

CC5. Restoration of Watson Bayou Process Assessment

Actions Completed: A citizens group has been formed that is concerned with the conditions and plans for the development of Watson Bayou. The U.S. Fish and Wildlife Service has completed two rounds of sediment sampling at ten locations within the bayou. Round one was completed in July 1985 and consisted of triplicate samples at each of the ten locations. Round two was completed in July 1995 and consisted of duplicate samples at each of the ten locations. Using sediment quality guidelines, the 1985 data were evaluated, and the bayou ranked as one of the three most extensively contaminated locations within St. Andrew Bay.

Action: Compare the 1985 data with the 1995 data to determine if storm water, spill prevention, dredge and fill, and other management programs have resulted in less contamination into the bayou. Also compare data sets to determine if any natural restoration resulting from biodegradation or hydraulic flushing has taken place. If the bayou still scores high, using the sediment quality guidelines, proceed with the development and implementation of a Bayou Restoration Plan. Evaluate the bayou water for bacterial problems to assure water that is safe for activities such as swimming, wading and water skiing. Evaluate biological organisms to assure they are safe for consumption.

Background: The Bayou has been a receiving water for pollutants of various types since 1835 when a sawmill was constructed along the shoreline. A paper mill was constructed in 1931, various oil and fuel storage facilities were located later, as was a municipal waste water treatment plant that discharged directly into the bayou. Several marine construction and repair facilities with associated marine railways also contributed metal-containing runoff to the Bayou. Organic wastes from commercial fishing operations and petroleum and chemicals from recreational marinas and vessel discharges have also been responsible for contaminants entering the water body. Finally, fertilizers, pesticides and septic tank leachate from the residential housing on the western shore have contributed to the problem.

Strategy: If necessary, commence restoration through public education of shoreline property owners, evaluation of on-site environmental management regulatory programs, cleanup of particularly bad sections via dredging and disposal or other methods, stabilize shorelines and install storm water management facilities (particularly in the watershed headwaters) to control urban runoff.

Expected Benefits: Benefits include increased recreational use, cleaner water and sediments, fishable and swimmable conditions (as required by the federal Clean Water Act), associated increases in waterfront property values, increased quality of habitat for fish and wildlife, and an increase in the Bayou's species diversity.

Monitoring the Environmental Response: Develop a Bayou Management Plan that includes components for one-time restoration, and components for perpetual, appropriate actions through management, to maintain the Bayou's restored water quality, sediment quality, fish and wildlife and public recreational uses.

CC6. Restoration of Massalina Bayou, Sampling and Assessment

Actions Completed: The Fish and Wildlife Service has sediment chemical data for three locations within the Bayou (1985 and later). Some water quality data may exist. The City of Panama City has constructed storm water retention and treatment facilities at some points on the Bayou.

Action: Obtain additional sediment samples to compare with the 1985 data and determine the degree of contamination present. Evaluate the bayou waters for bacterial problems to assure recreational water that is safe for activities such as swimming, wading and water skiing. Evaluate biological organisms to assure they are safe for consumption. If the Bayou scores high, using the sediment quality guidelines, proceed with the development and implementation of a Bayou Restoration Plan.

Background: For better than fifty years, Massalina Bayou has been the site of several small industrial activities including marine vessel construction and repairs, large marinas, and unknown historical activities at the upper end of the bayou. Urban storm water runoff from downtown Panama City and adjacent residential neighborhoods has also contributed chemicals, pollutants, fertilizers and pesticides.

Strategy: If necessary, commence restoration through public education of shoreline property owners, evaluation of on-site environmental management regulatory programs, cleanup particularly bad sections via dredging and disposal or other methods and install storm water management facilities (particularly in the watershed headwaters) to control urban runoff.

Expected Benefits: Benefits include increased recreational use, cleaner water and sediments, and improved fishing and swimming conditions (as required by the federal Clean Water Act), and associated increases in waterfront property values. Increased quality of habitat for fish and wildlife, and an increase in the bayou's species diversity.

Monitoring the Environmental Response: Develop a Bayou Management Plan that includes components for one-time restoration, and components for perpetual, appropriate actions through management, to maintain the bayou's restored water quality, sediment quality, fish and wildlife and public recreational uses.

CC7. Restoration of Lynn Haven Bayou, Sampling and Assessment

Actions Completed: The Florida Department of Environmental Protection, U.S. Fish and Wildlife Service, and private citizens have conducted separate limited, sampling and analysis efforts for water quality and sediment quality sampling within the bayou. The Defense Logistic Agency has been conducting petroleum assessment and remediation since 1993. Tyndall Air Force Base has been actively conducting a CERCLA investigation since 1999 and has just completed the Preliminary Assessment and Site Inspection phases of the process.

Action: Assess conditions within the bayou, evaluate impacts and potential sources, establish needed action/options, develop remediation and restoration options and recommended remedy, and create a bayou management plan

Background: A Defense Fuel Support Point was constructed adjacent to Lynn Haven Bayou in 1943. A causeway that bisected the bayou into north and south sections provided road and rail access. The southern section is open to North Bay while the northern section is closed by the causeway. Tidal action in the northern segment is provided by two sets of culverts through the causeway and a mile long canal located along the southern boundary of the facility. This canal provides some recreational access to adjacent bay waters. The property was originally over 400 acres in size, but 200 acres were provided to the Panama City-Bay County Airport and Industrial District in 1967. The area now serves as an industrial park.

The area was sparsely populated when the facility was built, but now has dense residential development. Neither the residential area nor the industrial park appears to have adequate stormwater management. Sedimentation is occurring in the northern section of the bayou, the northern extreme of the southern section of the bayou, and the canal. Initial results of studies indicate that contamination has occurred in both sections of the bayou as well as in Upper Goose Bayou. However, there is insufficient information to determine the extent, fate, and transport of contaminants. It does appear that that, in the absence of planned stormwater management, the northern section of the bayou is serving as a stormwater control mechanism.

Strategy: Continue the CERCLA investigation to characterize the contamination, and supplement the investigation with stormwater and biodiversity studies to assess the health of the bayou and identify adverse impacts that require attention. Once identified, eliminate or minimize the sources and develop long-term restoration and management options

Expected Benefits: Proper identification of the status of the bayou, restoration of wetland habitat, bayou biodiversity, bayou productivity, and improved stormwater/sediment management.

Monitoring the Environmental Response: The completion of the status assessment of the bayou will provide the basics for restoration actions and determine the monitoring process. Monitoring will be included in the future action and management plans.
Point Source Discharges

The amount of permitted pollutant loading to the St. Andrew Bay estuarine system has been reduced over the past 10 years. This reduction is the result of the elimination of several small package treatment plants that, in many instances, did not provide adequate levels of treatment. The following is a list of the facilities that have been eliminated by sending wastewater to the Panama City Beach AWT: Woodlawn AWT discharge to West Bay (0.109 mgd), Venture Out WWTP discharge to Grand Lagoon (0.09 mgd), Pride Resorts discharge to Alligator Bayou and St. Andrew Bay (0.0365 mgd), and the Naval Coastal System Center discharge to St. Andrew Bay (0.2 mgd). The remaining WWTP discharging to the St. Andrew Bay system either currently use or are developing plans to use advanced wastewater treatment processes that will further decrease the pollutant loading to the bay from point source discharges. Volunteers of the St. Andrew Bay Resource Management Association (RMA) have conducted routine quarterly water quality monitoring over the last seven years

within the bay. Parameters measured include salinity, temperature, dissolved oxygen, nutrients, and some bacterial measurements

PD1. Cumulative Assessment

Action: Assess the total loading of the various permitted pollutants to the St. Andrew Bay estuary.

Background: The total pollutant loading from all permitted point sources is not known or generally known. The total amounts of each permitted pollutant should be determined and made available to the interested public.

Strategy: Obtain copies of all permitted point source discharges from the DEP. Calculate the total amounts of each permitted pollutant that is discharged to the estuary per unit time.

Expected Benefits: This information can be used to make informed decisions during the renewal of existing permits or the evaluation of new permit applications. It can also serve to educate the public as to the amount of pollutants entering the estuary.

Monitoring the Environmental Response: Monitoring of direct environmental response is not necessary, but monitoring of the increases or decreases in the total permitted pollutant loading to the estuary can be achieved and cumulative impacts better addressed.

PD2. Determine the Assimilative Capacity of the St. Andrew Bay Estuary

Actions Completed: A water quality based evaluation of the estuary that concentrated on a portion of East Bay has been conducted with regard to the Military Point discharge of treated domestic and industrial wastewater by Bay County (Hydroqual et al 1993).

Action: Perform the necessary analysis of the estuary to determine its capacity to assimilate the current level of permitted pollutant discharges.

Strategy: Discuss the need for such an analysis with the agencies responsible for issuing point sources discharges, DEP and EPA, with the purpose of obtaining the information necessary to the design and cost of such an analysis.

Expected Benefits: Knowledge of the assimilative capacity of the estuary is essential to the permitting of new point source discharges and the renewal of existing permitted discharges in view of the rapidly expanding human population.

Monitoring the Environmental Response: Monitoring of the environmental response would not be required until the assimilative capacity is determined.

Non-Point Sources Discharges: Stormwater Treatment Actions

The number of stormwater permits issued is increasing steadily from 51 issued in Bay County in 1991 to 95 issued in 1995 with a continuing increase as development of the ecosystem proceeds. The beach nourishment project for Panama City Beach will include

stormwater rework that should increase the quality and decrease the quantity of stormwater directly entering the Gulf of Mexico along the nourished beach. Additional stormwater actions are needed.

ST1. Maintenance of Existing Stormwater Treatment Facilities

Actions Completed: Bay County is addressing the problem areas identified by DEP regarding stormwater treatment, and the municipalities are in various stages of planning and/or implementation of stormwater plans.

Action: Examine existing stormwater treatment ponds for proper functioning and obtain maintenance of the facilities to restore treatment capacity.

Background: Stormwater treatment facilities have been permitted since 1982. Some or a majority of the older ponds may require maintenance to re-establish their ability to adequately treat their influent.

Strategy: Examine existing stormwater treatment permits for the presence of a condition that requires maintenance of a facility. Inspect those facilities, oldest first, for compliance with treatment requirements. Require maintenance, if necessary.

Expected Benefits: Would return those facilities that are not currently functioning at the required level of efficiency to the required level of efficiency. This would serve to increase the quality of the water exiting these treatment facilities and entering surface waters.

Monitoring the Environmental Response: Monitor the quality of the water discharged from the facility before and after maintenance to quantify the effect of maintenance on the quality of water leaving the facility.

Regulatory Needs: If not already required, require that maintenance of stormwater facility be included in all permits to assure that the required treatment levels are maintained throughout the life of the facility.

ST2. Survey Stormwater Sediment Quality in Existing Ponds

Actions Completed: None known.

Action: Request that DEP provide any data that they may have obtained regarding sediment quality in existing stormwater ponds. Then select representative, permitted stormwater ponds and perform an analysis of the sediment.

Background: A number of treatment ponds have been in existence and functioning for some years. The ponds function to accumulate sediments and pollutants before the water is discharged to a surface water body. The accumulation of sediments and the pollutants carried by the runoff entering these ponds may be present in concentrations high enough to

be of concern. Examination of the sediment quality in the ponds should be investigated, and, if necessary, the contaminated sediments should be removed and disposed of properly.

Strategy: The information gathered under ST1 can be used to select a sample of the permitted treatment ponds for the analysis of contaminant levels in the sediments that have accumulated in the ponds. Standard sampling and analytical techniques should be employed in obtaining and analyzing the sediments.

Monitoring the Environmental Response: Perform in conjunction with ST1.

ST3. Retrofit Stormwater Infrastructure Constructed Prior to 1982

Actions Completed: The existing Stormwater Plan addresses stormwater problems identified by the DEP. Many of these involve retrofitting existing drainages with treatment facilities. Urbanized areas have drainages that would benefit from the installation of treatment facilities. Progress toward improving the water quality discharged from these drains is slow because of the lack of funds to perform all the needed work in as short a time as possible. Funds for this activity are present in the SWIM plan for preliminary work

Action: Identify the areas of most concern from aerial photographs, conduct onsite visits, investigate the date of construction, prioritize the areas of concern, and present the list to the appropriate governmental body for inclusion on their priority lists.

Background: Prior to 1982, stormwater drainage structures were often constructed without treatment facilities. These old drains, in some instances, may be contributing a major amount of pollutants to surface waters.

Strategy: Survey the existing, non-permitted (pre-1982) stormwater drainage structures and assess their possible impact on the receiving waters based upon sediment load and pollutant load that they carry. This could be estimated from an examination of the condition of the drainage area of the structure.

Monitoring the Environmental Response: Compare the quality of the water discharged before retrofitting with the quality of the water discharged after retrofitting.

ST4. Investigate the Advantages and Disadvantages of Organizing a Stormwater Utility for Bay County

Actions Completed: The concept of creating a stormwater utility has been discussed at various levels of local government.

Action: Investigate the process of creating a stormwater utility for Bay County and determine the advantages and disadvantages of doing so. Provide information to the public and local officials for consideration.

Background: Stormwater Utilities open the door to additional sources of funding to address stormwater needs. The reasons for Bay County not establishing a stormwater utility should be addressed again in light of the actual and potential growth and development of the county.

Expected Benefits: May provide a means to obtain additional funds to those budgeted by the NFWFMD to address the stormwater action plans in the SWIM plan and the plans under development by various political entities in the county. Would provide for a holistic approach to stormwater management, if feasible.

Implementing the St. Andrew Bay Ecosystem Management Plan

Implementation of the ecosystem management plan requires actions directed at explaining the plan to those not familiar with ecosystem management, distributing the plan to the interested citizens, encouraging its use by the local land use planning organizations, and use of the plan by the municipal and county planning commissions

IM1. Coordinate Growth Management Plans

It appears from the currently proposed legislation and administration directions to state government agencies that the concept of growth management in the State of Florida is, to say the least, in a state of flux. It would not be prudent to wait for the situation to stabilize before taking action at the local level to assure the survival of the functions of the St. Andrew Bay ecosystem.

Actions Completed: All of the Evaluations and Appraisal Reports from each entity in Bay County that has a Growth Management Plan have been reviewed.

Action: Lines of communication should be maintained with the cities and counties in order to ensure that the Action Plans are completed, the plan is explained and understood, and that it is incorporated into the planning processes. Interested groups should continue to communicate with and provide technical assistance to the entities as the Comprehensive Growth Management Plans are modified or rewritten, and participate in the activities of the various planning commissions.

Strategy: Obtain a working relationship with the citizens organizations in the county to make the local governmental bodies aware of the need to develop and implement meaningful, consistent land use plans that address ecosystem concerns.

Expected Benefits: Aid in the development of more uniform Growth Management Plans in terms of the management of natural resources based on an ecosystem management approach.

Monitoring the Environmental Response: Monitoring would involve tracking the development of the Comprehensive Plans and the Land Development Regulations by which they are implemented, and track the implementation of the plans to obtain information as to the uniformity in the management of the natural resources of the St. Andrew Bay ecosystem.

Regulatory Needs: Uniformity of Growth Management Plans regarding natural resources.

Related Indicators: The Growth Management Plans are related directly or indirectly to all of the Action items in this plan.

IM2. Establish the St. Andrew Bay Ecosystem Management Plan as a Legal Component of Each Bay County Local Government Comprehensive Management Plan

Actions Completed: Publication of the original document provided a significant portion of the basic information required to establish the existing natural resource quality of St. Andrew Bay, Florida. A multitude of other reports and surveys have established the ecosystem as a unique, resource with exceptional water quality, biological diversity, biological productivity, and extremely high economic, educational, and social value.

Action: Provide this revision of the St. Andrew Bay ecosystem Management Plan to the municipalities and Bay County Commission to adopt and include as a component of each individual Local Government Comprehensive Management Plan.

Background: It has been demonstrated by several federal and state government agencies, municipal governments, conservation groups, and citizens that the St. Andrew Bay ecosystem is an ecologically, economically, and recreationally valuable resource of significant importance to the general public, commercial fishermen, recreational businesses, industries, and educational institutions. Further, it has been demonstrated that the St. Andrew Bay ecosystem faces a multitude of conservation, growth and management challenges that will require a variety of management tools, funding sources, management resources, and dedicated persons to assure retention of the valuable resources within the ecosystem. The Coastal Management, Conservation, Recreation and Open Space, and Economic elements of Local Government Comprehensive Plans include strategies for municipal government management that can significantly protect and conserve the resources of the Bay. However, these elements can be strengthened and improved by adoption of the ecosystem management plan as a component of each comprehensive plan, and modification of specific elements of each local government comprehensive plan to include management practices identified and recommended in the plan.

Strategy: 1. Provide copies of the plan to each local government for their review.
2. Individuals and groups familiar with the plan should be available to work with a particular local government to assist them in understanding the plan and modifying their appropriate comprehensive plan elements to incorporate maximum management actions and practices.

Expected Benefits: Continuity between Local Government Comprehensive Plans and the ecosystem management plan and an increased overall effort to manage properly the St. Andrew Bay ecosystem.

Monitoring the Environmental Response: Modification and improvement in Local Government Comprehensive Plans should be reflected in myriad positive actions by local governments that result in beneficial management results within St. Andrew Bay.

IM3. Implement the Ecosystem Management Plan and the SWIM plan for the St. Andrew Bay Ecosystem

Actions Completed: The NFWFMD has developed the Surface Water Improvement Management Plan. This Ecosystem Management Plan has been developed as a complement to the SWIM plan.

Background: The emphasis of the SWIM plan is on the maintenance and restoration of surface water quality, and the emphasis of this document is on the maintenance and restoration of ecosystem functions in general. The goals of this document are stated on page 1 of this document. The achievement of the goals of the two plans should proceed in concert to avoid duplication of effort and expenditures of time and money.

Action: In conjunction with the NFWFMD, develop a list of priority items to be accomplished by the NFWFMD and those to be accomplished by other agencies or organizations that are interested in and capable of completing the Action Plans listed as priorities. Progress toward completion of the listed Actions Plans should begin immediately following the development of the priority list.

Expected Benefits: Progress toward implementing the two plans will proceed in concert with the more important Action Plans being addressed first. The ecosystem would benefit by a planned and active approach to obtaining the information needed to implement the two plans, and an accelerated accomplishment of the goals of both plans.

IM4. Land Use Planning and Transferable Development Rights in the St. Andrew Bay Ecosystem

Actions Completed: *Other counties in Florida have established the value of Transferable Development Rights (also known as Non-Contiguous Density Transfers) in their Growth Management Plans. Shaffer (2001) provides an insight into this method of approach to land use planning.*

Action: *Explore the advantages of this concept to the management of the St. Andrew Bay ecosystem and if applicable to achieving the goals of this plan, participate in the education of the citizens regarding the advantages. Participate in the Growth Management Planning process by encouraging the use of these methods in the growth management processes of the counties in the ecosystem.*

Expected Benefits: The use of this method may apply directly to the acquisition of conservation and preservation lands in the ecosystem and to the acquisition of corridors connecting existing public lands and those lands acquired by the use of the method.

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APPENDIX 1. Biotic Communities of the St. Andrew Bay Ecosystem

The Florida Natural Areas Inventory (FNAI) has developed a list of the 70 natural biotic communities of Florida and has placed them in a hierarchy. Each level of the hierarchy is defined. The following is from the list for the St. Andrew Bay ecosystem that contains 31 community types provided by Linda Chafin of the FNAI. The definitions of the community types and rankings are from FNAI (2000). The top of the hierarchy contains six Community Categories that are defined by their hydrology and vegetation. Each Community Category is divided into a number of Community Groups that are defined by the land form, substrate, and vegetation. Each Community Group contains Community Types that are defined by the land form and substrate, soil moisture, fire, climate, and characteristic vegetation. The Community Categories, Community Groups, and Community Types listed for Bay County are included below. One must realize that these are natural biotic communities. Therefore, altered areas such as agricultural (farms, pine plantations, catfish ponds, etc.) are not included.

Community Categories

Terrestrial: Defined as upland habitats dominated by plants that are not adapted to anaerobic soil conditions imposed by saturation or inundation for more than 10% of the growing season.

Palustrine: Defined as wetlands dominated by plants adapted to anaerobic substrate conditions imposed by substrate saturation or inundation during 10% or more of the growing season (tidal and nontidal wetlands).

Lacustrine: Defined as non-flowing wetlands of natural depressions lacking persistent emergent vegetation except around the perimeter (lakes and ponds).

Riverine: Defined as natural, flowing waters from their source to the downstream limits of tidal influence and bounded by channel banks (rivers, streams, creeks).

Marine/estuarine: Defined as subtidal, intertidal, and supratidal zones of the sea, landward to the point at which seawater becomes significantly diluted with freshwater inflow from the land (Gulf of Mexico, bays, and sounds).

Subterranean: Defined as twilight, middle and deep zones of natural chambers overlain by the earth's crust and characterized by climatic stability and assemblages of troglonecic, troglophilic, and troglobitic organisms (Caves both terrestrial and submerged)

The following list contains the Community Categories and Community Types and their FNAI designations listed for Bay County. The Community Group is stated at the beginning of the definition of the Community Type. FNAI maintains a list of the number of occurrences of each community type.

Terrestrial Category

Sandhill: Xeric Upland Group. Upland with deep sand substrate; xeric; temperate; frequent fire (every 2-5 years); longleaf pine and/or turkey oak with wiregrass understory. *Rank = S2 (imperiled in Florida because of rarity).*

Scrub: Xeric Upland Group. Scrub is found on old dunes with deep, fine sand substrate: temperate or subtropical: occasional or rare fire (20-80 years): sand pine and/or scrub oaks and/or rosemary and lichens. *Rank = S2 (imperiled in Florida because of rarity).*

Xeric Hammock: Xeric Upland Group. Xeric hammocks exist on deep, fine sand substrate: xeric-mesic: temperate or subtropical: rare or no fire: live oak and/or sand live oak and/or laurel oak and/or other oaks, sparkleberry, saw palmetto. *Rank = S3 (either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors).*

Beach Dune: Coastal Upland Group. Active coastal dune with sand substrate: xeric; temperate or subtropical: occasional or rare fire; sea oats and/or mixed salt-spray tolerant grasses and herbs. *Rank = S2 (imperiled in Florida because of rarity).*

Coastal Grassland: Coastal Upland Group. Coastal flatland with sand substrate; xeric-mesic; subtropical or temperate; occasional fire; grasses, herbs, and shrubs with or without slash pine and/or cabbage palm. *Rank = S2 (imperiled in Florida because of rarity).*

Coastal Strand: Coastal Upland Group. Stabilized coastal dune with sand substrate; xeric; subtropical or temperate; occasional or rare fire; dense saw palmetto and/or seagrape and/or mixed stunted shrubs, yucca, and cacti. *Rank = S2 (imperiled in Florida because of rarity).*

Maritime Hammock: Coastal Upland Group. Stabilized coastal dune with sand substrate; xeric-mesic; subtropical or temperate rare or no fire; mixed hardwoods and/or live oak. *Rank = S2 (imperiled in Florida because of rarity).*

Shell Mound: Coastal Upland Group. Although not on the list provided by FNAI, this community type is known from the St. Andrew Bay ecosystem at a number of places along the bay. Indian midden with shell substrate; xeric-mesic; subtropical or temperate; rare or no fire; mixed hardwoods. *Rank = S2 (imperiled in Florida because of rarity).*

Bluff: Mesic Uplands Group. Steep slope with rock, sand, and/or clay substrate; hydric-xeric; temperate; sparse grasses, herbs, and shrubs. Not ranked.

Slope Forest: Mesic Upland Group. Steep slope on bluff or sheltered ravine; sand/clay substrate; mesic-hydric; temperate; rare or no fire; magnolia, beech, spruce pine, Shumard oak, Florida maple, mixed hardwoods. *Rank = S2 (imperiled in Florida because of rarity).*

Mesic Flatwoods: Mesic Flatlands Group. Flatland with sand substrate; mesic-xeric; subtropical or temperate; frequent fire; slash pine and/or longleaf pine with saw palmetto, gallberry and/or wiregrass or cutthroat grass understory. Not ranked.

Scrubby Flatwoods: Mesic Flatlands Group. Flatland with sand/organic soil over marl or limestone substrate; mesic; subtropical; occasional or rare fire; live oak and/or cabbage palm. *Rank = S3 (either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors).*

Upland Hardwood Forest: **Mesic Uplands Group.** Upland with sand/clay and/or calcareous substrate; mesic; temperate; rare or no fire; spruce pine, magnolia, beech, pignut hickory, white oak, and mixed hardwoods. *Rank = S3 (either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors).*

Palustrine Category

Hydric Hammock: Wet Flatlands Group. Lowland with sandy/clay/organic soil, often over limestone; mesic-hydric; subtropical or temperate; rare or no fire; water oak, cabbage palm, diamond-leaf oak, red maple, bays, hackberry, hornbeam, black gum, blue palmetto, and hardwoods. *Rank = S4? (apparently secure statewide).*

Wet Flatwoods: Wet Flatlands Group. Flatland with sand substrate; seasonally inundated; subtropical or temperate; annual or frequent fire; vegetation characterized by slash pine or pond pine and/or cabbage palm mixed with grasses and herbs. *Rank = S4? (apparently secure statewide).*

Wet Prairie: Wet Flatlands Group. Flatland with sand substrate; seasonally inundated; subtropical or temperate; annual or frequent fire; beakrush, spike rush, wiregrass, pitcher plants, St. John's-wort, mixed herbs. *Rank = S4? (apparently secure statewide).*

Baygall: Seepage Wetlands Group. Wetland with peat substrate at base of slope; maintained by downslope seepage, usually saturated and occasionally inundated; subtropical or temperate; rare or no fire; bays and/or titi and/or dahoon holly and/or red maple and/or mixed hardwoods. *Rank = S4? (apparently secure statewide).*

Seepage Slope: Seepage Wetlands Group. Wetland on or at base of slope with organic or sand/clay substrate; maintained by downslope seepage, usually saturated but rarely inundated; subtropical or temperate; frequent or occasional fire; sphagnum moss, mixed grasses and herbs or mixed hydrophytic shrubs. *Rank = S2 (imperiled in Florida because of rarity).*

Floodplain Swamp: Floodplain Wetlands Group. Floodplain with organic or alluvial substrate; usually inundated; subtropical or temperate; rare or no fire; vegetation characterized by cypress, gums, and/or green ash. *Rank = S4? (apparently secure statewide).*

Basin Marsh: Basin Wetlands Group. Large basin with peat substrate; seasonally inundated; temperate or subtropical; frequent fire; saw grass, cattail, buttonbush, or mixed emergents. *Rank = S4? (apparently secure statewide).*

Basin Swamp: Basin Wetlands Group. Large basin with peat substrate; seasonally inundated, still water; subtropical or temperate; occasional or rare fire; cypress, black gum, bays, and/or mixed hardwoods. *Rank = S3 (either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors).*

Bog: Basin Wetlands Group. Wetland on deep peat substrate; moisture maintained by capillary action, soil usually saturated, occasionally inundate; subtropical or temperate; rare fire; sphagnum moss and titi an/or bays and/or dahoon holly, and/or mixed hydrophytic shrubs. *Rank = S3 (either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors).*

Coastal Interdunal Swale: Basin Wetlands Group. Long narrow depression wetlands in sand or peat-sand substrate; seasonally inundated, fresh to brackish, still water; temperate; rare fire; graminoids and mixed wetland forbs. *Rank = S2 (imperiled in Florida because of rarity).*

Dome Swamp: Basin Wetlands Group. Rounded depression in sand/limestone substrate with peat accumulating toward center; seasonally inundated; still water; subtropical or temperate; occasional or rare fire; pond cypress, and/or black gum. Bays, often tallest in center. *Rank = S3? (either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors).*

Lacustrine Category

Sandhill Upland Lake: No Group designation. Generally a rounded solution depression in deep sandy uplands or sandy uplands shallowly underlain by limestone; predominantly without surface inflows/outflows; typically sand substrate with organic accumulations toward middle; clear, acidic, moderately soft water with varying mineral content; ultra-oligotrophic to mesotrophic. *Rank = S2 (imperiled in Florida because of rarity).*

Sinkhole Lake: No Group designation. Typically deep, funnel-shaped depression in limestone base; occurs in most physiographic regions; predominantly without surface inflows/outflows, but frequently with connection to the aquifer; clear, alkaline, hard water with high mineral content (calcium, bicarbonate, magnesium). *Ranking = S3 (either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors).*

Riverine Category

Blackwater Stream: No Group Designation. Perennial or intermittent/seasonal watercourse characterized by tea-colored water with a high content of particulate and dissolved organic matter derived from drainage through swamps and marshes; generally lacking an alluvial floodplain. *Rank = S2 (imperiled in Florida because of rarity).*

Seepage Stream: No Group designation. Upper perennial or intermittent/seasonal watercourse characterized by clear to lightly colored water derived from shallow groundwater seepage. *Rank = S2 (imperiled in Florida because of rarity).*

Spring-run Stream: No Group designation. Perennial watercourse with deep aquifer headwaters and characterized by clear water, circumneutral pH and, frequently, a solid limestone bottom. *Rank = S2 (imperiled in Florida because of rarity).*

Subterranean Category

Terrestrial Cave: No Group designation. *Cavernicolous area lacking standing water; often characterized by bats, such as Myotis, and other terrestrial vertebrates and invertebrates; includes interstitial areas above standing water such as fissures in the ceiling of caves. Rank = S1 (critically imperiled in Florida because of extreme rarity).*

Marine/Estuarine Category

Unconsolidated Substrate: No Group designation. Expansive subtidal, intertidal, and supratidal area composed primarily of loose mineral matter (e.g., mud, sand, shell); octocorals, sponges, stony corals, nondrift macrophytic algae, bluegreen mat-forming algae and seagrasses sparse, if present. *Rank = S5 (demonstrably secure statewide).*

Grass Bed: No Group designation. Expansive subtidal or intertidal area, occupied primarily by rooted vascular macrophytes (e.g., shoal grass, *Halophila*, widgeon grass, manatee grass, turtle grass); may include various epiphytes and epifauna; octocorals, sponges, stony corals, and attached macrophytic algae sparse, if present. *Rank = S2 (imperiled in Florida because of rarity).*

Mollusk Reef: No Group designation. Substantial subtidal or intertidal area with relief from concentrations of sessile organisms of the Phylum Mollusca, Class Bivalvia (e.g., molluscs, oysters, & worm shells); octocorals, sponges, stony corals, macrophytic algae, and seagrasses sparse if present. *Ranking = S3 (either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors).*

Tidal Marsh: No Group designation. Expansive intertidal or supratidal area occupied by rooted, emergent vascular macrophytes (e.g. cord grass, needlerush, saw grass, saltwort, saltgrass, and glasswort); may include various epiphytes and epifauna. *Rank = S4? (apparently secure statewide).*

Man Made Marine/Estuarine Substrates

Rock Jetties: Although not a natural component of the St. Andrew Bay marine/estuarine system, rock structures such as the jetties along the man-made channel into St. Andrew Bay and at the Landmark Apartments serve as consolidated substrate and support a diverse community of organisms associated with such natural structures. Man-made substrates are not ranked because they are artificial areas rather than naturally occurring substrates.

APPENDIX 2. Protected, Rare, or Endemic Biota of the St. Andrew Bay Ecosystem

The following tables of species that are considered protected by the responsible state and federal agencies are presented as major groups of organisms. The sources of the tables are provided below. The Florida Department of Agriculture and Consumer Affairs, through the Endangered Plant Advisory Council, is responsible for determining the status of protected plants. The Florida Fish and Wildlife Commission is responsible for determining the status of protected animals, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service are responsible for determining the status of plants and animals under the federal Endangered Species Act. The tables of protected species provided below are constructed in a similar fashion. The heading “State” refers to the status of the organism as determined by the responsible Florida agency, the heading “Federal” refers to the status as provided by the responsible federal agency, and “County” is the county or counties within the watershed where that organism may be found. The designations are: E = endangered, T = threatened, SSC = species of special concern, N = not listed, S1 = critically imperiled in Florida because of extreme rarity, S2 = imperiled in Florida because of rarity, S3 = either very rare or local throughout its range or found locally in a restricted range or vulnerable to other factors, B = Bay County, C = Calhoun County, G = Gulf County, J = Jackson County, and W = Washington County.

Bay County is the only county entirely within the St. Andrew Bay watershed. Therefore, those protected species known to occur in Bay County are confirmed as present in the watershed. Relatively small portions of the other counties are included in the watershed. It was not possible within the time available to determine the exact locations of the species listed as protected in the other counties in the watershed. Therefore, some to many of the protected species listed for the other counties may not actually occur within the St. Andrew Bay watershed. The Lake Powell watershed extends a short distance into Walton County. Walton County is not included for the purposes of protected species because the Lake Powell subdrainage basin has been excluded from this plan. The species designated as protected in the official lists change periodically, and one should consult the most recent document for the current designations and status.

Vascular Plants

Wunderlin et al. (1996) listed 856 species and varieties of vascular plants from Bay County. In 1998, the BEST, Inc. received a grant from the Norcross Wildlife Foundation to perform a survey of the vascular plants of Bay County and to develop a herbarium for the specimens collected. Keppner and Keppner (2001a) completed the work and provided 1000 specimens of over 900 species from Bay County for the herbarium and a list of the vascular plants reported from Bay County. That work has continued and the current list of vascular plants known from Bay County currently totals 1271 species in 512 genera in 151 families.

The lists of vascular plants from the other counties in the watershed were obtained from Wunderlin et al. (1996). According to that work, there are 844 species known from Calhoun County, 726 species known from Gulf County, 1377 from Jackson County, 1275 from Walton County, and 804 from Washington County. There is, of course, a significant similarity in species between the counties so that a simple addition of the number of species from each county is not valid. The following table of protected vascular plants was taken from the Florida Department of Agriculture and Consumer Affairs document prepared by Coile (2000). Scientific and common names are from Coile (2000). The federal status of the plants on the list was obtained from FNAI (2000).

The St. Andrew Bay ecosystem supports about 130 species of plants listed by the State of Florida and/or the federal government and/or tracked by FNAI (Table 1). One can not be sure which species reported from counties other than Bay County actually occur in the St. Andrew Bay ecosystem because the location records have not been analyzed. However, Bay County supports populations of 53 of the listed plant species or 42% of the possibly occurring species in the ecosystem.

Animals

As with the plants in the ecosystem, the total number of species of animals that are actually present in the St. Andrew Bay ecosystem is impossible to determine for those counties that are only partly located in the ecosystem. No one has attempted to develop a list of all the animals that might occur in the ecosystem. Keppner (1996) provided information on the animals reported from the St. Andrew Bay estuary, but did not include animals from any other habitat in the ecosystem.

The animals that are designated as protected and/or tracked in the ecosystem were obtained from Wood (1996), from the document dated 1997 on the Florida Game and Fish Commission website, and from FNAI (2000). None of these references provided information pertaining to the counties from which each species is known. However, Peterson (1997) did provide a list of the counties from which the species designated as protected at the time of his compilation have been reported. This document was used to determine the protected animals that occur in the counties in the St. Andrew Bay ecosystem. Additional records of protected birds were obtained from Loftin et al. (1987) for Bay County. Barkuloo (pers. comm. 2001) stated that the alligator gar, *Atractosteus spatula*, was collected from Bay County, and the specimens are at Tulane

University. The State of Florida or the federal government does not list this species, but it is tracked by FNAI.

Vascular Plants

There are 60 protected and/or tracked species of animals known from the ecosystem. Bay County supports 33+ or 80% of those species. FNAI tracks a much larger number of animals including many invertebrates. However, they are not listed because the species on the list are not known to be present in the ecosystem. A search of the literature and a search of specimens in taxonomic collections would provide the species present in the most accurate manner (Table 2).

Beck et al. (2000) provided records of the occurrence of certain species of animals from the St. Andrew Bay estuarine system and Gulf of Mexico waters not encountered in the other literature. They list three records of occurrence for the Manatee, 2 records of occurrence for the Fringed Pipefish, and 23 records of occurrence for Kemp's Ridley sea turtle listed as endangered by the federal government. The Fringed Pipefish is neither a candidate nor listed under the Endangered Species Act according to the National Marine Fisheries Service (pers. comm. 2001).

Vascular Plants

Scientific Name	Common Name	FNAI	State	Federal	County
<i>Andropogon arctatus</i>	Pinewood Bluestem	S3	T	N	B,C,G,J,W
<i>Arabis canadensis</i>	Sicklepod	N	E	N	J
<i>Aristolochia tomentosa</i>	Pipevine	N	E	N	B,C,G,J,W
<i>Asclepias viridula</i>	Green Milkweed	S2	T	N	B,G,W
<i>Asplenium verecundum</i>	Delicate Sleenwort	S1	E	N	J
<i>Aster hemisphericus</i>	Aster	S1	E	N	W
<i>Aster spinulosus</i>	Pinewoods Aster	S1	E	N	B,C,G,W
<i>Baptisia megacarpa</i>	Apalachicola Wild Indigo	S2	E	N	W
<i>Bigelovia nuttallii</i>	Nuttall's Rayless Goldenrod	S1	E	N	W
<i>Brickellia cordifolia</i>	Flyer's Nemesis	S1	E	N	J
<i>Sideroxylon lycioides</i>	Buckthorn	N	E	N	J
<i>Sideroxylon thornei</i>	Thorn's Buckthorn	N	E	N	G,J
<i>Arnoglossum diversifolia</i>	Indian-plantain	N	T	N	C,J,W
<i>Calamintha dentata</i>	Toothed Savory	S3	T	N	B,J,W
<i>Calamovilfa curtissii</i>	Curtiss's Sandgrass	S3	T	N	B
<i>Callirhoe papaver</i>	Poppy Mallow	S2	E	N	J
<i>Calycanthus floridus</i>	Sweetshrub	S2	E	N	J
<i>Calystegia catesbaeiana</i>	Catesby's Bindweed	SH	E	N	J
<i>Carex baltzellii</i>	Baltzell's Sedge	S3	T	N	B,C,W
<i>Cheilanthes microphylla</i>	Southern Lip Fern	S3	E	N	W
<i>Chrysopsis cruiseana</i>	Cruise's Goldenaster	S2	E	N	B
<i>Chrysopsis godfreyi</i>	Godfrey's Goldenaster	S2	E	N	B
<i>Cleistes divaricata</i>	Spreading Pogonia	N	T	N	B,C,G
<i>Coelorachis tuberculosa</i>	Florida Jointail	S3	T	N	B*,W
<i>Coreopsis integrifolia</i>	Fringleaf Tickseed	S1	E	N	C,J,W
<i>Cornus alternifolia</i>	Pagoda Dogwood	S2	E	N	C,J,W
<i>Crataegus phaenopyrum</i>	Washington Thorn	S1	E	N	W
<i>Cryptotaenia canadensis</i>	Honewort	S1	E	N	J
<i>Cuphea aspera</i>	Tropical Waxweed	S1	E	N	C,G
<i>Dirca palustris</i>	Leatherwood	S2	E	N	J
<i>Drosera filiformis</i>	Threadleaf Sundew	S1	E	N	B,W
<i>Drosera intermedia</i>	Water Sundew	S3	T	N	B,C,G
<i>Eriocaulon nigrobracteatum</i>	Darkheaded Hatpins	S1	E	N	B,C
<i>Euphorbia commutata</i>	Wood Spurge	S2	E	N	J
<i>Euphorbia telephioides</i>	Telephus Spurge	S1	E	N	B,G
<i>Forestiera godfreyi</i>	Godfrey's Swamp Privet	S2	E	N	J
<i>Gentiana pennelliana</i>	Wiregrass Gentian	S3	E	N	B,C,G,W
<i>Hexalectris spicata</i>	Crested Coralroot	N	E	N	C,J
<i>Hexastylis arifolia</i>	Heartleaf Wild Ginger	S3	T	N	W
<i>Hymenocallis henryae</i>	Henry's Spiderlily	S2	E	N	B,G
<i>Hypericum lissophloeus</i>	Smoothbark St. John's-wort	S2	E	N	B,W
<i>Ilex amelanchier</i>	Serviceberry Holly	S2	T	N	J
<i>Isopyrum biternatum</i>	False Rue-anemone	S1	E	N	J,W
<i>Isotria verticillata</i>	Whorled Pogonia	S1	E	N	W
<i>Juncus gymnocarpus</i>	Coville's Rush	S2	E	N	B,W
<i>Justicia crassifolia</i>	Thickleaved Waterwillow	S2	E	N	G
<i>Kalmia latifolia</i>	Mountain Laurel	S3	T	N	B,C,W
<i>Lachnocaulon digynum</i>	Panhandle Bog Buttons	S3	T	N	B,C,
<i>Liatris provincialis</i>	Godfrey's Gayfeather	S2	E	N	B*

<i>Lilium catesbaei</i>	Catesby Lily	N	T	N	B,C,G,J,W
<i>Lilium michauxii</i>	Carolina Lily	S2	E	N	J
<i>Linum westii</i>	West's Flax	S2	E	N	C,G,J
<i>Lilaeopsis carolinensis</i>	Carolina Lilaeopsis	S3	N	N	B
<i>Listera australis</i>	Southern Tway Blade	N	T	N	J
<i>Lobelia cardinalis</i>	Cardinal Flower	N	T	N	C,J
<i>Lupinus westianus</i>	Gulf Coast Lupine	S2	T	N	B,G,W
<i>Macbridea alba</i>	White Birds-in-a-nest	S2	E	T	B,G
<i>Macranthera flammea</i>	Hummingbird Flower	S2	E	N	B,C,J
<i>Magnolia ashei</i>	Ashe's Magnolia	S2	E	N	B,W
<i>Magnolia pyramidata</i>	Pyramid Magnolia	S3	E	N	B,C,J
<i>Malaxis uniflora</i>	Green Addersmouth	S3	E	N	J,W
<i>Malus angustifolia</i>	Southern Crabapple	N	T	N	C,J,W
<i>Marshallia obovata</i>	Barbara's Buttons	S1	E	N	J
<i>Marshallia ramosa</i>	Barbara's Buttons	S1	E	N	W
<i>Matelea alabamensis</i>	Alabama Spinypod	S2	E	N	J
<i>Matelea baldwiniana</i>	Baldwin's Spinypod	S1	E	N	J
<i>Matelea flavidula</i>	Yellowflowered Spinypod	S1	E	N	W
<i>Matelea gonocarpus</i>	Angle-pod	N	T	N	B,C,G,J,W
<i>Myriophyllum laxum</i>	Piedmont Water-milfoil	S3	N	N	**
<i>Nyssa ursina</i>	Bog Tupelo	S2	N	N	B
<i>Opuntia stricta</i>	Shell Mound Prickly Pear	N	T	N	G
<i>Oxypolis greenmanii</i>	Giant Water-dropwort	S3	E	N	B,C,G
<i>Pachysandra procumbens</i>	Allegheny Spurge	S1	E	N	J
<i>Panicum nudicaule</i>	Naked-stemmed Panicgrass	S3	LT	N	B
<i>Paronychia chartacea</i>	Papery Whitlow-wort	S1	E	T	B,W
<i>Pellaea atropurpurea</i>	Hairy Cliff-brake Fern	S1	E	N	W
<i>Phoebanthus tenuifolius</i>	Narrowleaf Phoebanthus	S3	LT	N	**
<i>Physocarpus opulifolius</i>	Ninebark	S1	E	N	C,J
<i>Physostegia godfreyi</i>	Apalachicola Dragonhead	S3	T	N	B,C,G
<i>Pinckneya bracteata</i>	Fever Tree	N	T	N	B,C,G,J,W
<i>Pinguicula ionantha</i>	Panhandle Butterwort	S2	E	T	B,G
<i>Pinguicula lutea</i>	Yellow Butterwort	N	T	N	B,C,G,J,W
<i>Pinguicula planifolia</i>	Swamp Butterwort	N	T	N	B,C,G,J,W
<i>Pinguicula primuliflora</i>	Primrose-flowered Butterwort	S3	E	N	B,W
<i>Platanthera blephariglottis</i>	Whitefringed Orchid	N	T	N	J,W
<i>Platanthera ciliaris</i>	Yellowfringed Orchid	N	T	N	B,C,J,W
<i>Platanthera clavellata</i>	Green Rein Orchid	SH	E	N	C
<i>Platanthera integra</i>	Orange Rein Orchid	S3	E	N	C,G,J,W
<i>Platanthera nivea</i>	Snowy Orchid	N	T	N	B,C,J,W
<i>Podophyllum peltatum</i>	Mayapple	S1	E	N	J
<i>Pogonia ophioglossioides</i>	Rose Pogonia	N	T	N	B,C,G,W
<i>Polygonella macrophylla</i>	Largeleaf Jointweed	S2	T	N	B
<i>Polymnia laevigata</i>	Tennessee Leaf-cup	S1	E	N	J
<i>Quercus arkansana</i>	Arkansas Oak	S3	T	N	C
<i>Rhexia parviflora</i>	Apalachicola Meadowbeauty	S2	E	N	B,C,G
<i>Rhexia salicifolia</i>	Panhandle Meadowbeauty	S2	T	N	B,C,W
<i>Rhododendron austrinum</i>	Florida Flame Azalea	S3	E	N	C,J,W
<i>Rhododendron chapmanii</i>	Chapman's Rhododendron	S1	E	E	G
<i>Rhynchospora crinipe</i>	Hairy-peduncled Beakrush	S1	N	N	**
<i>Rhynchospora stenophylla</i>	Narrowleaf Beakrush	S3	T	N	B,W
<i>Rudbeckia nitida</i>	St. John's Susan	S2	E	N	B

<i>Ruellia noctiflora</i>	Nightflowering Ruellia	S2	E	N	G,J
<i>Salix eriocephala</i>	Heartleaved Willow	S1	E	N	J
<i>Salvia urticifolia</i>	Nettle-leaved Sage	S1	E	N	J
<i>Sarracenia leucophylla</i>	Whitetop Pitcher Plant	S3	E	N	B,C,G
<i>Sarracenia psitticina</i>	Parrot Pitcher Plant	N	T	N	B,C,G,J,W
<i>Sarracenia purpurea</i>	Decumbent Pitcher Plant	N	T	N	B,C,W
<i>Sarracenia rubra</i>	Sweet Pitcher Plant	S3	N	LT	**
<i>Schisandra coccinea</i>	Bay Star Vine	S2	E	N	J,W
<i>Scutellaria floridana</i>	Florida Skullcap	S1	E	T	B,G
<i>Silene virginica</i>	Fire Pink	S1	E	N	**
<i>Spigelia gentianoides</i>	Gentian Pinkroot	S1	E	E	C,J,W
<i>Spiranthes laciniata</i>	Lace-lip Ladies'-tresses	N	T	N	B
<i>Spiranthes longilabris</i>	Long-lip Ladies'-tresses	N	T	N	G
<i>Spiranthes ovalis</i>	Lesser Ladies'-tresses	N	E	N	J
<i>Spiranthes tuberosa</i>	Little Pearl-twist	N	T	N	J,W
<i>Stachydeoma graveolens</i>	Mock Pennyroyal	S2	E	N	B,C
<i>Stewartia malacodendron</i>	Silky Camelia	S3	E	N	B,C,W
<i>Tipularia discolor</i>	Crane-fly Orchid	N	T	N	J
<i>Trillium lancifolium</i>	Narrowleaf Trillium	S2	E	N	J
<i>Verbesina chapmanii</i>	Chapman's Crownbeard	S3	T	N	B,C,G,J
<i>Xanthorhiza simplicissima</i>	Yellowroot	S1	E	N	J
<i>Xyris chapmanii</i>	Chapman's Yelloweyed Grass	S1	E	N	C
<i>Xyris drummondii</i>	Drummond's Yelloweyed Grass	S3	N	N	B
<i>Xyris isoetifolia</i>	Quillwort Yelloweyed Grass	S1	E	N	B,G,W
<i>Xyris longisepala</i>	Kral's Yelloweyed Grass	S2	E	N	B,W
<i>Xyris louisianica</i>	Louisiana Yelloweyed Grass	S1	E	N	C
<i>Xyris stricta var. obscura</i>	Pineland Yelloweyed Grass	S1	N	N	**
<i>Xyris scabrifolia</i>	Harper's Yelloweyed Grass	S3	T	N	B,C,G,J
<i>Zephranthes atamasco</i>	Rainlily	N	T	N	J

** = FNAI list, Counties not designated

Animals

Scientific Name	Common Name	FNAI	State	Federal
Invertebrates				
<i>Caecidotea sp. 8</i>	Econfina Springs Cave Isopod	S1	N	N
<i>Dasyscias franzi</i>	Shaggy Ghostsnail	S1	N	N
<i>Medionidus penincillatus</i>	Gulf Moccasinshell	S2	N	LE
<i>Panopea bitruncata</i>	Atlantic Geoduck	S3?	N	N
<i>Pleurobrema pyriforme</i>	Oval Pigtoe	S?	N	LE
<i>Procambarus econfinae</i>	Panama City Crayfish	S1	SSC	N
<i>Sphodros abboti</i>	Blue Purse-web Spider	S4	N	N
** = FNAI list, Counties undesignated				
Freshwater Fish				
<i>Acipenser oxyrhynchus desotoi</i>	Gulf Sturgeon	S2	SSC	T
<i>Ameirus serracanthus</i>	Spotted Bullhead	S3	N	N
<i>Atractosteus spatula</i>	Alligator Gar	S3	N	N
* = Barkuloo, pers. Comm. See text				
** = FNAI list, counties undesignated				
Saltwater Fish				
<i>Micrognathus crinigerus*</i>	Fringed Pipefish			
* = Considered imperiled by Beck et al. (2000)				
Amphibians				
<i>Ambystoma cingulatum</i>	Flatwoods Salamander	S2S3	N	T
<i>Rana capito</i>	Gopher Frog	S3	SSC	N
Reptiles				
<i>Alligator mississippiensis</i>	American Alligator	S4	SSC	T
<i>Caretta caretta</i>	Atlantic Loggerhead Turtle	S3	T	T
<i>Chelonia mydas</i>	Atlantic Green Turtle	S2	E	E
<i>Crotalis adamanteus</i>	Eastern Diamondback Rattlesnake	S3	N	N
<i>Dermochelys coriacea</i>	Leatherback Turtle	S2	T	T
<i>Drymarchon corias couperi</i>	Eastern Indigo Snake	S3	T	T
<i>Gopherus polyphemus</i>	Gopher Tortoise	S3	SSC	N
<i>Graptomys barbouri</i>	Barbour's Map Turtle	S2	SSC	N
<i>Lepidochely kempii</i>	Kemp's ridley	S1	E	E
<i>Macrolemys temminckii</i>	Alligator Snapping Turtle	S3	SSC	N
<i>Nerodia clarkii clarkii</i>	Gulf Salt Marsh Snake	S3?	N	N
<i>Pituophis melanoleucas</i>	Florida Pine Snake	S3	SSC	N
Birds				
<i>Accipiter cooperi</i>	Cooper's Hawk	S3?	N	N
<i>Ajaia ajaja</i>	Roseate Spoonbill	S2	SSC	N
<i>Ammodramus maritimus peninsulae</i>	Scott's Seaside Sparrow	S2	SSC	N
<i>Aramus guarauna</i>	Limpkin	S3	SSC	N
<i>Ardea alba</i>	Great Egret	S4	N	N
<i>Charadrius alexandrius</i>	S2	S2	LT	N

<i>Charadrius melodus</i>	Southeastern Snowy Plover	S2	T	T
<i>Cistothorus palustris marianae</i>	Marian's Marshwren	S3	SSC	N
<i>Dendroica kirtlandii</i>	Kirtland's Warbler	S1	E	E
<i>Egretta caerulea</i>	Little Blue Heron	S4	SSC	N
<i>Egretta rufescens</i>	Reddish Egret	S2	SSC	N
<i>Egretta thula</i>	Snowy Egret	S3	SSC	N
<i>Egretta tricolor</i>	Tricolored Heron	S4	SSC	N
<i>Eudocimus albus</i>	White Ibis	S4	SSC	N
<i>Falco peregrinus</i>	Peregrine Falcon	S2	E	N
<i>Falco sparverius paulus</i>	Southeastern American Kestrel	S3	T	N
<i>Haematopus palliatus</i>	American Oystercatcher	S2	SSC	N
<i>Haliaeetus leucocephala</i>	Bald Eagle	S3	T	T
<i>Ixobrychus exilis</i>	Least Bittern	S4	N	N
<i>Myctera americana</i>	Wood Stork	S2	E	E
<i>Pandion haliaetus</i>	Osprey	S3S4	SSC	N
<i>Pelecanus occidentalis</i>	Brown Pelican	S3	SSC	N
<i>Picoides borealis</i>	Red-cockaded Woodpecker	S2	T	E
<i>Rhynchops niger</i>	Black Skimmer	S3	SSC	N
<i>Sterna antillarum</i>	Least Tern	S3	T	N
<i>Sterna maxima</i>	Royal Tern	S3	N	N
<i>Sterna sandvicensis</i>	Sandwich Tern	S2	N	N

** = FNAI list, Counties undesignated

* records in Loftin et. al. 1987

Mammals

<i>Mustela frenata olivacea</i>	Southeastern WS3?easel	S3?	N	N
<i>Myotis grisescens</i>	Gray Bat	S1	E	E
<i>Myotis sodalis</i>	Indiana Bat	SA	E	E
<i>Peromyscus polionotus alloparys</i>	Choctawhatchee Beach Mouse	S1	E	E
<i>Peromyscus polionotus peninsularis</i>	St. Andrews Beach Mouse	S1	E	N
<i>Sciurus niger shermani</i>	Sherman's Fox Squirrel	S3	SSC	N
<i>Trichechus manatus</i>	West Indian Manatee	S2	E	E
<i>Ursus americanus floridanus</i>	Florida Black Bear	S2	T	N

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