosystems, in particular estuarine systems. They are largely restricted to the alluvial rivers of the Panhandle. The dominant trees are generally mixed mesophytic hardwoods and the understory may be open and parklike or dense and nearly impenetrable. Floodplain Forests harbor a diverse array of animals including both temporary and permanent residents. Floodplain Forests are often associated with and grade into Floodplain Swamp, Bottomland Forest, Baygall, or Slope Forest. They are also known as bottomland hardwoods, seasonally flooded basins or flats, oak-gum-cypress, elm-ash-cottonwood, second bottom, levee forest, river terrace, and river ridge. FNAI Ranking: G?S3.

Floodplain Swamp: Floodplain Swamps occur on flooded soils along stream channels and in low spots and oxbows within river floodplains where water stands most of the year. These swamps are usually too wet to support fire. Floods redistribute detrital accumulations to other portions of the floodplain or into the main river channel, which is essential to the functional integrity of downriver ecosystems. Dominant trees are usually buttressed hydrophytic trees and the understory and groundcover are generally very sparse. These areas harbor a diverse array of animals including both temporary and permanent residents. Alteration of the hydroperiod by impoundments or river diversions and the disruption of floodplain communities by forestry or agriculture have devastating consequences to entire river and bay systems. They are often associated with and grade into Floodplain Forest, Bottomland Hardwood Forest, Wet Flatwoods, and Baygall. Floodplain Swamps are also known as river swamp, bottomland hardwoods, seasonally flooded basins or flats, oak-gum-cypress, cypress-tupelo, slough, oxbow, and back swamp. FNAI Ranking: G?S4?

Freshwater Tidal Swamp: Freshwater Tidal Swamps occur on floodplains near the mouths of rivers just inland from saltmarshes. They are swamp forests with well-developed trees inland and increasingly dwarfed trees towards the coast, often with an extensive mat of convoluted surface roots. They are flooded by freshwater at least twice daily in response to tidal cycles. These swamps are extremely vulnerable to hydrological modifications, saltwater intrusion, and clearcut logging. They are also known as tidewater swamp, rivermouth swamp, sweetbay-swamp, and tupelo-redbay. FNAI Ranking: G3S3.

Slough: Sloughs are characterized as broad shallow channels, inundated with flowing water except during extreme droughts. They are the deepest drainageways within Strand Swamp systems. The vegetation structure is variable but characterized by Carolina ash, fragrant waterlily, large emergent herbs, and floating aquatic plants. The normal hydroperiod is at least 250 days per year. They are extremely vulnerable to hydrologic disturbance and must have a reliable, quality water source to persist. Sloughs often grade into Stand Swamps and may also occur in Floodplain Swamps and Basin Swamps. FNAI Ranking: G4/S4?

Table 3. Blackwater Rivers, Streams and Floodplains Summary

Nested Targets	Spring-run stream, Seepage (headwater) stream, Floodplain swamps and bluffs, Blackmouth shiner, Bluenose shiner, Southeastern bat, Southern dusky salamander, Seal salamander, Escambia map turtle, Gulf coast smooth soft shell, Alligator snapping turtle, Diminutive clubtail, River otter						
Overall Viability	**GOOD**						
High Threats	Housing & Urban Areas	Commercial & Industrial Areas		Roads & Railroads		Fire & Fire Suppression	
Medium Threats	Dams & Water Management /Use	Other Ecosystem Modifications	Wood & Pulp Plantations	Invasive Non-Native/ Alien Species	Recreational Activities	Problematic Native Species	Annual & Perennial Non-Timber Crops
Low Threats	Logging & Wood Harvesting	Household Sewage & Urban Waste Water	Industrial & Military Effluents	Tourism & Recreation Areas	Agricultural & Forestry Effluents		Garbage & Solid Waste
Stresses	Altered fire regime; Altered floodplain / riparian size & intactness; Altered water quality; Altered hydrologic regime						

DIADROMOUS FISHES

Target Descriptions

The FL Fish and Wildlife Conservation Commission rates the GCPEP region as having the greatest concentration of rare and imperiled fish species in Florida. The main threats to water quality are sedimentation, which can smother stream bottoms and render them unsuitable for aquatic creatures, and increasing pollution from agricultural runoff and incompatible development. Key Ecological Processes: hydrology. The diadromous fishes target contains four fishes: the Gulf sturgeon, the American eel, the Alabama shad, and the skipjack herring.

Figure 7. Gulf Sturgeon in live well

Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)
FNAI Ranks: G3T2/S2
FL Status: Species of Special Concern
Description: A large sturgeon, generally reaching 5 - 7.5 ft. (1.5 - 2.2 m), with historical records of specimens reaching 9.5 ft. (2.8 m); vertical mouth, lightly colored viscera, long, sharply V-shaped snout (upturned at the tip in young), and prominent bony scutes (enlarged scales); general body color is blue-black dorsally, fading on sides, and eventually white ventrally. *Habitat*: Forages in Gulf of Mexico and associated estuaries; spawns in most major coastal rivers in areas with limestone outcrops. *Seasonal Occurrence*: Gulf sturgeon is anadromous; adults and subadults spend the coldest three to four months in the Gulf and the remainder of the year in rivers where spawning occurs. Spawning typically takes place February - April. *Florida Distribution*: Reproducing populations in Gulf of Mexico and major Panhandle rivers eastward to the Suwannee River. Non-breeding animals observed in Tampa Bay and Charlotte Harbor. During cold years, individuals have been documented as far south as Florida Bay. *Conservation Status*: Due to the damming of many of north Florida's tributaries to the Gulf of Mexico, the Suwannee, Choctawhatchee, Yellow, and Escambia rivers appear to be the last high-quality spawning areas for the Gulf sturgeon. Banning of commercial harvest of this species has undoubtedly resulted in increased stocks. *Protection and Management*: Due to the limited breeding habitat that has resulted from the damming of most of the large rivers within the Gulf sturgeon's range, the recovery of this and other anadromous species will likely require some means for these species to pass dams that are currently blocking their migrations. Protection of existing spawning areas is critical; any main channel or tributary construction or maintenance should be avoided during spawning periods.

Figure 8. American eel

American Eel (*Anguilla rostrata*)
FNAI Ranks: N/A
FL Status: N/A
Description: The American eel has a snakelike body covered with tiny embedded scales and a thick slime layer. On the head are paired eyes and nostrils. The mouth has movable jaws with many sharp teeth. The dorsal, caudal and anal fins are fused into one long fin extending around the posterior of the body. The upper half of the body is olive green to brown, grading from pale yellow to white on the venter. Mature adults range from 2.9 to 4.9 ft (0.9 to 1.4 m). The American eel is catadromous; it spawns in oceanic waters but uses freshwater, brackish and estuarine systems for most of its developmental life. Sexually mature adults, called silver eels, migrate from freshwater to the sea in fall. Their destination for spawning is the Sargasso Sea. Adults are thought to die after spawning. *Habitat:* American eel habitats range from warm freshwater rivers and lakes to coastal brackish areas to the open ocean. *Seasonal Occurrence*: Year round. *Florida Distribution*: Statewide. *Conservation Status*: The American eel currently has no special status under state or federal regulations; however, a petition was filed in late 2004 with the United States Fish and Wildlife Service and the National Marine Fisheries Service to have the American eel listed as an endangered species. The Atlantic States Marine Fisheries Commission (ASMFC) has published a management plan for the conservation of this species in response to perceived declines. *Protection and Management*: Initially, population and life history data must be collected for the Florida/Alabama sub-population of the species. Threats must be identified and prioritized and threat abatement strategies must be developed. Specifically, in-stream alterations such as dredging and damming must be investigated as related to American eel life history, biology, and ecology.

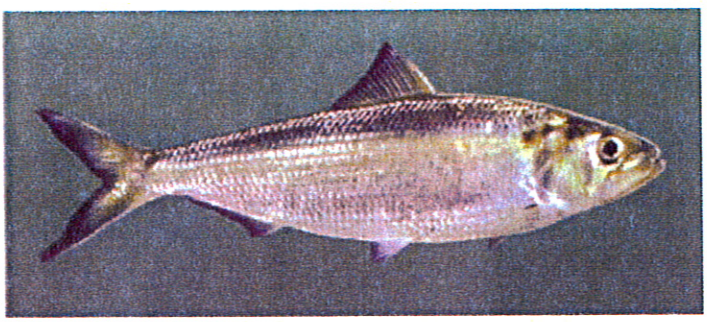


Figure 9. Alabama Shad

Alabama shad (*Alosa alabamae*)
FNAI Ranks: N/A
Species of Special Concern (NOAA National Marine Fisheries Service)
FL Status: Status Not Reported
Description: The Alabama shad is an elongate, silvery fish, the back is greenish blue; the rest of the body is silvery. Fins are generally clear. The dorsal and caudal fins have a slightly darker margin. The Alabama shad is an anadromous clupeid species. Adults spawn in April, when water temperatures reach 65° to 68°F (18° to 20°C), and migrate downstream shortly thereafter. *Habitat:* Adults live in brackish/saltwater but migrate upstream into free-flowing rivers to spawn. *Seasonal Occurrence:* Offshore, except during late winter spawning run into coastal rivers. *Florida Distribution:* Panhandle streams. *Conservation Status:* Populations declining primarily due to dredge activities, locks and dams, and pollution. *Protection and Management:* Threats must be identified and prioritized and threat abatement strategies must be

developed. Specifically, in-stream alterations such as dredging and damming must be investigated as related to Alabama shad life history, biology, and ecology.

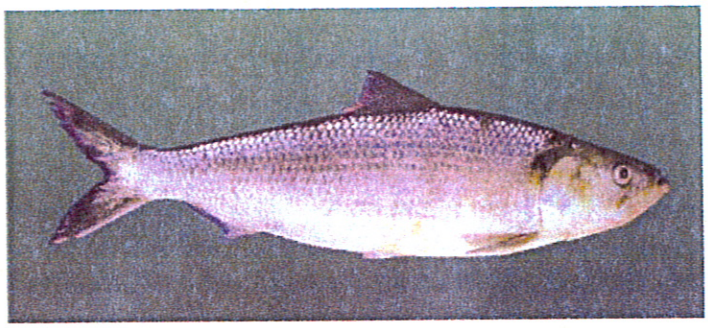


Figure 10. Skipjack Herring

Skipjack herring (*Alosa chrysochloris*)
FNAI Ranks: N/A
FL Status: Status Not Reported
Description: The Skipjack herring is silvery colored with a small dorsal fin, deeply forked caudal fin and small mouth. The lower jaw on a skipjack extends in front of the upper jaw and the fish is flattened side to side. Skipjack herring mature at approximately 12 inches (30 cm), but may grow up to 21 inches (55 cm). The Skipjack herring is an anadromous clupeid species. They spawn from March to late April in the Apalachicola River, FL. *Habitat:* Clear to moderately turbid medium to large rivers and large reservoirs; usually in current over sand and gravel; Bay/sound, river mouth/tidal river (coastal brackish or saltwater). Probably spawns in deep water of main channel over bars of coarse sand or gravel. *Seasonal Occurrence:* Offshore, except during late winter spawning run into coastal rivers. Florida Distribution: Western Panhandle streams. *Conservation Status:* Populations declining primarily due to dredge activities, locks and dams, and pollution. *Protection and Management:* Threats must be identified and prioritized and threat abatement strategies must be developed. Specifically, in-stream alterations such as dredging and damming must be investigated as related to Skipjack herring life history, biology, and ecology.

Table 4. Diadromous Fishes Summary

Nested Targets	N/A			
Overall Viability	**GOOD**			
High Threats	Dams & Water Management/Use			
Medium Threats	Roads & Railways	Other Ecosystem Modifications	Industrial & Military Effluents	Excess Energy
Low Threats	Logging & Wood Harvesting	Household Sewage & Urban Waste Water	Fishing & Harvesting Aquatic Resources	
Stresses	Altered population size & dynamics; Altered population structure & recruitment; Altered hydrologic regime			

ESTUARINE SYSTEMS

Figure 11. Estuarine System

Target Description

Estuarine communities occur along coastlines and include subtidal, intertidal, and supratidal zones. These systems may temporarily exhibit freshwater conditions during periods of heavy rainfall or upland runoff, or marine conditions when rainfall and upland runoff are low. The salinity levels vary between 0.5 and 30 parts per thousand. Key Ecological Processes: hydrology. The following are Estuarine Communities found within the GCPEP area:

Mineral Based-Unconsolidated Substrate: This area is also known as beach, shore, sand bottom, shell bottom, sand bar, mud flat, tidal flat and soft bottom. This community is generally characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species. It may support a large population of infaunal organisms as well as a variety of transient planktonic and pelagic organisms such as tube worms, sand dollars, mollusks, isopods, amphipods, burrowing shrimp, and crabs. While these areas may seem relatively barren, the densities of infaunal organisms in the subtidal zones can reach the tens of thousands per meter square, making these areas important feeding grounds for many bottom feeding fish. The supratidal zones are extremely important feeding grounds for many shorebirds and invertebrates. The unconsolidated substrate communities are associated with and grade into Beach Dunes, Tidal Marshes, Tidal Swamps, and Grass Beds. Florida Natural Areas Inventory (FNAI) ranking: G5/S5.

Floral Based-Seagrass Bed: These are also known as seagrass meadows, grass beds and grass flats and are typically characterized as expansive strands of vascular plants. This community occurs in subtidal zones, in clear, coastal waters where wave energy is moderate. Seagrasses, along with the epiphytic algae and invertebrates that attach to it, are important food sources for marine turtles and many fish. These areas also serve as nursery grounds for many invertebrates and fish. They are often associated with and grade into Unconsolidated Substrate, Tidal Swamps, and Tidal Marshes. Seagrass beds are extremely vulnerable to human impacts such as dredging and filling activities, sewage outfalls, industrial wastes, oil spills, and scarring cuts from boat propellers, anchors, and trawls. FNAI ranking: G2/S2.

Floral Based-Tidal Marsh: Also known as saltmarsh, brackish marsh, coastal wetlands, coastal marshes, and tidal wetlands. Tidal Marshes are characterized as expanses of grasses, rushes, and sedges along coastlines of low wave-energy and river mouths. Tidal fluctuation, which cycles nutrients and allows marine and estuarine fauna access to the marsh, is the most important

ecological factor. This exchange helps to make this community one of the most biologically productive natural communities in the world. Invertebrates and fish use Tidal Marshes throughout part or all of their life cycles. Adverse impacts of urban development of these areas include degradation of water quality, filling of marshes, increased erosion, and other alteration such as bulkheading and beach renourishment. FNAI ranking: G4/S4.

The Pensacola Bay system includes five interconnected estuarine embayments (Blackwater Bay, Escambia Bay, East Bay, Pensacola Bay, and Santa Rosa Sound) and is fed by three major rivers (Yellow, Blackwater, and Escambia rivers). The estuary empties into the Gulf of Mexico through a narrow pass at the mouth of Pensacola Bay. The Choctawhatchee River and numerous small streams drain into the Choctawhatchee Bay, which empties into the Gulf of Mexico through a small pass and a man-made canal. Both estuaries historically had high fish and shellfish diversity, but they have been experiencing decreases in seafood landing and seagrass beds have virtually disappeared.

Table 5. Estuarine Systems Summary

Nested Targets	Oyster reef, Submerged aquatic vegetation/Seagrass beds, Salt marsh, Tidal marsh and streams, Tidal freshwater swamp, Tide flats, Bays, Inlets, Diamondback terrapin, Gulf saltmarsh snake, Saltmarsh topminnow, In-shore game fish complex, Great white heron, Snowy egret, Little blue heron, Reddish egret, Marsh wren, Sea-side sparrow, Black skimmer, Snowy plover and Least tern, Alligator gar, Gulf sturgeon, Alabama shad, Sand fiddler crab, Mud fiddler crab, River otter					
Overall Viability	**GOOD**					
High Threats	Housing & Urban Areas	Commercial & Industrial Areas	Other Ecosystem Modifications	Shipping Lanes		
Medium Threats	Roads & Railroads	Dams & Water Management/ Use	Recreational Activities	Household Sewage & Urban Waste Water	Industrial & Military Effluents	Tourism & Recreation Areas
Low Threats	Invasive Non-Native/ Alien Species		Garbage & Solid Waste		Fishing & Harvesting Aquatic Resources	
Stresses	Habitat fragmentation; Altered community structure & function; Reduced estuarine upland buffer; Altered water quality					

FLORIDA BLACK BEAR

Figure 12. Florida Black Bear

Target Description

Black bears once ranged throughout most of North America in forested habitats. However, black bears now occupy from 5-10% of their historic range in the southeastern United States, mainly in large forested tracts and wetlands in public ownership. Viable populations can exist in highly modified agricultural landscapes, so long as adequate cover remains along rivers and swamps, and hunting, poaching, and vehicle mortality is kept to a minimum. Key Ecological Processes: fire.

The Florida black bear (*Ursus americanus floridanus*) has a coat that is mostly black with a brown muzzle and sometimes a white blaze on the chest and weighs 150 to 600 pounds. This species uses a variety of habitats that provide an assortment of foods during different seasons of the year. They prefer thick swamps, forested areas with dense understory vegetation, pine flatwoods, and sand pine scrub. Females have relatively small home ranges, and female offspring are likely to occupy adjacent territories. Males typically have very large home ranges, often overlapping with other males, and encompassing the home ranges of one or more females. Home range sizes vary considerably from population to population. Females give birth to 1-2 cubs every 2-3 years, depending on habitat quality and productivity. In Florida the greatest concentrations of this species occur in and around five general areas: Ocala National Forest, Big Cypress National Preserve, Osceola National Forest, Apalachicola National Forest, and Eglin Air Force Base.

On Eglin, bears typically spend 95% of their time within 300 meters of creek bottoms. Palmetto berries, insects, acorns, and fruits are primary foods. These bears also use other Gulf Coastal Plain Ecosystem Partnership (GCPEP) lands including the lands known as the Yellow River Ravines, Northwest Florida Water Management District, and possibly Blackwater River State Forest. GCPEP appears to have enough acreage to secure a moderately large population of black bears, and was identified by the Florida Fish and Wildlife Conservation Commission as a "strategic habitat conservation area" for the black bear in Florida. The large area of suitable habitat may be critical to the long-term survival of black bears in the western coastal plain. Major threats to long-term persistence include increased mortality due to vehicle collisions and poaching, habitat loss due to urban development and demographic isolation due to habitat fragmentation. A specific population goal has not yet been set, but a minimally viable population is estimated to be 200 adults. FNAI Ranking: G5T2/S2. It is listed as Threatened by the State.

Table 6. Florida Black Bear Summary

Nested Targets	N/A		
Overall Viability	**FAIR**		
Very High Threats	Housing & Urban Areas	Commercial & Industrial Areas	Roads & Railroads
High Threats	Dams & Water Management/Use		
Medium Threats	Fire & Fire Suppression	Wood & Pulp Plantations	
Low Threats	Recreational Activities	Hunting & Collecting Terrestrial Animals	
Stresses	Altered fire regime; Habitat fragmentation; Reduced recruitment; Reduced population size; Reduced habitat availability		

GOPHER TORTOISE

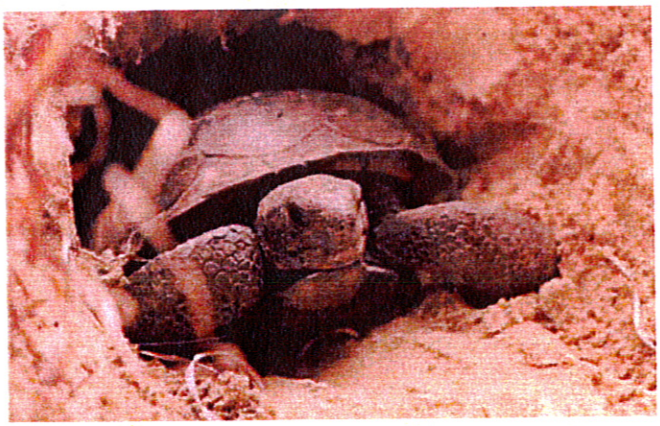


Figure 13. Gopher Tortoise in burrow

Target Description

Gopher Tortoise (*Gopherus polyphemus*)
FNAI Ranks: G3/S3
FL Status: Threatened
Description: A medium-sized turtle (up to 10 in. = 254 mm) fully adapted for life on land. Upper shell brown and relatively flat above; lower shell yellowish, without hinge, and projecting forward, especially in male; skin brown to dark gray. Forelimbs greatly expanded for digging; hind limbs reduced, stumpy, lacking any form of webbing between toes. Lower shell of male is somewhat concave. Young: scales of carapace often with yellow centers, skin yellowish to tan; approximately 2 in. (51 mm) shell length at hatching. *Habitat:* Typically found in dry upland habitats, including sandhills, scrub, xeric oak hammock, and wet and dry pine flatwoods; also commonly uses disturbed habitats such as pastures, oldfields, and road shoulders. Tortoises excavate deep burrows for refuge from predators, weather, and fire; more than 300 other species of animals have been recorded sharing these burrows. *Seasonal Occurrence:* Above-ground activity is greatly reduced during cold weather, with tortoises in northern Florida remaining below ground for months. Nonetheless, burrows are relatively conspicuous year-round. *Florida Distribution:* State-wide except absent from the Everglades and Keys. *Conservation Status:* Despite its widespread occurrence throughout Florida, there is considerable concern about the declining abundance of this species. Much of its native habitat has been lost to agriculture, citriculture, forestry, mining, and urban and residential development. *Protection and Management:* Manage large, undivided tracts of upland habitat to maintain native vegetative conditions; this generally requires periodic prescribed fire beneath trees to reduce brush and favor growth of grasses and forbs.

Table 7. Gopher Tortoise Summary

Nested Targets	Eastern indigo snake, Eastern diamondback rattlesnake, Florida mouse, Gopher frog			
Overall Viability	**FAIR**			
High Threats	Housing & Urban Areas	Commercial & Industrial Areas	Roads & Railroads	
Medium Threats	Fire & Fire Suppression	Wood & Pulp Plantations	Logging & Wood Harvesting	War, Civil Unrest & Military Exercises
Low Threats	Recreational Activities	Hunting & Harvesting Aquatic Resources		
Stresses	Altered fire regime; Habitat fragmentation; Habitat availability; Habitat structure & composition; Population structure & recruitment			

PINE FLATWOODS MATRIX WITH EMBEDDED WETLANDS

Figure 14. Pine Flatwoods

Target Description

Pine Flatwoods occur on flat, moderately well-drained sandy soils with varying levels of organic matter, often underlain by a hard pan. While the canopy is consistently longleaf pine, the understory varies greatly, from shrubby to an open understory of grasses and herbs. The primary environmental factors controlling vegetation type are soil moisture (soil type and depth to groundwater) and fire history (natural and human-influenced). The functional significance of the Flatwoods Matrix is to maintain regional biodiversity and is the foundation for fire, the key ecological process for much of GCPEP. The natural communities that make up the Pine Flatwoods Matrix are:

Scrubby Flatwoods: Scrubby Flatwoods are characterized as an open canopy forest of widely scattered pine trees with a sparse shrubby understory and numerous areas of barren white sand. This community is associated with and often grades into Mesic Flatwoods, Scrub, or Sandhills. It is essentially a Mesic Flatwoods with a Scrub understory. It is also known as xeric flatwoods and dry flatwoods. FNAI Ranking: G3S3.

Mesic Flatwoods: Mesic Flatwoods are characterized as a fire-maintained open canopy forest of widely spaced pines, little or no midstory, and a dense groundcover of herbs and shrubs. This community is closely associated with and often grades into Wet Flatwoods or Scrubby Flatwoods and Longleaf Pine Sandhills. It is also known as pine flatwoods, pine savannas, and pine barrens. FNAI Ranking: G?S4.

Wet Flatwoods: Wet Flatwoods are relatively open-canopy forests of pines with either thick shrubby understory and very sparse groundcover, or a sparse understory and a dense groundcover of hydrophytic herbs and shrubs. They are closely associated with and often grade into Hydric Hammock, Mesic Flatwoods, Wet Prairie, or Basin Swamp. They are also known as low flatwoods, moist pine barren, hydric flatwoods, pond-pine flatwoods, pocosin, pine savanna or flatwoods. FNAI Ranking: G?S4?.

Wet Prairie: Wet Prairie is characterized as a treeless plain with a sparse to dense groundcover of grasses and herbs. It is closely associated with and often grades into Wet Flatwoods, Depression Marsh, Seepage Slope, and Mesic Flatwoods. Wet Prairies are also known as sand marsh, savanna, coastal savanna, coastal prairie, and pitcher plant prairie. FNAI Ranking: G?S4?.

The following communities are embedded within the Pine Flatwoods Matrix:

Baygall buckwheat tree association: This occurs over large, low areas associated with floodplains or flatwoods, and can occur in narrow bands along streams. It is also known as the flatwood variant.

Depression Marshes: Depression Marshes are characterized as shallow, usually rounded depressions in sand substrate with herbaceous vegetation often in concentric bands. They are often associated with and grade into Wet Prairie, Seepage Slope, Wet Flatwoods, Mesic Flatwoods, Dome Swamp or Bog, and also may be associated with various types of lakes, such as Sandhill Lake or Flatwoods Lake. Depression Marshes are also known as isolated wetland, flatwoods pond, St. John's wort pond, pineland depression, ephemeral pond, and seasonal marsh. FNAI Ranking: G4?S3.

Dome Swamps: Dome Swamps are shallow, forested depressions that sometime present a domed profile because trees are shorter in the shallower waters of the outer edge, gradually becoming taller in the deeper water of the interior. They typically grade into Wet Prairie around the periphery, but Bottomland Forest may also border them. Dome Swamps are also known as isolated wetland cypress dome, cypress pond, gum pond, bayhead, cypress gall, and pine barrens pond. FNAI Ranking: G4?/S3?.

Seepage Slopes: Seepage Slopes are wetlands on or at the base of slopes where moisture levels are maintained by the downslope seepage of water from the intersection with a semi- or impermeable soil layer resulting in saturated but rarely inundated conditions. Seepage Slopes are also known as herb bogs, pitcher plant bogs, grass-sedge bogs, shrub bogs, and seeps. They are relatively rare habitats throughout the state. The functional significance of Seepage Slopes is the maintenance of regional biodiversity. FNAI Ranking: G3?/S2.

Table 8. Pine Flatwoods Matrix with Embedded Wetlands Summary

Nested Targets	Mesic flatwoods, Scrubby flatwoods, Wet flatwoods, Wet prairie, Bog, Depression wetlands, Dome swamps, Flatwoods salamander, Four-toed salamander, Pine barrens tree frog, Gopher frog, Florida bog frog, White-top pitcher plant, Red pitcher plant, Hummingbird flower, Panhandle lily, Bog button, Eastern indigo snake, Southern hognose snake, Eastern diamondback rattlesnake, Southeastern big-eared bat, Southeastern bat						
Overall Viability	**FAIR**						
High Threats	Housing & Urban Areas	Commercial & Industrial Areas	Roads & Rail	Dams & Water Mangt./ Use	Fire & Fire Suppression	Wood & Pulp Plantations	Logging & Wood Harvesting
Medium Threats	Recreational Activities		Problematic Native Species			Utility & Service Lines	
Low Threats	Invasive Non-Native/Alien Species						
Stresses	Altered fire regime; Loss of habitat availability; Altered groundcover composition; Absence of nested wetland species; Altered forest structure; lack of ecotonal edge; Altered hydrology						

RED-COCKADED WOODPECKER

Figure 15. Red-cockaded Woodpecker

Target Description

The Red-cockaded woodpecker (*Picoides borealis*) is a medium size woodpecker identified by its black-and-white barred back, black cap, and large white cheek patch. The adult male has a barely visible red tuft on the crown which juvenile males lack. Their voices consist of a raspy *sripp* and high-pitched *tsick* which are nasal in sound. Red-cockaded woodpeckers (RCWs) inhabit open, mature pine or pine-oak woodlands. They excavate nest and roost cavities only in large living pines usually afflicted with heartwood disease. They peck small holes around the cavity opening. From these holes, resin oozes down the trunk and helps to repel predators. They have evolved a cooperative breeding behavior that limits habitat occupation to sites that have existing RCW cavities; hence, natural population expansion is slow even when otherwise excellent habitat is available.

RCW family groups defend large home ranges (150-500 acres) and viable populations require relatively high densities (300 to 500 breeding pairs) in order to survive expected fluctuations in key habitat and demographic variables. Evidence suggests that RCW productivity is directly related to the diversity and quality of the understory plant-insect community, which is mediated by frequent fire.

Because of the large area required to establish and maintain a viable population, RCW recovery is a politically charged issue. RCW population changes (natural rates of increase/decrease) can serve as one indicator of the integrity of fire-maintained longleaf pine ecosystems, and the many species that depend on the open habitats preferred by RCWs. This species is likely an indicator of high quality longleaf pine sandhills and has shown a positive correlation with some fire-associated habitat variables. Key Ecological Processes: fire. Its current FNAI Ranking is G3S2 and they were federally listed as Endangered in 1970 under the Endangered Species Act. Declines are due to habitat loss, demographic isolation, fire exclusion/suppression of open pine habitats, and loss of old tress (>100 years) required for cavity excavation.

Table 9. Red-cockaded Woodpecker Summary

Nested Targets	N/A			
Overall Viability	**FAIR**			
Medium Threats	Housing & Urban Areas			
Low Threats	Fire & Fire Suppression	Wood & Pulp Plantations	Logging & Wood Harvesting	Problematic Native Species
Stresses	Altered fire regime; Altered population size & dynamics; Reduced habitat connectivity; Altered habitat structure			

STEEPHEAD SYSTEMS

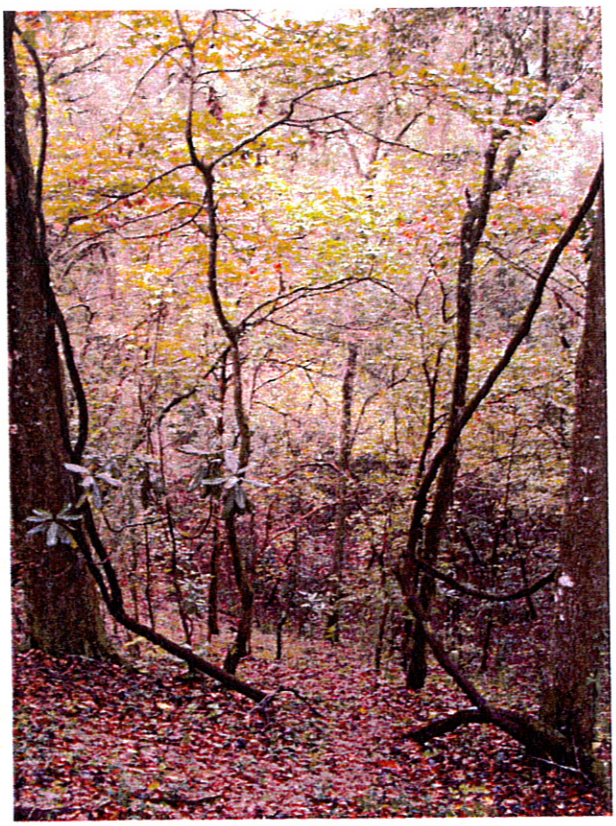


Figure 16. Steephead System

Target Description

The Steephead System encompasses several natural communities with similar canopy species (mesic hardwoods) and topographic positions. Steepheads are deep ravines at the headwaters of streams, where sands overlay a clay layer. Lateral movement of the groundwater emerges (seepage flow) and washes away the sandy soils, creating an amphitheater-shaped steephead with steeply sloped sides, up to 80 feet deep and 1000 feet wide. Slopes are similar but do not have an amphitheater-shaped topography. Species composition is dependent on the interaction of fire, soil moisture, slope aspect, steephead size, time since formation, and the availability of propagules. These systems have higher humidity and cooler temperatures than the uplands. These systems function to maintain regional biodiversity and hydrology of streams. Key Ecological Processes: hydrology and fire. The following communities and association are part of this focal target:

Slope Forest: The Slope Forest is characterized as well-developed, closed canopy forests of upland hardwoods on steep slopes, bluffs, and ravines. This forest community is associated with and often grades into Upland Pine Forests or Sandhills at their upper elevations, and Bottomland Forest, Seepage Slope, or floodplain communities at their lower elevations. Also known as ravine forest, bluff forest, mesic hammock, hardwood hammock, steepheads, mixed hardwood and pine, climax hardwoods, southern mixed hardwoods, and mixed mesophytic forest. FNAI Ranking: G3S2.

Upland Hardwood Forest and Upland Mixed Forest: These communities are characterized as well-developed, closed-canopy forests of upland hardwoods on rolling hills. They are often associated with and grade into Upland Pine Forest, Slope Forest, or Xeric Hammock. They are also known as mesic hammock, climax hardwoods, upland hardwoods, beech-magnolia climax, oak-magnolia climax, pine-oak-hickory association, southern mixed hardwoods, clay hill hammock, and Piedmont forest. On Eglin AFB they occur in small patches on the slopes of the steephead ravines and in narrow corridors on the slopes of large stream systems. FNAI Rankings: G?S3, G?S4.

Florida anise association: This association of Baygall occurs in the upper reaches of seepage streams, near the base of the steephead ravines and is therefore seepage fed. It is also known as the steephead variant. Examples can be found in the bottom of almost any well-formed steephead.

Table 10. Steephead Systems Summary

Nested Targets	Steephead seepage stream, Steephead slope forest, Diminutive clubtail, Ashe's magnolia, Alabama milkweed, Okaloosa darter, Southern dusky salamander, Seal salamander, Florida bog frog								
Overall Viability	**GOOD**								
Medium Threats	Housing & Urban Areas		Dams & Water Management/Use						
Low Threats	Roads & Railroads	Fire & Fire Suppression	Wood & Pulp Plantations	Logging & Wood Harvesting	Invasive Non-Native/ Alien Species	Problem Native Species	Household Sewage & Urban Waste Water	Agr. & Forestry Effluent	Garbage & Solid Waste
Stresses	Altered fire regime; Altered hydrology								

UPLAND PINE MATRIX WITH EMBEDDED WETLANDS

Figure 17. Longleaf Pine Sandhill

Target Description

Longleaf Pine Sandhills are characterized by an open, savanna-like structure with a moderate to tall canopy of longleaf pines, a sparse midstory of oaks and other hardwoods, and a diverse groundcover comprised mainly of grasses, forbs and low stature shrubs. It is believed this structure was maintained by lightning season fires, every 3-5 years, which control hardwood, sand pine, and titi encroachment. Longleaf Pine Sandhills consist of a high diversity of species adapted to fire and the heterogeneous conditions that frequent fires create. Variation within the Sandhills is recognized by two associations differing in the dominance of grass species (wiregrass versus bluestem). Sandhills are often associated with and grade into Scrub, Scrubby Flatwoods, Mesic Flatwoods, Upland Pine Forest, or Xeric Hammock. It is also known as longleaf pine-turkey oak, longleaf pine-xerophytic oak, longleaf pine-deciduous oak, or high pine. The functional significance of the Sandhill Matrix is to maintain regional biodiversity and is the foundation for fire, the key ecological process for many systems within the GCPEP area. Florida Natural Areas Inventory (FNAI) Ranking: G2G3/S2. Embedded within the Longleaf Pine Sandhill Matrix are:

Mainland Sand Pine Scrub: The Scrub community, which is a type of xeric uplands, is characterized as a closed to open canopy forest of sand pines with dense clumps or vast thickets of scrub oaks and other shrubs dominating the understory. It is associated with and often grades into the more mesic Sandhills and Scrubby Flatwoods, and the equally dry Xeric Hammock. Scrub is also known as sand pine scrub, Florida scrub, sand scrub, rosemary scrub, and oak scrub. There are two associations of Scrub, barrier island scrub and mainland scrub (which we are referring to as the Mainland Sand Pine Scrub). The Mainland Sand Pine Scrub occurs on deep sands of ancient dune ridges and shorelines and in areas somewhat protected from fire, such as sandy uplands between the confluence of creeks. FNAI Ranking: G2S2.

Xeric Hammocks: Xeric Hammocks are characterized as either a scrubby, dense, low canopy forest with little understory other than palmetto, or a multi-storied forest of tall trees with an open or closed canopy. They are an advanced successional stage of Scrub or Sandhill. Xeric Hammocks are often associated with and grade into Scrub, Sandhill, Upland Mixed Forest or Slope Forest. It is often considered the climax community on sandy uplands that are naturally fire suppressed. These areas do not require fire, which should extinguish naturally at the edges. They are also known as xeric forest, sand hammock, live oak forest, oak woodland, and oak hammock. FNAI Ranking: G?S3.

Seepage Slopes: Seepage Slopes are wetlands characterized as boggy meadows on or at the base of slopes where moisture levels are maintained by the downslope seepage of water from the slope intersecting a perched water table resulting in saturated but rarely inundated conditions. Seepage Slopes are also known as herb bog, pitcher plant bog, grass-sedge bog, shrub bog, and seep. They are relatively rare habitats throughout the state. FNAI Ranking: G3?/S2.

Sandhill Upland Lakes: Sandhill Upland Lakes are shallow rounded solution depressions occurring in sandy upland communities. They are generally permanent water bodies, although water levels may fluctuate substantially, sometimes becoming completely dry during extreme droughts. Fire from the surrounding Sandhill Matrix influences structure and composition of the vegetation surrounding these lakes. Sandhill Upland Lakes are also known as sand-bottomed lake, silt-bottomed lake, oligotrophic lake, and sandhill lake. FNAI Ranking: G4?/S2.

Table 11. Upland Pine Matrix with Embedded Wetlands Summary

Nested Targets	Longleaf pine sandhill, Sand pine scrub, Xeric hammock, Clay hill longleaf pine, Baygall, Seepage slope, Bog, Depression marsh, Dome swamp, Southern copperhead, Eastern diamondback rattlesnake, Eastern indigo snake, Florida pine snake, Tiger salamander, Pine barrens tree frog, Gopher frog, Bachmann's sparrow, Florida burrowing owl, Eastern chipmunk, Sherman's fox squirrel, Upland game birds, Florida king snake					
Overall Viability	**FAIR**					
Very High Threats	Housing & Urban Areas	Commercial & Industrial Areas				
High Threats	Dams & Water Management/Use		Wood & Pulp Plantations		Logging & Wood Harvesting	
Medium Threats	Roads & Railroads	Fire & Fire Suppression	Recreational Activities	Problematic Native Species	War, Civil Unrest & Military Exercises	Agricultural & Forestry Effluents
Low Threats	Invasive Non-Native/Alien Species					
Stresses	Loss of habitat availability; Altered fire regime; Altered groundcover composition; Absence of nested wetland species; Altered forest structure; Lack of natural ecotonal edge; Altered hydrology; Patch size distribution					

BIODIVERSITY VIABILITY AND INTEGRITY RANKING SYSTEM

The viability or integrity of the selected conservation elements should be assigned a rank using a four-level scale. The ratings are made using the best science available and often with vigorous discussion. The planning team develops simple categories that define the status of the target in terms of landscape context, condition, and size. The four-level scale is as follows:

- VERY GOOD. The factor is functioning at its ecologically desirable status and requires little human intervention.
- GOOD. The factor is functioning within its range of acceptable variation. However, it may require some human intervention to maintain this status.
- FAIR. The factor lies outside of its range of acceptable variation and requires human intervention. If unchecked, the target will be vulnerable to serious degradation.
- POOR. Allowing the factor to remain in this condition for an extended period will make restoration or preventing extirpation practically impossible.

The three criteria – landscape context, condition and size – are described below:

- LANDSCAPE CONTEXT. This is an integrated measure of two factors: the dominant environmental regimes and processes that establish and maintain the element occurrence, and connectivity. Dominant environmental regimes and processes include herbivory, hydrologic and water chemistry regimes (surface and groundwater), geomorphic processes, climatic regimes (temperature and precipitation), fire regimes and many kinds of natural disturbance. Connectivity includes such factors as species having access to habitats and resources needed for life cycle completion, fragmentation of ecological systems and the ability to respond to environmental change through dispersal, migration, or re-colonization.
- CONDITION. We make an integrated measure of the composition, structure and biotic interactions that characterize the occurrence. This includes factors such as reproduction, age structure, biological composition (e.g., presence of native versus non-native species; presence of characteristic patch types for ecological systems), structure (e.g., canopy, understory, and groundcover in a forested community) and biotic interactions (e.g., levels of competition, predation, and disease).
- SIZE. This is a measure of the area or abundance of the conservation target or element's occurrence. For ecological systems and communities, size is simply a measure of the occurrence's geographic coverage. For species, size takes into account the area of occupancy and number of individuals. Minimum area needed to ensure survival or re-establishment after natural disturbance is another aspect of size.

While we have a good understanding of the viability of a majority of our conservation targets, there are still a few that as we continue to learn and understand them more thoroughly, we will need to re-visit them and establish indicator ratings for specific key attributes and indicators.

The current overall viability summary for the Panhandle Longleaf Pine LCA / GCPEP is found in the table below.

Table 12. Overall Viability Summary

Conservation Targets	Landscape Context	Condition	Size	Viability Rank
Alluvial Rivers, Streams and Floodplains		Fair	Fair	**Fair**
Barrier Island Ecosystem		Fair		**Fair**
Blackwater Rivers, Streams and Floodplains		Good	Fair	**Good**
Diadromous Fishes	Good			**Good**
Estuarine Systems	Good			**Good**
Florida Black Bear	Fair		Fair	**Fair**
Gopher Tortoise		Fair	Fair	**Fair**
Pine Flatwoods Matrix with Embedded Wetlands	Fair	Fair	Fair	**Fair**
Red-cockaded Woodpecker	Fair	Fair	Fair	**Fair**
Steephead Systems	Good			**Good**
Upland Pine Matrix with Embedded Wetlands	Fair	Fair	Good	**Fair**
Overall Site Biodiversity Health Rank				**FAIR**

Overall, the health of the PLLP LCA / GCPEP is considered "fair" and holds potential for further degradation without continued human intervention. While most of the aquatic targets are considered "good" except for Alluvial Rivers, Streams, and Floodplains, all of the terrestrial targets are ranked as "fair". It is fortunate that there are still large tracts of conservation lands in northwest Florida and southern Alabama that have retained connectivity through aggressive conservation land acquisition and partnerships like GCPEP. However, past incompatible land uses, disruption of natural environmental regimes, such as frequent fire, and population growth have stressed and degraded many of the targets. Ecological restoration is still in its infancy in this ecoregion, but land managers are recognizing the need to restore many of these disrupted ecological regimes and processes and are finding success in pursuing restoration strategies, particularly within the longleaf ecosystem and its embedded conservation targets. Viability in this ecoregion should improve into the future as restoration of systems, reintroduction of species at appropriate densities, efforts to connect landscapes, and land management partnerships, such as GCPEP, continue.

THREATS (A.K.A., STRESSES AND SOURCES OF STRESS)

Threats are composed of stresses and sources of stress (or "sources"). A stress is defined as a process or event with direct negative consequences on the biodiversity (e.g., alteration of water flow into a marsh). The source of stress is the action or entity that produces a stress (e.g., channel building). The planning team must identify and rank the stresses and sources for each of the conservation targets.

The stress ranks and source ranks: 1) help elucidate the factors influencing that species and ecological systems and subsequently, the necessary conservation strategies, and 2) contribute to the analysis of threats for the conservation area. The stress and source rankings are analyzed together via computer to provide threat ranks for the element.

Stresses are ranked based on the severity and scope of damage expected within 10 years under the current circumstances. Sources of stress are ranked based on the expected contribution of the sources and the irreversibility of the impact.

All these aspects are combined into an overall threat rank for a particular source (i.e., operation of dams) to all ecological systems. The Summary of Threats for the Panhandle Longleaf Pine LCA / GCPEP is in the table below (Table 13) with a description of the threats following.

Overall, the top "killer" threats to this area pertain to incompatible development. Housing & Urban Areas, Commercial & Industrial Areas, and Roads were ranked overall as "Very High" and affect every target, either directly or indirectly, in some capacity and severity. Several of the counties in the GCPEP landscape continue to rank in the top tier of fastest growing counties in the State of Florida. Property values have escalated dramatically over the past two years, and speculative interest in undeveloped or damaged areas increased after the recent hurricanes. This growth and development in areas surrounding GCPEP partner lands and in sensitive areas inappropriate for development ends up fragmenting the landscape with roads and infrastructure, increases direct human disturbances to wildlife, leads to greater levels of local air and water pollution, and presents more constraints to vital management activities such as prescribed burning and watershed protection.

Table 13 also ranks six other threats as "High." Of the six threats, Dams and Water Management/Use and Fire and Fire Suppression exhibit the greatest threats to the area, affecting, to some degree, all 11 targets. Other Ecosystem Modifications, such as the placement of artificial structures (i.e., seawalls and docks, rip-rapping shorelines, and beach renourishment), have a significant impact on aquatic systems, particularly Barrier Islands and Estuaries. Forestry/silvicultural practices (Wood & Pulp Plantations and Logging & Wood Harvesting), including their "footprint" and present practices, have an important negative impact on our landscape. Shipping Lanes have the "lowest" overall "High" threat to the landscape, though the impact of this threat is great to Barrier Island Ecosystems and Estuarine Systems. All six threats pose tremendous negative consequences to the landscape, especially as population and resource trends continue to escalate.

Several "Emerging" threats were identified in Table 13, and while the threat level is not as great as noted above, they represent problematic areas that must be considered early, rather than late. One significant threat that emerges is problems associated with organisms (Problematic Native and Invasive/Non-native Species). These problematic organisms, both plants and animals, have the potential to negatively affect all of our listed targets. Recreation (Recreational Activities and Tourism & Recreation Areas) is becoming a growing threat to the landscape, affecting, through use and infrastructure, six (and potentially all) of our targets. They range from "overuse/misuse" to landscape alterations due to large tracts of land being converted. Waste water threats (Household Sewage & Urban Waste Water, Industrial & Military Effluents, and Agricultural & Forestry Effluents), while not as great in the recent past, are once again becoming problematic in the area. Threats range from improper or illegal septic tank installation to poorly managed non-point and point sources of pollution. As with our other "Very High" and "High" threats, these "Emerging" threats are directly or indirectly related to human activity and/or population growth and should be addressed.

Table 13. Summary of Threats for the PLLP LCA / GCPEP

Threats Across Targets	Alluvial Rivers, Streams, Floodplains	Barrier Island Ecosystem	Blackwater Rivers, Streams, Floodplains	Diadromous Fishes	Estuarine Systems	Florida Black Bear	Gopher Tortoise	Pine Flatwoods Matrix w/ Wetlands	Red-Cockaded Woodpecker	Steephead Systems	Upland Pine Matrix w/ Wetlands	Overall Threat Rank
Housing & Urban Areas	High	Very High	High		High	Very High	High	High	Medium	Medium	Very High	Very High
Commercial & Industrial Areas	Medium		High		High	Very High	High	High			Very High	Very High
Roads & Railroads	Medium	High	High	Medium	Medium	Very High	High	High		Low	Medium	Very High
Dams & Water Management/use	Medium		Medium	High	Medium	High		High		Medium	High	High
Fire & Fire Suppression	High	High	High			Medium	Medium	High	Low	Low	Medium	High
Other Ecosystem Modifications	Low	Very High	Medium	Medium	High							High
Wood & Pulp Plantations	Medium		Medium			Medium	Medium	High	Low	Low	High	High
Logging & Wood Harvesting	Low		Low				Medium	High	Low	Low	High	High
Shipping Lanes		High			High							High
Invasive non-native/ Alien Species	Medium	High	Medium		Low			Low		Low	Low	Medium
Recreational Activities	Low	Low	Medium		Medium	Low	Low	Medium			Medium	Medium
Problematic Native Spp.	Medium		Medium					Medium	Low	Low	Medium	Medium
Utility & Service Lines		Medium			Low			Medium			Medium	Medium
Household Sewage & Urban Waste Water	Low	Medium	Low		Medium					Low		Medium
Industrial & Military Effluents	Low		Low	Medium	Medium							Medium
Tourism & Recreation Areas	Low	Medium	Low		Medium							Medium
Annual & Perennial Non-Timber Crops	Medium		Medium									Medium
War, Civil Unrest & Military Exercises							Medium				Medium	Medium
Agricultural & Forestry Effluents	Low		Low							Low	Medium	Low
Excess Energy		Low		Medium								Low
Garbage & Solid Waste	Low		Low		Low					Low		Low
Fishing & Harvesting Aquatic Resources				Low	Low							Low
Hunting & Collecting Terrestrial Animals						Low	Low					Low
Threat Status for Targets and Project	High	Very High	High	Medium	High	Very High	High	Very High	Low	Medium	Very High	Very High

In order to clear-up any ambiguity or uncertainty of what a particular threat pertains to, the planning team used the following definitions as guidance.

Housing & Urban Areas – Human cities, towns, and settlements including non-housing development typically integrated with housing.

- The actual "footprint" of development (urban areas, suburbs, villages, ranchettes, vacation homes, shopping areas, offices, schools, hospitals)
- The potential of development in inappropriate areas
- Encroachment
- In-holdings

Commercial & Industrial Areas – Factories and other commercial centers.

- The actual "footprint" of development (factories, stand-alone shopping centers, office parks, power plants, airports, landfills)

Roads & Railroads – Surface transport on roadways and dedicated tracks.

- Highways, secondary roads, primitive (dirt) roads, logging roads
- Bridges & causeways
- Culverts
- Road kill
- Fencing associated with roads

Dams & Water Management/Use – Changing water flow patterns from their natural range of variation either deliberately or as a result of other activities.

- Dam construction (also considering the potential)
- Sediment control
- Wetland filling
- Levees and dikes
- Surface water diversions
- Groundwater pumping
- Channelization
- Ditching

Fire & Fire Suppression – Suppression or increase in fire frequency and/or intensity outside of its natural range of variation.

- Inappropriate or inadequate fire management
- Altered burn season and frequency
- Plowlines and fire breaks
- Arson

Other Ecosystem Modifications – Other actions that convert or degrade habitat in service of "managing" natural systems to improve human welfare

- Seawalls/Docks / placement of other artificial structures
- Rip-rap along shoreline / shoreline hardening
- Beach "renourishment" or construction

Wood & Pulp Plantations – Stands of trees planted for timber or fiber outside of natural forests, often with non-native species.

- The actual "footprint" of off-site pine plantations

Logging & Wood Harvesting – Harvesting trees and other woody vegetation for timber, fiber, or fuel

- Actual practices involved: bedding, species conversion, groundcover destruction
- One-age management versus un-even age management
- Deadhead logging
- Removal of upland large woody debris
- Pulp or woodchip operations
- Fuel wood collection

Shipping Lanes – Transport on and in freshwater and ocean waterways.

- Dredging
- Canals/passes
- Inlet relocation/creation

Invasive Non-Native/Alien Species – Harmful plant, animals, pathogens and other microbes not originally found within the ecosystem(s) in question and directly or indirectly introduced and spread into it by human activities.

- Feral hogs
- Feral cats
- Top invasive plants in landscape

Recreational Activities – People spending time in nature or traveling in vehicles outside of established transport corridors, usually for recreational reasons.

- Off-road vehicles (OHV, ATV)
- Canoe launches in inappropriate places
- Boats/prop scarring
- Clearing woody debris for water conveyance or recreational access
- Jet-skis
- Temporary campsites
- Carrying capacity

Problematic Native Species – Harmful plants, animals, or pathogens and other microbes that are originally found within the ecosystem(s) in question, but have become "out-of-balance" or "released" directly or indirectly due to human activities (overabundant native deer).

- Overgrown titi
- Raccoons
- Predators in RCW cavities

Utility & Service Lines – Transport of energy & resources (electrical & phone wires).

- Roads/Utility corridors
- Underground facilities in sensitive areas

Household Sewage & Urban Waste Water – Water borne sewage and non-point runoff from housing and urban areas that include nutrients, toxic chemicals and/or sediments.

- Discharge from municipal waste treatment plants
- Leaking septic tanks
- Untreated sewage
- Oil or sediments from roads (stormwater run-off)
- Fertilizers and pesticides from lawns and golf-courses

Industrial & Military Effluents – Water borne pollutants from industrial and military sources including mining, energy production, and other resource extraction industries that include nutrients, toxic chemicals and/or sediments.

- Industrial effluent
- Illegal dumping of chemicals
- PCBs in river sediments

Tourism & Recreation Areas – Tourism and recreation sites with a substantial footprint.

- The actual "footprint" of areas, not the practices
- Golf courses
- Campgrounds / RV parks
- Water parks
- OHV parks
- Resorts

Annual & Perennial Non-Timber Crops – Crops planted for food, fodder, fiber, fuel, or other uses.

- The actual "footprint" of areas, not the practices
- Peanut farms
- Cotton fields
- Soy farms

War, Civil Unrest & Military Exercises – Actions by formal or paramilitary forces without a permanent footprint.

- Tank ranges
- Test ranges
- Ranger training areas
- Sight line paths

Agricultural & Forestry Effluents – Water-borne pollutants from agricultural, silivicultural, and aquaculture systems that include nutrients, toxic chemicals and/or sediments including the effects of these pollutants on the site where they are applied.

- Nutrient loading from fertilizer run-off
- Herbicide run-off
- Soil erosion

Excess Energy – Inputs of heat, sound, or light that disturb wildlife or ecosystems.

- Heated water from industrial facilities
- Beach lights disorienting turtles

Garbage & Solid Waste – Rubbish and other solid materials including those that entangle wildlife.

- Municipal waste
- Litter from cars
- Flotsam & jetsam from recreational boats
- Illegal dumping

Fishing & Harvesting Aquatic Resources – Harvesting aquatic wild animals or plants for commercial, recreation, subsistence, research, or cultural purposes, or for control/persecution reasons; includes accidental mortality/bycatch.

- Gulf sturgeon eggs
- In-shore fishing pressures

Hunting & Collecting Terrestrial Animals – Killing or trapping terrestrial wild animals or animal products for commercial, recreation, subsistence, research or cultural purposes, or for control/persecution reasons; includes accidental mortality/bycatch.

- Illegal takes of black bear and gopher tortoise

OBJECTIVES AND CONSERVATION STRATEGIES (A.K.A., STRATEGIES)

Viability and threat assessments help to inform the selection of project objectives (*what* the project aims to achieve) and strategic actions (*how* we propose to do it) by identifying critical threats in need of abatement and key ecological attributes in need of enhancement or restoration.

The following 27 objectives, in no particular order, were developed for the PLLP LCA / GCPEP landscape. Included are the strategic actions that are associated with each objective.

Objective: By 2017, greater than 75% of the river miles with intact floodplain / riparian zone within the PLLP LCA / GCPEP are either protected or in some form of conservation.

Strategic Action: Support and develop continued federal, state and local land acquisition funding programs.

Strategic Action: Secure commitments from private landowners and developers to protect river corridors through buffer programs and other land protection techniques.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Objective: By 2013, county governments and state agencies will adopt ecologically sustainable floodplain / shoreline protection requirements.

Strategic Action: Work with the TNC Rivers Team and the GCPEP Aquatic Subcommittee to mirror Florida counties that have adopted floodplain/shoreline protection ordinances, regulatory guidelines, and/or models.

Objective: By 2012, NWFWMD will adopt and implement minimum flows regimes (or reservations) that sustain freshwater and estuarine ecosystems for maintaining in-stream flow in priority rivers within the PLLP LCA / GCPEP landscape.

Strategic Action: Coordinate with the TNC Rivers and Marine Teams and the GCPEP Aquatic Subcommittee to establish ecologically sustainable flow regimes for PLLP LCA / GCPEP priority rivers.

Objective: By 2017, improve and/or maintain a Stream Condition Index (SCI) of "good" for greater than or equal to 75% of PLLP LCA alluvial and blackwater stream sites sampled.

Strategic Action: Work with DEP to increase the number of sites sampled and the frequency of sampling for SCI.

Strategic Action: Work with appropriate agencies on approaches to improve water quality as indicated by SCI below "good" or declining.

Objective: By 2017, ensure that Total Maximum Daily Loads (TMDLs) are established for all PLLP LCA / GCPEP priority rivers and estuaries.

Strategic Action: Work with DEP on TMDL development for pollutants affecting aquatic ecosystems on PLLP LCA / GCPEP priority rivers and estuaries.

Objective: By 2012, commitments will be secured from decision-makers, regulatory agencies and stakeholders to prevent any further dams and water diversions on priority rivers in order to maintain flow conditions from identified historic flow records.

Strategic Action: Coordinate with the TNC Rivers and Marine Teams and the GCPEP Aquatic Subcommittee to establish ecologically sustainable flow regimes for PLLP LCA / GCPEP priority rivers.

Objective: By 2012, all future permits for small agricultural impoundments will have ecological based in-stream flow and species diversity requirements, or ecologically sustainable alternatives.

Strategic Action: Work through the GCPEP Aquatic Subcommittee to investigate options and develop BMPs for small agricultural impoundments.

Objective: Between 2007 and 2017, maintain at least 90% PLLP LCA / GCPEP riverine shorelines of priority rivers in a natural/unhardened/un-engineered state.

Strategic Action: Work through the GCPEP Aquatic Subcommittee and the TNC Rivers Team to establish strategies to protect riverine shoreline.

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Support and develop continued federal, state and local land acquisition funding programs.

Objective: Between 2007 and 2017, maintain or restore 75% of PLLP LCA / GCPEP bay shorelines to a natural/unhardened/un-engineered condition.

Strategic Action: Secure commitments from agencies managing conservation areas that no new hardening would be permitted by 2009.

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Support and develop continued federal, state and local land acquisition funding programs.

Objective: By 2017, "no wake" and/or "no motorize entry" zones associated with critical habitat (e.g., SAVs, shorebirds, oyster reefs, river riparian, and other aquatic zones) will be established and enforced as necessary.

Strategic Action: Work through the GCPEP Aquatic Subcommittee and the TNC Rivers and Marine Teams to promote establishment of protected zones.

Objective: By 2012, no new river dredging in previously un-dredged river channels and limited maintenance dredging within PLLP LCA / GCPEP landscape.

Strategic Action: Work with TNC's Rivers Team and the GCPEP Aquatic Subcommittee to develop strategies to preclude damaging dredging activities.

Objective: By 2010, prevent any future groundwater withdrawal that negatively affect hydroperiods in wetland communities including steepheads, isolated wetlands, and other natural wetland and aquatic systems.

Strategic Action: Work with the GCPEP Aquatic Subcommittee to develop a proposal for comprehensive water-use guidelines, incentive systems, and educational programs for local citizens, developers, local municipalities, and utility boards.

Objective: Between 2007 and 2017, no new cuts/passes within LCA coastline and any appropriate dredged material are deposited down current of passes and within longshore current zones.

Strategic Action: Work with TNC Marine Team, ACOE, state, local governments, etc to develop dredging and dredge material disposal plans that maximize protection / enhancement of marine targets.

Strategic Action: Develop alliances that are able to effectively stop any new proposed cuts/passes within the PLLP LCA / GCPEP landscape.

Objective: By 2012, coastal counties will coordinate and adopt guidelines that protect marine and barrier island targets for beach restoration/renourishment/reconstruction activities within their comprehensive beach restoration plans.

Strategic Action: Work with the TNC Marine Team to develop proposed guidelines that maximize protection of marine targets for all beach restoration/renourishment/reconstruction activities for incorporation in coastal county comprehensive beach restoration plans.

Objective: By 2017, more than 50% Upland Pine Matrix within GCPEP partner lands contain an average of 15-30 stems/acre of mature (greater than 60 years) pines with recruitment and maintenance of mature pines sufficient over time.

Strategic Action: Working with the TNC Forest Team, develop and refine guidelines for uneven-aged timber management in the longleaf pine communities within the PLLP LCA / GCPEP landscape.

Strategic Action: Promote longer stand rotations (greater than 60 years) and retention of old-growth longleaf pine across all GCPEP lands by participating in opportunities for comment on GCPEP partner management plan revisions/updates and throughout forestry planning.

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Objective: By 2010, ensure no net loss of native groundcover across GCPEP partner lands.

Strategic Action: Working through the GCPEP Invasive / Native and Fire Subcommittees, develop, adopt and implement guidelines and BMPs for protecting, restoring, and monitoring native groundcover.

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Objective: By 2017, identify and protect all high priority upland acres (recharge zones, linkages/corridors, in-holdings, and buffers) within the PLLP LCA / GCPEP landscape.

Strategic Action: Identify and prioritize in-holdings and buffers needed to sustain ecosystem function within the PLLP LCA / GCPEP.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Strategic Action: Support and develop continued federal, state and local land acquisition funding programs.

Strategic Action: Ensure that the "IP" lands (Yellow River Ravines, GCPEP Additions, and the Whiting Field Buffers) are managed to protect all of the conservation targets and ecological values associated with these lands.

Objective: By 2012, greater than or equal to 70% of all fire-dependent conservation lands within the PLLP LCA / GCPEP in maintenance phase condition (maintained by fire alone) will be managed within an identified appropriate fire regime (to attain a "good" viability rating).

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Work with agencies, municipalities, and prescribed fire advocacy groups to promote and ensure the safe, continued use of prescribed fire for ecological management, silviculture, and fuel reduction in the Wildland Urban Interface (WUIs) across the LCA.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Strategic Action: By 2009, the GCPEP Fire Subcommittee will develop strategies/actions to ensure that by 2012, greater than or equal to 70% of all fire-dependent conservation lands within the LCA in maintenance phase condition will be managed within an identified appropriate fire regime.

Objective: By 2017, apply fire in an appropriate regime to greater than or equal to 25% (subject to change with completion of the GCPEP GIS spatial database) of all GCPEP conservation lands in longleaf and slash pine plantations.

Strategic Action: Working through the GCPEP Fire Subcommittee, develop a process for ensuring that prescribed fire is being applied to longleaf pine plantations in an appropriate regime within GCPEP partner lands.

Strategic Action: By 2012, educate GCPEP partner land managers on range of appropriate tools, techniques, and sequencing of restoration activities for conversion of off-site plantation pine species to longleaf pine on sites historically occupied by longleaf pine.

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Objective: By 2017, on GCPEP partner lands all Category I (FLEPPC) invasive plant species and impacts from invasive animal species have not increased from 2008 / 2009 levels.

Strategic Action: Working through the GCPEP Invasive / Native Subcommittee, by 2008, finalize and begin implementation of the GCPEP invasive species management/work plan.

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Objective: By 2009, any new non-native invasive species discoveries within the GCPEP landscape are rapidly detected, communicated, and responded to appropriately.

Strategic Action: By 2008, work with the TNC Florida Invasive Species Team and the GCPEP Invasive / Native Subcommittee to establish a early detection / rapid response process for new invasive species infestations across the PLLP LCA / GCPEP landscape.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Objective: Starting in 2007, federal/state/local road entities will develop and implement ecologically sustainable design, maintenance, and improvement guidelines (Best Management Practices-BMPs) for new and existing roads.

Strategic Action: Work with agencies and organizations to develop BMP's for road development through and/or near conservation lands.

Strategic Action: Influence location and design of GINS roads and wildlife underpass development on Eglin roads (ex., 331, 85, 87, 285, I-10) to minimize impact to habitat.

Strategic Action: Work with GCPEP partners on management and maintenance of dirt and forest road systems.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Objective: By 2012, a regulatory framework will be adopted for new subdivision developments that consider adjacent developments, protects conservation values, and minimizes impacts to potentially threatened portfolio sites and focal targets.

Strategic Action: Propose language for comprehensive plans and other state and local regulations/ordinances/codes that protect conservation values and conservation targets.

Strategic Action: Engage developers and development industry (such as consultants) on implementing development that minimizes impacts to key conservation lands and provides for buffers and corridors.

Objective: By 2010, implement an integrated and ecologically sustainable recreational plan providing a balanced array of compatible recreational opportunities across the PLLP LCA.

Strategic Action: Create GCPEP Recreational Subcommittee to develop the sustainable recreational plan by 2009.

Strategic Action: Designate OHV sites to minimize negative environmental impacts across the LCA.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

By 2017, the PLLP LCA / GCPEP Red-cockaded woodpecker (RCW) populations will meet projected benchmarks established for the two metapopulations (Eglin and Conecuh/Blackwater) in the RCW recovery plan.

Strategic Action: Support RCW management, monitoring, and translocation efforts at Eglin AFB, Conecuh NF, and Blackwater River State Forest

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Objective: By 2017, the Florida black bear population within the PLLP LCA / GCPEP landscape will be greater than 100 bears.

Strategic Action: Working through the GCPEP Steering Committee and with individual partners, ensure management of Florida black bear habitat within the PLLP LCA / GCPEP is in accordance with the state management plan.

Strategic Action: Work with FDOT and county public works departments to ensure corridors and other passage features are built into new roads or when retrofitting existing roads in black bear habitat.

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

Strategic Action: Support and develop continued federal, state and local land acquisition funding programs.

Objective: By 2017, greater than 75% of protected acres with suitable habitat have gopher tortoises present at 1 tortoise burrow per acre.

Strategic Action: Establish the PLLP LCA / GCPEP Gopher Tortoise surveying, monitoring, and research program.

Strategic Action: Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.

Strategic Action: Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".

All strategies were discussed and prioritized according to three criteria: benefits, feasibility, and cost. The following table (Table 14) summarized that prioritization effort and displays each strategic action according to its overall combined priority rank.

Table 14. Prioritized Strategic Actions

Strategic Actions	Overall Rank	Benefits	Feasibility	Cost
Fully staff, fund, and equip the GCPEP Ecosystem Support Team to serve as an ecosystem management and monitoring resource to address the multiple priorities on GCPEP partner lands.	Very High	Very High	High	High
Promote longer stand rotations (greater than 60 years) and retention of old-growth longleaf pine across all GCPEP lands by participating in opportunities for comment on GCPEP partner management plan revisions/updates and throughout forestry planning.	Very High	Very High	Medium	Medium
Work with the TNC Rivers Team and the GCPEP Aquatic Subcommittee to mirror Florida counties that have adopted floodplain/shoreline protection ordinances, regulatory guidelines, and/or models.	Very High	Very High	Medium	Medium
Working with the TNC Forest Team, develop and refine guidelines for uneven-aged timber management in the longleaf pine communities within the PLLP LCA / GCPEP landscape.	Very High	Very High	Medium	Medium
By 2009, the GCPEP Fire Subcommittee will develop strategies/actions to ensure that by 2012, greater than and/or equal to 70% of all fire-dependent conservation lands within the LCA in maintenance phase condition will be managed within an identified appropriate fire regime.	High	High	High	Medium
Designate OHV sites to minimize negative environmental impacts across the LCA.	High	Very High	Medium	Very High
Develop alliances that are able to effectively stop any new proposed cuts/passes within the PLLP LCA / GCPEP landscape.	High	High	Medium	Medium
Engage developers and development industry (such as consultants) on implementing development that minimizes impacts to key conservation lands and provides for buffers and corridors.	High	High	Medium	Medium
Establish and maintain a GCPEP website for public outreach and internal interface for GCPEP partner communications including a comprehensive GIS database with "webtool".	High	High	High	High
Propose language for comprehensive plans and other state and local regulations/ordinances/codes that protect conservation values and conservation targets.	High	High	Medium	Medium
Secure commitments from private landowners and developers to protect river corridors through buffer programs and other land protection techniques.	High	Very High	Medium	High
Support and develop continued federal, state and local land acquisition funding programs.	High	Very High	Medium	Very High
Work through the GCPEP Aquatic Subcommittee and the TNC Rivers and Marine Teams to promote establishment of protected zones.	High	Very High	Medium	High
Work with agencies and organizations to develop BMP's for road development through and/or near conservation lands.	High	Very High	Medium	High
Working through the GCPEP Fire Subcommittee, develop a process for ensuring that prescribed fire is being applied to longleaf pine plantations in an appropriate regime within GCPEP partner lands.	High	High	Medium	Medium

Strategic Actions	Overall Rank	Benefits	Feasibility	Cost
Working through the GCPEP Invasive / Native and Fire Subcommittees, develop, adopt and implement guidelines and BMPs for protecting, restoring, and monitoring native groundcover.	High	Very High	Medium	High
By 2008, work with the TNC Florida Invasive Species Team and the GCPEP Invasive / Native Subcommittee to establish an early detection / rapid response process for new invasive species infestations across the PLLP LCA / GCPEP landscape.	Medium	Medium	Medium	Medium
Coordinate with the TNC Rivers and Marine Teams and the GCPEP Aquatic Subcommittee to establish ecologically sustainable flow regimes for PLLP LCA / GCPEP priority rivers.	Medium	Medium	Medium	Medium
Create GCPEP recreational subcommittee to develop the sustainable recreational plan by 2009.	Medium	Medium	Medium	Medium
Ensure that the "IP" lands (Yellow River Ravines, GCPEP Additions, and the Whiting Field Buffers) are managed to protect all of the conservation targets and ecological values associated with these lands.	Medium	Very High	Low	High
Identify and prioritize in-holdings and buffers needed to sustain ecosystem function within the PLLP LCA / GCPEP landscape.	Medium	Medium	High	Medium
Influence location and design of GINS roads and wildlife underpass development on Eglin roads (ex., 331, 85, 87, 285, I-10) to minimize impact to habitat.	Medium	High	Medium	High
Work through the GCPEP Aquatic Subcommittee and the TNC Rivers Team to establish strategies to protect riverine shoreline.	Medium	Medium	High	Medium
Work with appropriate agencies on approaches to improve water quality as indicated by SCI below "good" or declining.	Medium	Medium	Medium	Medium
Work with FDOT and county public works departments to ensure corridors and other passage features are built into new roads or when retrofitting existing roads in black bear habitat.	Medium	Very High	Low	High
Work with GCPEP partners on management and maintenance of dirt and forest road systems.	Medium	Medium	Medium	Medium
Work with the GCPEP Aquatic Subcommittee to develop a proposal for comprehensive water-use guidelines, incentive systems, and educational programs for local citizens, developers, local municipalities, and utility boards.	Medium	Medium	Medium	Medium
Work with the TNC MarineTeam to develop proposed guidelines that maximize protection of marine targets for all beach restoration/renourishment/reconstruction activities for incorporation in coastal county comprehensive beach restoration plans.	Medium	High	Low	Medium
Work with TNC Marine Team, ACOE, state, local governments, etc. to develop dredging and dredge material disposal plans that maximize protection / enhancement of marine targets.	Medium	High	Low	Medium
Work with TNC's Rivers Team and the GCPEP Aquatic Subcommittee to develop strategies to preclude damaging dredging activities.	Medium	Medium	Medium	Medium

Strategic Actions	Overall Rank	Benefits	Feasibility	Cost
Working through the GCPEP Steering Committee and with individual partners, ensure management of Florida black bear habitat within the PLLP LCA / GCPEP landscape is in accordance with the state management plan.	Medium	Medium	Medium	Medium
By 2012, educate GCPEP partner land managers on range of appropriate tools, techniques, and sequencing of restoration activities for conversion of off-site plantation pine species to longleaf pine on sites historically occupied by longleaf pine.	Low	Medium	Medium	High
Establish the PLLP LCA / GCPEP Gopher Tortoise surveying, monitoring, and research program.	Low	Medium	Medium	High
Secure commitments from agencies managing conservation areas that no new hardening would be permitted by 2009.	Low	High	Low	High
Support RCW management, monitoring, and translocation efforts at Eglin AFB, Conecuh NF, and Blackwater River State Forest.	Low	Low	Very High	High
Work through the GCPEP Aquatic Subcommittee to investigate options and develop BMPs for small agricultural impoundments.	Low	Medium	Medium	High
Work with agencies, municipalities, and prescribed fire advocacy groups to promote and ensure the safe, continued use of prescribed fire for ecological management, silviculture, and fuel reduction in the Wildland Urban Interface (WUIs) across the LCA.	Low	Medium	Medium	High
Work with DEP to increase the number of sites sampled and the frequency of sampling for SCI.	Low	Low	Medium	High
Work with DEP on TMDL development for pollutants affecting aquatic ecosystems on PLLP LCA / GCPEP priority rivers and estuaries.	Low	Medium	Low	High
Working through the GCPEP Invasive / Native Subcommittee, by 2008, finalize and begin implementation of the GCPEP invasive species management/work plan.	Low	Medium	Medium	High

MEASURING AND MONITORING

How do we know if the conservation strategies we are using are having their intended impact? To answer this question we have identified a number of indicators that will gauge how well we are keeping the critical threats in check, and in turn, whether the condition of the ecosystems are improving. For each Objective below, Indicators that can be used to track the progress and success for that particular Objective are shown. One indicator can be used to track several Objectives. The indicators are in no particular order.

Objective: By 2017, greater than 75% of the river miles with intact floodplain / riparian zone within the PLLP LCA / GCPEP are either protected or in some form of conservation.

Indicator: number of 7 Florida and 5 Alabama counties with a regulatory framework for new subdivision developments that protects conservation values.

Indicator: number of state agencies and local governments with ecologically sustainable floodplain protection requirements.

Indicator: percent of river miles with intact floodplain / riparian zone.

Indicator: percent of total area in patches greater than 2,000 acres.

Indicator: percent of total area in patches greater than 30,000 acres.

Indicator: river temperature of at least 65 degrees for spawning; flows of at a minimum of 20,000 cubic feet per second from April through October for spawning/nursery conditions.

Objective: By 2013, county governments and state agencies will adopt ecologically sustainable floodplain / shoreline protection requirements.

Indicator: number of 7 Florida and 5 Alabama counties with a regulatory framework for new subdivision developments that protects conservation values.

Indicator: number of state agencies and local governments with ecologically sustainable floodplain protection requirements.

Indicator: river temperature of at least 65 degrees for spawning; flows of at a minimum of 20,000 cubic feet per second from April through October for spawning/nursery conditions.

Objective: By 2012, NWFWMD will adopt and implement minimum flows regimes (or reservations) that sustain freshwater and estuarine ecosystems for maintaining in-stream flow in priority rivers within the PLLP LCA / GCPEP landscape.

Indicator: number of 5 priority rivers with Minimum Flow Levels defined by the Water Management District.

Indicator: number of river miles for which commitments have been made for no dams and protection of flow.

Indicator: deviation from "natural" flow regime.

Indicator: river temperature of at least 65 degrees for spawning; flows of at a minimum of 20,000 cubic feet per second from April through October for spawning/nursery conditions.

Objective: By 2017, improve and/or maintain a Stream Condition Index (SCI) of "good" for greater than or equal to 75% of PLLP LCA alluvial and blackwater stream sites sampled.

Indicator: number of spawning adults; number of young of year (yoy).

Indicator: stream condition index (SCI) and/or BioRecon (macroinvert).

Objective: By 2017, ensure that Total Maximum Daily Loads (TMDLs) are established for all PLLP LCA / GCPEP priority rivers and estuaries.

Indicator: number of rivers and estuaries with identified TMDLs.

Indicator: consistency with TMDLs once established.

Objective: By 2012, commitments will be secured from decision-makers, regulatory agencies and stakeholders to prevent any further dams and water diversions on priority rivers in order to maintain flow conditions from identified historic flow records.

Indicator: number of river miles for which commitments have been made for no dams and protection of flow.

Indicator: miles of historic river habitat remaining available.

Indicator: river temperature of at least 65 degrees for spawning; flows of at a minimum of 20,000 cubic feet per second from April through October for spawning/nursery conditions.

Objective: By 2012, all future permits for small agricultural impoundments will have ecological based in-stream flow and species diversity requirements, or ecologically sustainable alternatives.

Indicator: percent of permits issued after 2008 for small agricultural impoundments that have in-stream flow and other specifications.

Objective: Between 2007 and 2017, maintain at least 90% PLLP LCA / GCPEP riverine shorelines of priority rivers in a natural/unhardened/un-engineered state.

Indicator: number of 7 Florida and 5 Alabama counties with a regulatory framework for new subdivision developments that protects conservation values.

Objective: Between 2007 and 2017, maintain or restore 75% of PLLP LCA / GCPEP bay shorelines to a natural/unhardened/un-engineered condition.

Indicator: number of 7 Florida and 5 Alabama counties with a regulatory framework for new subdivision developments that protects conservation values.

Indicator: number of state agencies and local governments with ecologically sustainable floodplain protection requirements.

Indicator: percent of natural (unhardened) shoreline.

Indicator: percent of natural vegetative cover within 100 m of shoreline.

Indicator: miles of un-engineered shoreline with commitment NOT to do so.

Objective: By 2017, "no wake" and/or "no motorize entry" zones associated with critical habitat (e.g., SAVs, shorebirds, oyster reefs, river riparian, and other aquatic zones) will be established and enforced as necessary.

Indicator: acreage of specified critical habitat with designated "no wake" and/or "no motorize entry" zones.

Indicator: total person hours dedicated to patrolling and enforcing no wake and no motorize entry zones.

Objective: By 2012, no new river dredging in previously un-dredged river channels and limited maintenance dredging within the PLLP LCA / GCPEP landscape.

Indicator: number of new permits issued for dredging in previously un-dredged river channels.

Objective: By 2010, prevent any future groundwater withdrawal that negatively affects hydroperiods in wetland communities including steepheads, isolated wetlands, and other natural wetland and aquatic systems.

Indicator: number of residential well permits issued within XX mile(s) of wetland targets AND number of commercial/industrial/municipal well (field) permits within XX mile(s) of wetland targets (mileage to be determined).

Indicator: groundwater levels OR potentometric surface.

Objective: Between 2007 and 2017, no new cuts/passes within LCA coastline and any appropriate dredged material are deposited down current of passes and within longshore current zones.

Indicator: number of new permits starting in 2008 for cuts and passes.

Indicator: number of the 4 coastal counties that have adopted guidelines within their comprehensive beach restoration plans that protect marine and barrier island targets.

Indicator: percent of new permits starting in 2008 for dredged material deposited down current of passes and within longshore current zone.

Objective: By 2012, coastal counties will coordinate and adopt guidelines that protect marine and barrier island targets for beach restoration/renourishment/reconstruction activities within their comprehensive beach restoration plans.

Indicator: number of the 4 coastal counties that have adopted guidelines within their comprehensive beach restoration plans that protect marine and barrier island targets.

Indicator: percent of linear miles with natural profile.

Indicator: availability of quality reproductive habitat.

Objective: By 2017, more than 50% Upland Pine Matrix within GCPEP partner lands contain an average of 15-30 stems/acre of mature (greater than 60 years) pines with recruitment and maintenance of mature pines sufficient over time.

Indicator: percent canopy cover.

Indicator: mature pine density.

Objective: By 2010, ensure no net loss of native groundcover across GCPEP partner lands.

Indicator: native herbaceous groundcover.

Objective: By 2017, identify and protect all high priority upland acres (recharge zones, linkages/corridors, in-holdings, and buffers) within the PLLP LCA / GCPEP landscape.

Indicator: number of 7 Florida and 5 Alabama counties with a regulatory framework for new subdivision developments that protects conservation values.

Indicator: percent of total area in patches greater than 2,000 acres.

Indicator: percent of total area in patches greater than 30,000 acres.

Indicator: area of high priority upland acres protected.

Indicator: bear habitat in protected status.

Indicator: presence / absence of wetland nested specie(s).

Objective: By 2012, greater than or equal to 70% of all fire-dependent conservation lands within the PLLP LCA / GCPEP in maintenance phase condition (maintained by fire alone) will be managed within an identified appropriate fire regime (to attain a "good" viability rating).

Indicator: fire frequency and season.

Objective: By 2017, apply fire in an appropriate regime to greater than or equal to 25% (subject to change with completion of the GCPEP GIS spatial database) of all GCPEP conservation lands in longleaf and slash pine plantations.

Indicator: fire frequency and season.

Objective: By 2017, on GCPEP partner lands all Category I (FLEPPC) invasive plant species and impacts from invasive animal species have not increased from 2008 / 2009 levels.

Indicator: number of species previously undocumented within LCA in 2008 subsequently documented to be spreading.

Indicator: percent cover of hog damage.

Indicator: percent cover of riparian / slope forest canopy.

Indicator: frequency of presence of invasive plant species within management units.

Indicator: systematic reconnaissance flights percent cover of priority invasive plant species.

Objective: By 2009, any new non-native invasive species discoveries within the GCPEP landscape are rapidly detected, communicated, and responded to appropriately.

Indicator: number of species previously undocumented within LCA in 2008 subsequently documented to be spreading.

Indicator: frequency of presence of invasive plant species within management units.

Indicator: systematic reconnaissance flights percent cover of priority invasive plant species.

Objective: Starting in 2007, federal/state/local road entities will develop and implement ecologically sustainable design, maintenance, and improvement guidelines (Best Management Practices-BMPs) for new and existing roads.

Indicator: number of 7 Florida and 5 Alabama counties with a regulatory framework for new subdivision developments that protects conservation values.

Indicator: bear habitat in protected status.

Indicator: BMPs developed and adopted for new and existing roads.

Objective: By 2012, a regulatory framework will be adopted for new subdivision developments that considers adjacent developments, protects conservation values, and minimizes impacts to potentially threatened portfolio sites and focal targets.

Indicator: number of 7 Florida and 5 Alabama counties with a regulatory framework for new subdivision developments that protects conservation values.

Objective: By 2010, implement an integrated and ecologically sustainable recreational plan providing a balanced array of compatible recreational opportunities across the PLLP LCA.

Indicator: percent coverage of woody debris.

Indicator: ecologically sustainable recreation plan for the LCA developed and implemented.

Objective: By 2017, the PLLP LCA / GCPEP Red-cockaded woodpecker (RCW) populations will meet projected benchmarks established for the two metapopulations (Eglin and Conecuh/Blackwater) in the RCW recovery plan.

Indicator: distance between clusters within each population.

Indicator: midstory basal area.

Indicator: number of potential breeding groups (PBG) within Conecuh/Blackwater.

Indicator: number of potential breeding groups (PBG) within Eglin.

Objective: By 2017, the Florida black bear population within the PLLP LCA / GCPEP landscape will be greater than 100 bears.

Indicator: bear habitat in protected status.

Indicator: estimated population size.

Indicator: road density.

Objective: By 2017, greater than 75% of protected acres with suitable habitat have gopher tortoises present at 1 tortoise burrow per acre.

Indicator: percent of protected areas with Gopher Tortoises.

Indicator: number of adult active burrows.

These final two indicators could not be linked specifically to any of the above Objectives, but does reflect the viabilities for specific targets.

Target: Steephead Systems

Indicator: percent of historic steephead systems.

Targets: Pine Flatwoods Matrix with Embedded Wetlands
Upland Pine Matrix with Embedded Wetlands

Indicator: percent of isolated wetlands with natural ecotone.

IMPLEMENTATION AND NEXT STEPS FOR THE PANHANDLE LONGLEAF PINE LCA / GCPEP CAP

The CAP can be an active tool in adaptive management and its intended use was not to become a "sit-upon-the-shelf" document. The CAP is not a static document; instead, it is a dynamic tool that should be used as such. Throughout time status of targets, threats, objective priorities all change and evolve. The CAP should be used to capture those changes and assist with establishing new directions. However, the tool is only as effective as its user(s). Therefore, the following next steps are highly recommended.

- ✓ Determine who within the GCPEP staff will become the "keeper-of-the-CAP" in order to keep track of changes and modifications and therefore only have one working version. This person should receive training on how to utilize both the CAP tool and the process so as to get the most out of the CAP.
- ✓ This current version needs to be presented to the GCPEP Steering Committee for review and comments. Their comments should be captured and incorporated within the CAP.
- ✓ Within the Viability section, those Key Attributes that haven't had Indicator Ratings established should be assigned to the appropriate subcommittees in order to work on creating those. Current Indicator Status should then be determined.
- ✓ In preparing this summary document, it was discovered that there were some slight variations and minor inconsistencies in the terminology of stresses and sources of stress amongst the targets. It is highly recommended that these be corrected and while doing so take advantage of the opportunity and modify terminology to reflect local usage.
- ✓ Each Objective with associated Strategic Actions should be assigned accordingly to appropriate subcommittees. Each subcommittee should then work on completing action steps for each strategy. This will assist in giving the subcommittees focus and direction.
- ✓ While Monitoring Indicators have been linked to Objectives, work stills needs to occur on establishing Methods, Priority, Status, Frequency and Timing, Location, Who Monitors, Annual Cost, Funding Source, and determining existence of any Monitoring Plans. These should be worked on in the appropriate subcommittees with the GCPEP staff serving has facilitators.
- ✓ Within the CAP tool, there is a process for determining Project Resource. The resources that are examined are: People (staff leadership, multidisciplinary team), Internal Resources (Institutional Leadership, Funding), External Resources (Social/Legal Framework for Conservation, Community and Constituency Support). These three factors then give you an Overall Project Resources Rank. It is highly recommended that this exercise be conducted.
- ✓ At least annually the CAP should be reviewed and used to assist in creating Annual Work Plans.
- ✓ This document and future versions should be made available on the new GCPEP website.
- ✓ Using the newly acquired comprehensive GCPEP GIS database, new maps should be produced that reflect the new targets.