COASTAL MANAGEMENT ELEMENT

I. INTRODUCTION TO THE COASTAL MANAGEMENT PLAN

The coastal management plan for Wakulla County has the purpose of planning for development in an area of major environmental concern. The protection of coastal resources and protection of human life are the primary goals of this element. Guidelines and restrictions for development activities are identified here so that the goals can be achieved with a minimum of public expenditure.

II. COASTAL MANAGEMENT AREA BOUNDARIES OP WAKULLA COUNTY

The definition of the coastal area in Wakulla is based on the requirements of Rule 9J-5, Florida Administrative Code, (F.A.C.). These are: (1) General Case; (2) Hurricane Evacuation and Hazard Mitigation; and, (3) Estuarine Water Quality. Each of these areas will be treated separately and defined accordingly. Based on the requirements, the coastal management area boundaries described below will be used for this element. The maximum extent of these boundaries is the County boundaries.

General Case Coastal Area Boundary

The general case boundary encompasses waters and submerged lands of oceanic or estuarine waterbodies, shorelines adjacent to oceanic waters or estuaries, coastal barriers, living marine resources, marine wetlands, water-dependent facilities or water-related facilities on or adjacent to oceanic or estuarine waters, and public access facilities to oceanic beaches or estuarine shorelines.

The inland boundary of the coastal area of Wakulla County is as follows:
Starting at the western boundary of the County with Jefferson County, thence west to Stony Bayou Pools, thence northwest to Highway 59, thence southwest to East River, thence northwest to the confluence of Port Leon Creek and the St. Marks Rivet, thence west to West Goose Creek, thence west to Highway 365, thence in a direction parallel to Oyster Bay to Highway 61, thence south parallel to Highway 61 terminating at the Ochlockonee Bay. These boundaries were arrived at by examination of Landsat photos and subsequent analysis of vegetative types. These areas are dominated by “A” and “V” zones, based on Flood Insurance Rate Map (FIRM) with only a few areas of “B” or “C” zones.

The special purpose study area for FEMA hurricane evacuation and hazard mitigation is basically County-wide since this eliminates the need to disaggregate data contained in the Regional Planning Council’s Hurricane Evacuation Study.* The special purpose study area for estuarine water quality is the St. Marks estuary, East River estuary, Goose Creek Bay, Oyster Bay, Dickerson Bay, Ochlockonee Bay, Walker Creek, and the Apalachee Bay.
* Apalachee Regional Planning Council Hurricane Evacuation Plan, 1988

III. EXISTING CONDITIONS

A. General Land Use

The pattern of land uses is represented by a combination of residential, commercial, agriculture, conservation, and public lands. The predominant use is conservation. Those lands incorporate nearly 62 percent of the total land area in the coastal management zone. There is a considerable amount of land set aside for agricultural use, although little of this is actually farmed at present. The area of residential and commercial use is also small. The urban uses are concentrated in three areas along the coast: Panacea, Shell Point, and Spring Creek. With the majority of coastal management area lying in the St. Marks Wildlife Refuge and a few isolated communities in the coastal management area, analysis required for this element pursuant to Rule 9J-5, F.A.C., will be performed by the community study of Panacea/Ochlockonee Bay, Shell Point/Live Oak Island, and Spring Creek.

B. Panacea/Ochlockonee Bay

1. General

Wakulla County's coastal zone economy is based on timber, pulp, tourism and seafood oriented. It is understandable that economic development would be oriented to the available natural resources, however, the competition for such activities is particularly rigid due to the surrounding counties utilizing the same natural resources. Panacea's economic base was once very strong as the seafood industry was thriving and much of the County's work force was employed in that industry. Due to increased competition, heavy regulation, increased population in the coastal areas, and natural disasters, the seafood industry has been steadily decreasing as the principal industry to a point where only 4.4 percent of the working population of the County is employed in the seafood industry. This has allowed for blighted conditions such as abandoned or substandard housing and abandoned seafood processing plants and warehouses along U.S. 98. Currently, attempts are being made to increase the economic base of the community through divergent grant programs and commercial revitalization through Community Development Block Grants and a special overlay district. This may clean up some of the blighted conditions through aesthetic improvements along U.S. 98 in hopes of once again making the Panacea area commercially attractive. The shorelines land uses in the Panacea and Ochlockonee Bay areas now principally include residential development, one County-owned park and dock, and several very small marinas that serve residential or minor commercial fishing industries. No major land use conflicts exist due to the limited size of the marinas that serve the residents of the area.

2. Sanitary Sewer

Much of Panacea is now served by the Panacea Area Sewer System. The necessity of the system was due to high levels of fecal coliform in waters adjacent to Panacea and Ochlockonee Bay. The Panacea Sewer System has allowed environmental conditions in Ochlockonee and Dickerson Bays to greatly improve and allows for the increased harvesting of commercially valuable species, particularly shellfish.

3. Roads
Arterial and collector roads in the Panacea/ Ochlockonee Bay area include Highways 61, 372, 372A, and 372B. All other roads in this area are minor collectors or forest roads.

4. Drainage
The drainage facilities in the Panacea/ Ochlockonee Bay area are more extensive than other areas in the County due to low lying areas with existing development, high water tables and poor percolation capacity of soils. Due to limited impervious surfaces, flooding from major storm events has not caused extensive property losses. The majority of drainage facilities in this area are in the fort of mosquito control ditches. These ditches serve to divert runoff during storm events and adequately provide drainage for those areas, but these facilities do not include retention or detention facilities and are not effective in preventing pollutant loading of receiving waters. Some of these facilities are located in such a manner that stormwater runoff is unimpeded and drains into estuarine waters (particularly Dickerson, Levy, and Ochlockonee Bays) that serve as feeding and breeding areas for many terrestrial and marine species (particularly shellfish and oysters). Offshore fisheries and oyster beds are numerous and represent important resources which require protection to maintain the salinity ranges essential to proper growth of the oysters. These areas should be a first priority when considering the placement of retention or detention facilities to slow the introduction of nutrient loads into the receiving waters. Costs that will be incurred from the placement of modified stormwater facilities may be addressed in the Capital Improvements Element. Much of the stormwater runoff drains to the westerly lands which eventually drain through small creeks into Levy Bay (See the Stormwater Drainage Sub-Element of the Infrastructure Element to identify the drainage patterns in Panacea).

5. Management and Maintenance Provisions
The proper operation of the drainage system is critical to the existing development for flood protection and mosquito control. Present maintenance is done by the County Road Department on historically designed roadway drainage. Those ditches that are mosquito control ditches are maintained by mosquito control personnel through the Public Works Department.

C. Analysis

Open space in the Panacea area could be reserved for drainage facilities in areas characterized by impervious surfaces such as shopping centers. These issues will be addressed in the Goals, Objectives and Policies section of the Comprehensive Plan.

Shell Point/spring Creek and Live Oak Island combined form a community that is smaller than Panacea but with predominately residential uses and a middle to upper income population. Residential uses include water front single family dwellings and few mobile homes, some of which are vacation homes occupied on weekends or seasonally. The few commercial uses are water related services for the community and include a restaurant, hotel and marina. There are no land use conflicts in this coastal area as the above listed commercial uses are integral parts of the community and enhance the community's character.

The Shell Point/Spring Creek area is served by both septic tanks and sewer systems. It is estimated that 60% of all dwellings in Shell Point are on one of the private

sewer systems serving the area. Live Oak Island is served by septic systems including aerobic systems and a small 10,000 gallon private wastewater system.

The two sewer systems that serve Shell Point are generally small package plants located outside of the subdivided residential areas. The following table displays the systems serving Shell Point.

TABLE 2			
ACTIVE SYSTEMS	DEMAND (GPD)	CAPACITY (GPD)	UNITS SERVED
MOORINGS OF LIVE OAK ISLAND	1,000	10,000	4
OYSTER BAY ESTATES	6,000	60,000	200
PARADISE VILLAGE	19,200	30,000	100
SHELL POINT	10,000	24,000	120

TABLE 3 EXISTING LAND USES SHELL POINT/LIVE OAK ISLAND (HARTSFIELD SURVEY 121)		
	ACRES	PERCENT
RESIDENTIAL	301.37	21.19
COMMERCIAL	121.55	8.35
AGRICULTURE	355	24.96
CONSERVATION	290	20.66
VACANT	353.3	24.84

D. Water-Dependent and Water—Related Uses

The following water-dependent uses occur in the coastal management area: water-dependent recreation (swimming beaches, fishing piers and boat ramps); commercial fishing facilities; marinas; and conservation activities. The following water-related uses occur in the County: fish camps associated with marinas, dry storage and upland support for marinas, and upland support for parks and recreation areas.

E. Natural Resources of the Coastal Area

The purpose of this section is to outline the biological resources of the coastal area. Other sections of the plan will discuss the physical features and associated problems in detail.

1. Ecological Communities of the Coastal Area
These communities, as identified by the Soil Conservation Service publication "26 Ecological Communities of Florida" are as follows: Wetlands, Hardwood Hammock, Salt Marsh, Swamp Hardwoods, and Shrub Bogs-Bay swamps.

2. Vegetative Cover and Wetlands
The coastal management area is composed of five ecological communities with a resulting diversity of vegetative types. Each of the vegetative associations is wildlife habitat. The Salt Marsh community is the most prevalent in the coastal area and will be examined in detail. The major flora species for this community are outlined below. A more detailed inventory of the remaining four communities is presented in the Conservation Element along with their development associated problems.

3. Salt Marsh
The type of vegetation found in this community is adapted to conditions which are a result of water levels from tidal action and salinity concentrations in water and soil. These species have a wide tolerance range due to fluctuations of the salt marsh conditions. Plants in this group are black needlerush and seashore grass. Smooth cordgrass is more indicative of low, regularly flooded marsh, while the high marsh supports salt myrtle, marshhay cordgrass, marshelder, saltwort and sea oxeye. As described in the land use inventory associated with this element, development in the coastal management area has been minimal, and most of the salt marsh community is protected through publicly owned lands set aside for conservation. However, some human activities have had a somewhat adverse effect on the wellbeing of the area. The location of commercial marinas in Shell Point and Panacea have contributed to the pollution of nearby waters. Nonpoint sources of residential sewage disposal are also a matter of concern; however, a public sewage disposal system in Panacea is helping to alleviate this problem.

a) A listing of the vegetative species of the Salt Marsh community follows:

1) Herbaceous Plants:
Sea Mite, Suaeda Linearis
Sea Purslane, Sesuvium Portulacastrum
Annual Baldwina, Actinospermuin Anpustifolium
Gerardia, Acralinis Sp
Alligatorweed, Alternanthera Philoxeroides
Milkweed-Red, Asclepjas Lanceolata
Milkweed, Asclepias Spp.
Aster-Bush, Aster Duniosus
Aster-White-Top, Aster Reticulatus
Hyssop-Water, Bacopa Ntonnieri
Bacopa, Bacopa Marjtjina
Ticks-Beggar, Bidens Mitts
Sea Oxaye-Bush, Borrichia Arborescens
Flatsedges, Cyperus Nedunculatus
Eupatoriuni-Semaphore, Eupatorium Mikaniodes
Eustonta, Eustoma Exaltata

Prariegenties, Eustoma Axaltata
Heliotrops-Seaside, Heliotropium Curassavicum
Helitropa, Helitropium Spp.
Mallow-Saltmarsh, Kosteletzkya Virginica
Lavender-Sea, Limonium Spp
Marsh Samphire, Philoxerus Vermicularis
Glasswort, Salicornia Spp.
Pimpernal-Watyer, Samolus Abracteatus
Bulirush, Scirpus Spp.
Cattail, Typhapp
Verberna, Verbena Spp.

2) Vines:
Morning Glory, Iinpomoea Triloba

3) Grasses And Grasslike Plants:
Seashore Saltgrass, Distichlis Spicata
Shoregrass, Monanthochloe Litteralis (1)
Keygrass, Monarithochloe Litteralis (2)
Paspalum-Low, Pasalum Siju.
Paspalum-Seashore, Pasalum Vactinatum
Knotroot Bristlegrass, Setaria Peniculata
Cordgrass-Smocth, Spartina Alterniflora
Cordgrass-Bjg, Spartina Cynosurojdes
Cordgrass-Gulf, Spartina Sparinas
Knarleddropseed, Sporchulus Pyrabidatus
Seashore Dropseed, Sporobolus Virginicus
Caric Sedges, Carex Snp.
Sawgrass, Cladium Jamaicense
Flat Sedge, Cyperus Odoratus
Spike Rush, Eleocharis Spp
Fringed Rush, Fimbbristylis Spp.
Umbrella Grass, Fuirena Scirpoidea
Black Needle Rush, Juncus Roimneranus
Common Reed, Phraamited Australjs
Saltmarsh Bulirush, Scirpus Robustus
Bulirushes, Scirpus Spp.

4) Trees:
Common Buttonbush, Cephalanthus Occidentalis

SOURCE: Soil Conservation Service, “26 Ecological Communities of Florida”

b) Terrestrial and Aquatic Wildlife
The wildlife of the coastal area can be identified with the above vegetative communities. In like manner, the species that are present in the Salt Marsh community will be described in detail, the

wildlife in the other communities being dealt with in the Conservation Element.
The Salt Marsh community supports a variety of wildlife. The habitat type is maintained by natural forces and influences such as tidal action and periodic hurricanes. Storms cause the regression of vegetative succession creating open water spaces in marshes. These are favorable habitat for waterfowl, furbearers, and wading birds. Artificially created dikes to control salinity are used in the St. Marks National Wildlife Refuge, further providing food habitat areas. A listing of wildlife in the Salt Marsh community includes:

1) Amphibians:

Frog-Leopard	Rana pipians
Oak-Toad	Bufo quecicus
Southern Toad	Bufo terrestrjs
Green treefrog	Hyla cinerea
Squirrel treefrog	Hyla scitirella
Southern leopard frog	Rana urticularia

2) Birds:

Sandpiper-Spotted	Actitis macularia
Duck-Florida	Anas fulvigula
Heron-Great Blue	Ardea herodias
Duck-Ring-necked	Aythva collaris
Bittern-American	Botaurus lentiginosus
Hawk-Redtailed	Buteo iamaicensis
Hawk-Redshouldered	Buteo lineatus
Green-backed Heron	Butorides vireacans
Common Egret	Casmerodius albus
Grackel-Boat-tailed	Cassidix mexicanus
Vulture-Turkey	Carthartes aura
Willet	Catoptrophorus seiuipalniatus
Killdeer	Charadriusvaciferus
Northern Harrier	Circus cyaneus
Vulture-Black	Coraqups atratus
Crow	Corvus brachsyncho
Crow-Fish	Corvus ossifraqus
Warbier-Yellow-rumped	Dendroica coronata
Warbler-Palm	Dendroica palmarum
Ibis-White	Eudocimus albus
Falcon-perigrene	Falco perectinus
Heron-Little Blue	Florida caerylea
American Oystercatcher	Haematopus palliatus
Eagle-Sountern Bald	Haliaetus leucocephalus
Herring-Gull	Larus argentatus
Gull-Ringed-bill	Larus delawarensis
Egret Snowy	Leucephoyx thula
Kingfisher-Belted	Negacaryla alcvon
Nergnser-Red-Brested	Merq-us cerrator
Wood Stork	Mycteria americana
Great Crested Flycatcher	Myiarchus crinitus
Osprey	Pandion haliaetus
Pelican-White	Pelecanus erythrorhynchos
Grackel-Coinmon	Puiscalus ciuiscula
Rail-Clapper	Rallus lonctirostris
Tern-Least	Sterna albifrons
Tern-Royal	Thalasseus maximus
Wren-Carolina	Thryothorus ludovicianus
Owl-Barn	Tvto alba
Warbler-Blackpoll	Dendroica striata
Warbler-Prairie	Dendroica discolor
Northern Waterthrush	Seiurus noveboracensis
Warbler-Hooded	Wilsonia citrina
.Anerican redstart	Setophaga ruticilla
Scarlet tanager	Pirangaclivacea
American goldfinch	Spinus tristis
Savannah sparrow	Passerculus sandwichensis

3) Mammals:

Mink	Mustela vision
Deer-White tail	Odecoileus virginianus
Raccoon	Procyon lotor
Rabbit-Eastern Cottontail	Sylvilagus floridanus
Rabbit-Marsh	Sylvilagus palustris

4) Reptiles:

Moccasin-Cottonmouth, Agkistrodoy-	Piscivarus
Alligator-american	Alligator xuissjssjpniansjs
Terrapin-Diamondback	Malaciemys terripin
Snake-Gulf Salt Marsh	Nerodia fasciata
Snake-Florida Ribbon	Thamnophis sauritus
Florida Box Turtle	Terrapene carolina bauri
Green anole	Anolis carolinensis
Southeastern five-lined skink	Eueces inexpectatus
Six-Lined racerunner	Cnedmidophorus s. sauritus
Florida Green water snake	Nerodia cyclopion floridana
Florida pine snake	Pituophis melanoleucuc munitus
Peninsula ribbon snake	Thamnophis s. sauritus
Florida cottonmouth	Acjikstrodonp iscivorous
Dusky piginy rattlesnake	Sistrurus miliaris barouri
Canebrake rattlesnake	Crotalus horridus atricaudatus
Three toed Gecko	Gecko-Gecko

5) Major Sport Fishing Species:

Amberjack	Seriola dumerili
Bass-Channel	Sciaenops ocellatus
Bass-Sea	Centropristes striatis
Bonito-Artic	Katsuwonus vagans
Cobia	Rachycenron canadus
Croaker	Micronopon indulatus
Grouper-Red	EpinneDhelus mono
Grouper-Warsaw	Garrupa nicrrita
Pinfish	Lagodon rhomboides
Trout-Silver	Cynoscian arenanius
Sheepshead	Sarchosarctus probatocenhalus
Mullet	Mucgilidae Moxostoma

SOURCE: Soil Conservation Service, “26 Ecological Communities of Florida”, local observations

TABLE 4
LISTED SPECIES

Common Name	Scientific Name	USFWS	FGFWFC	AGRI.
Fishes				
Atlantic Sturgeon	Acipenser Oxyrhynus	----------	LS	----------
Suwannee Bass	Micropterus Notius	----------	LS	----------
Amphibians				
Gopher Frog	Rana Areolata	----------	LS	----------
Mammals				
West Indian Manatee	Trichechus Manatus	LE	LE	----------
Reptiles				
American Alligator	Alligator Mississippiens	LT	LS	----------
Loggerhead	Caretta Caretta	LT	LT	----------
Green Sea Turtle	Chelonia Mydas	LE	LE	----------
Leatherback Turtle	Dernochelys Coriacea	LE	LE	----------
Eastern Indigo Snake	Drynarchon Corais Couperi	LT	LT	----------
Gopher Tortoise	Gopherus polyphemus	LT	LT	----------
Kemp's Ridley Sea Turtle	Lepidochelys Kempii	LE	LE	----------
Alligator Snapping Turtle	Macroclemys Tenuninckii	----------	LS	----------
Florida Pine Snake	Pituophis Melanoleucus Mugitus	----------	LS	----------
Suwannee Cooter	Ammodramus Concinna Suwanniensis	----------	LS	----------
Birds				
Wakulla Seaside Sparrow	Ammodramus Maritima Junicola	----------	LS	----------
Limpkin	Aramus guarauna	----------	LS	
Marjan's Marsh Wren	Cistothorus Palustri	----------	LS	----------
Little Blue Heron	Egretta Caevulea	----------	LS	----------
Snowy Egret	Egretta Thula	----------	LS	----------
Southeastern American Kestrel	Falco Sparverius Paulus	----------	LT	----------
Wood Stork	Mycteria Americana	LE	LE	----------
Osprey	Pandion Haliaetus	----------	LS	----------
Brown Pelican	Pelicanus Occidentallis	----------	LS	----------
Red-Cockaded Woodpecker	Picoides Borealis	LE	LS	----------
Listed Plants				
Green Milkweed	Asciepias Viridula	----------	----------	LT
Scare-Weed	Baptisia Simplicifolia	----------	----------	LT
Wiregrass Gentian	Gentiana Perinelliana	----------	----------	LE
Godfreys Blazingstar	Liatris Provinvialis	----------	----------	LE
Ashes Magnolia	Magnolia Ashel	----------	----------	LE
Florida Golden Aster	Pityopsis Flexuosa	----------	----------	LE
Catesby Lily	Liliuin Catesbaei	----------	----------	LT
Flyr's Brickell Bush	Brickellia Cordifolia	----------	----------	LE
Corkwood	Leitneria Floridana	----------	----------	LT
Green Adder's Mouth	Malaxis Unifolia LT	----------	----------	LE
Yellow Fringeless Orchid	Platanthera Intergra	----------	----------	LE
Large-Leaved Jointweed	Polygonella Macrophylla	----------	----------	LT

KEY: LS — Species of Special Concern
LT - Threatened
LE - Endangered
NL - Not Listed

SOURCES: Florida Natural Areas Inventory (FNAI)
U.S. Fish and Wildlife Service (USFWS)
Florida Game & Freshwater Fish Commission (FGFWFC)
Florida Department of Agriculture (FDA)
Wakulla County Planning Department

The above plant and animal species that are described as of special concern may be classified as either endangered or as threatened by the Florida Fish and Wildlife Conservation Commission or the U. S. Fish and Wildlife Service. Other species may be included because of other concerns. The reason each species is imperiled and therefore given special status varies with the species. Some of the various reasons are discussed below.
The osprey has suffered population declines due to pesticide residues. The red-cockaded woodpecker has suffered from early harvesting of pine trees. While not predominant in the coastal area, some small pockets of suitable habitat do exist in the coastal management area.
The West Indian Manatee is the most endangered mammal in the coastal area. This animal infrequently inhabits the coastal areas of Wakulla County during summer feedings. The most common human induced cause of manatee death is boat collisions. Actions which could reduce the boat/manatee collisions include establishing speed zones, appropriate siting of marinas, limitations on boat operations in shallow water and seagrass meadows.
The American alligator has revived to a point where it is probably no longer threatened with immediate extinction, however special concern must still be given for its well being.

4. Shellfish Harvesting:
There are a variety of commercially viable marine shellfish along the shores of Wakulla County. However, harvesting of these oysters is limited by the water quality of the, coastal area.
Other commercially viable species include the blue and stone crab and the rock shrimp.

F. Historic Resources

Wakulla County has four sites in the National Register of Historic Sites that occur in the coastal area.

1. Known Archaeological and Historic Sites
Number Name Prehistoric (P)/Historic (H)

SWA3O Bird Hammock	P
8WA26 Fort San Marcos de Apalachee	H
8WA114 St. Marks Lighthouse	H

a) Fort San Marcos de Apalachee
Fort San Marcos de Apalachee was listed November 13, 1966, and can be found within the corporate limits of the Town of St. Marks. Fort San Marcos de Apalachee is managed by the Department of Environmental Protections on federal land. Since St. Marks is expected to have limited growth over the next ten years, impacts of development or redevelopment will be minimal.

b) St. Marks Lighthouse
St. Marks Lighthouse was listed July 31, 1972, and can be found deep within the St.

Marks National Wildlife Refuge. Impacts of development or redevelopment are non-existent.

c) Bird Hammock Indian Mounds A and B
The Bird Hammock Indian Mounds are located on private property within the coastal area. The land is currently zoned vacant industrial and is used as a buffer for an industrial complex. Even though the industrial complex is not expected to expand in the direction of these Indian Mounds, an archaeological survey shall be done before any building permit is issued within a quarter mile radius.

2. Potential Historic Resources
There are a few potential Historic Resources within the coastal area. These include Port Leon, old Newport, and various Indian archaeological sites. These sites shall be preserved in the future by way of adoption of a Historic Resources ordinance by the Board of County Commissioners.

G. Estuarine pollution

Wakulla County is among a number of counties in the panhandle unique to Florida because of the rich, inshore estuarine waters. Wakulla County's entire coastline is classified as estuarine as indicated on the inventory maps. This area is maintained as estuarine because of interface of marine and extensive freshwater wetlands and rivers.

Virtually all of Wakulla County's estuarine waters are classified as Class II. Class II waters are estuarine waters capable of producing shellfish, specifically non-mobile organisms, commercially important to man. The significant commercial shellfish in Wakulla County are oysters, and less importantly clams and mussels. Other significant commercial organisms include finfish, crabs and shrimp. Although the vitality of these species are not affected normally as adults, their juvenile periods require food ambient water quality conditions for survival in the estuarine marsh.

As indicated on the FDEP shellfish map, the County's estuarine areas are classified as approved, prohibited, or unclassified. Unclassified normally are offshore marine waters or river systems that are not classified as shell fishing waters. The County's estuarine area is approved for shell fishing which indicates that pollution from upland sources is still insignificant.

The remaining prohibited Class II waters are Ochlockonee Bay, adjacent to Panacea; Apalachee Bay/Goose Creek, affected by Shell Point and Live Oak Island; and North Oyster Bay, adjacent to Spring Creek. Another area identified on the shellfish harvesting maps near Purify Creek us expected to be conditionally approved. Almost all of the referenced areas were closed because of fecal colifonn bacteria which concentrates in shellfish, specifically oysters. DEP's shellfish sanitation lab is the section responsible for monitoring bacteria levels in the estuarine areas. When levels are unacceptable, waters are closed to shell fishing. Because of the proximity to uplands and susceptibility to pollution, the areas referenced could be permanently closed. The bacteria pollution source was found to be from faulty or poorly constructed septic tanks which discharge improperly treated sewage into adjacent waters in direct surface discharge or from lateral movement through very permeable soils. The most intense bacteria pollution is during the rainy season and other high water periods. These problems have been remedied through the placement of a central sewer system that serves coastal areas in Panacea and in developed areas along Ochlockonee Bay (see the Infrastructure Element for more details).

The primary pollution factor is stormwater runoff. Stormwater runoff is created by rainfall which results in an immediate flow of water. Depending on its origin, runoff can be generated quickly in saturated soils and especially impervious surfaces such as roads, parking lots, and rooftops. Usually, the first 1/2 to 1 inch of runoff is the most critical factor and is the factor used by DEP to determine pollution loads. This initial "first flush" has been identified as the most pollution laden portion of a discharge and occurs during most normal, frequent rain events. Runoff can be effectively filtered and treated in most cases by grass swales, slightly sloped to provide drainage after saturation in the swale is reached.

Properly designed swales treat runoff efficiently and require little review by Department of Environmental Protection. Impervious areas require more complex and sophisticated water retention facilities and usually require the scrutiny of a professional engineer.
stormwater runoff becomes a problem when untreated quantities of runoff are discharged into surface waters. Recent studies, not identified here, indicate that the pollutants in untreated stormwater runoff make runoff just as critical a pollution source as fecal coliform bacteria from septic tanks. Runoff can contain heavy metals, oils and greases, phosphates, nitrogenous compounds as well as fecal coliform bacteria. However, tracing runoff pollution is difficult and also more expensive to abate than septic tank pollution. Stormwater drainage studies will be conducted to find the best strategies to abate stormwater runoff problems in coastal areas (see the Drainage Sub-Element). Other methods of abating pollutions problems are shown below.
Urban land development adjacent to estuarine areas in Wakulla County is centered in two areas; that of Panacea and of Shell Point. Pollution of estuaries associated with urban stonuwater runoff may occur in these localities. There are no other non-point sources near estuaries in the County. Stormwater runoff and septic tank pollution are critical non-point pollution sources in Wakulla County. Therefore, improvement is required to abate the existing conditions. Methods for improvement include:

1. Closer coordination with agencies which can provide the County with expertise. These agencies can provide a template to the County, which in turn could set up its own program. DEP can provide technical expertise in the establishment of a workable stormwater management ordinance which could be staffed by local personnel. The ordinance could include sophisticated management plans for the County's urbanized areas and simple vegetative buffer setbacks in residential and rural areas.

2. Rezoning to eliminate existing pollution
source development and provide for compatible uses along the coastline. The existing and conflicting uses are inventoried and analyzed in this text's land use report.

3. Eliminate the use of septic tanks near the coastline by establishing a buffer in rural areas and providing a buffer of uplands between wetlands and water and the waste treatment system. In reviewing the wetlands inventory maps, septic tanks should not be approved in obvious open water and wetland areas. Also, critical review is recommended in palustrine areas. Palustrine areas are at least seasonally wet and impact the performance of septic tanks. Health and Rehabilitation Services maintains by Rule l0D-6, F.A,C., criteria and specifications for the construction of individual wastewater systems. However, the rules are generalized and used in all parts of Florida uniformly. Wakulla County is unique because of its vast low lying areas of

marsh lands which maintain productive seafood, but are not necessarily compatible with intense development. Therefore, the County may adopt an ordinance which would provide the referenced setback. In areas of more concentrated development, centralized sewage collection systems should be developed. Systems are proposed for most areas so implementation in the critical areas such as Panacea, Shell Point, Spring Creek, and Ochlockonee Bay should be accomplished. Sewer systems are in place in all coastal communities and new development is required to hook up on those systems where service is available.

4. Management, inspection and enforcement are important elements which can remedy coastal pollution problems. Most rural Panhandle counties exhibit problems with enforcement based on unclear or broad codes and lack of personnel to carry out mandates. Significant quantities of development can go unnoticed resulting in lost revenue.

5. Finally, environmental education is a primary tool that can be utilized through the County's school system. An educational transition period can require a generation to initiate a change, but education is probably the most effective tool to remedy adverse pollution conditions.
All the above factors can provide the County with methods to maintain or enhance water quality in the adjacent estuarine waters. It also should be noted that if the County has difficulty in providing effective protection of its coastal waters, then other remedial actions may be employed by the state to provide protection. The following is a listing of agencies involved in some coastal zone related programs.

H. Beach and Dune Analysis

The only identified beach dune system in Wakulla County is located at Mashes Sands Park, which is located at the confluence of Ochlockonee Bay and the Gulf of Mexico as identified on the Lighthouse Point quadrangle. Discussion of the beach dune community is included in the Uplands Section of the Conservation Element.

In reviewing accretion/erosion trends, some general coastal information is required. Most beach areas around the Gulf of Mexico, as well as other coastal areas, are experiencing a gradual erosion trend due to subtle increases in water elevation. This parameter in conjunction with normal wave energy creates a trend forcing the mean high-water line gradually inland. Other factors such as manmade structures have greater affects on the inward erosion rate.
Wakulla County is currently experiencing an erosion trend at a less gradual rate than most other beach areas. Although exposed to open water, wave energy is low being dissipated by shallow inshore bottoms. Heavy flow periods also affect the erosional trends providing some sedimentation as nourishment, although the sedimentation load is more directed by littoral currents toward Bald Eagle Point in Franklin County. More importantly, the Mashes Sands beach system is virtually devoid of shoreline structures. Structures include seawalls, groins, jetties and other natural or manmade defense mechanisms. These structures may temporarily stabilize a beach but can accelerate erosion in the long term.

In discussing beach protection measures, the Mashes Sands area can be best protected by restricting vehicular access on the beach area, minimize manmade structures along the shoreline, and encourage an ongoing natural vegetative planting program.

By restricting vehicular access on a beach, dune vegetation can be protected thereby maintaining the sand holding capacity of the plant roots. Vehicles can be physically restricted by pilings or other retaining devices and then enforced to ensure the poles remain in place. The placement of an elevated boardwalk from the parking area to the beach would direct pedestrian traffic and minimize the human impact on adjacent vegetation. Additionally, the vegetation planting program should increase the vegetative cover causing greater erosion protection. Vegetation to be used would be coordinated with FDEP, FNAI, or other appropriate agencies.

I. Coastal High Hazard Area

Per 163.3178 F.S. the coastal high-hazard area (CHHA) is the area below the elevation of the category 1 storm surge line as established by a Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computerized storm surge model. That area must be evacuated during a Category 1 through 5 storm event. According to the "Hurricane Loss Study" by the ARPC, in the event of a (vulnerability level B) category 3, 4, or 5 storm it may be safer to evacuate all residents living below Highway 98 at the Jefferson County border to the community of Newport following Highway 267 to Wakulla Station, then Highway 365 to the community of Shadeville, then south on Highway 365 to U.S. 98, then following u.s. 98 to the community of Medart, then following U.S. 319 to Sopchoppy, then following Highway 22 to its end near the Ochlockonee River.

1. Potential number of persons requiring evacuation:
In the event of a Category 1 through 5 hurricane, all County residents living in mobile homes will be evacuated whether they live within the coastal zone boundary or not. Approximately 6,500 residents will require evacuation in a Category 1 or 2 storm event (vulnerability Level A) and approximately 8,000 residents will require evacuation in a Category 3, through 5 storm event (vulnerability Level B).

2. Potential number of persons requiring shelter:
Many of the residents evacuating will seek shelter with friends, relatives, or hotels and motels in Tallahassee. They should avoid areas suspect of wind or flood damage. According to the ARPC, some 1,506 residents will seek public shelter in a category 1 or 2 hurricane (vulnerability Level A) and some 1,776 residents will seek public shelter in a Category 3, through 5 Storm (vulnerability Level B). This data is shown on the following table:

Table 5

LEVEL	POPULATION (APPROX.) EVACUATING	SHELTER CAPACITY
A	6,500 x 100% = 6,500 x 28% =	1,820 - 2,800
B	8,000 x 100% = 8,000 x 28% =	2,240 - 2,800

SOURCE: ARPC, 1992 Wakulla County PEP

According to the ARPC and 1992 PEP, public shelters in Wakulla County have a population capacity of 3,300 (40 square feet/person). These shelters are listed in Table 6. (Note: 40 square feet/person is in excess of the minimum requirements identified in Rule 9J-2.0256, F.A.C.)

TABLE 6
SHELTERS IN WAKULLA COUNTY

SHELTER		CAPACITY at 40 SQ-FT./ PERSON
Crawfordville Elementary School	----------	**500**
Crawfordville, Florida		
Old Shadeville Elementary	----------	**500**
Shadeville, Florida		
New Shadeville Elementary	----------	**500**
Shadeville, Florida		
Sopchoppy Elementary School	----------	**500**
Sopchoppy, Florida		
Middle School	----------	**600**
Medart, Florida		
High School	----------	**700**
Medart, Florida		
Total		**3,300**

SOURCE: ARPC, 1992 Wakulla County PEP

Evacuation Routes - Wakulla County has five routes heading north away from the coast for evacuation purposes. They are Highways 375, 373, 61, 363, and U.S. 319. Wakulla County has a limited road system within the coastal zone boundary; therefore, early warning systems are necessary. Most roads in Wakulla County have a potential for flooding during a 100 year storm event. For example, Panacea, Spring Creek, Shell Point, Live Oak Island, St. Marks, and other communities within the coastal zone boundary will be the first to evacuate; US 98 is a critical evacuation route for residents in Franklin County and the community of Panacea because it is in the 100 year flood zone. Two areas on U.S. 98 below Panacea have evaluations less than ten feet and traffic congestion can be heavy. Highway 375 is suspect to flooding because of the clay soils surrounding it. Flooding caused by runoff has the potential to inundate portions of this road; however, there is a minimum population along this road.

According to the 1986 “Hurricane Loss Study’ by the Apalachee Regional Planning Council, U.S. 319 is the critical arterial in Wakulla County. It will collect a good portion of the population based in Franklin County, as well as Wakulla County. U.S. 319 comes out of Franklin County and into the Town of Sopchoppy then runs east through the community of Buckhorn, then straight north where it converges with US. 98. There will be a major portion of the population traveling on U.S. 319 collecting residents from Franklin County, the communities of Sopchoppy, Panacea, Crawfordville, and other communities along U.S. 319. Because U.S. 319 will be the heaviest traveled during a storm event, it is important to divert traffic at the intersections of Highways 267 and 373 which will not be used to capacity.

There are two places along U.S. 319 where flooding may occur during a 100 year storm event. They are adjacent to the communities of Buckhorn and Medart where the elevation is low. Traffic congestion problems can be expected along U.S. 319 especially in Medart and near the Leon County Border.

Highway 61 will collect the population in the central corridor of the County that U.S. 319 does not. It is expected to collect the coastal traffic flow from Highway 365. Highway El will collect residents from Spring Creek, Shell Point, Live Oak Island, Wakulla Gardens, Shadeville, and Mysterious Waters. Highway 61 will not have as many traffic congestion problems as U.S. 319 because of lighter population and early warning to the coastal communities of Spring Creek, Shell Point, and Live Oak Island.

Highway 363 runs from the City of St. Marks north to Tallahassee. Highway 363 will collect residents from St. Marks, Newport and Wakulla Station. Due to early warnings in the City of St. Marks (1990 U.S. Census population was 307), traffic congestion should be minimal.

Two critical links in Wakulla County are worth noting. The first is the intersection of U.S. 319 and Highway 376 in Sopchoppy where traffic congestion may be a problem. The second is the intersection of U.S. 319 and U.S. 98 where traffic congestion may also be a problem.

3. Evacuation Times:
Per 163.3178 F.S. the level of service for evacuations shall be no greater than 16 hours for a category 5 storm event as measured on the Saffir-Simpson scale. Comprehensive Plan amendments in compliance with state coastal high hazard provisions 9J-5.012(3)(b)6. and 7., Florida Administrative Code, if:

1. The adopted level of service for out-of-county hurricane evacuation is maintained for a category 5 storm event as measured on the Saffir-Simpson scale;

2. A 12-hour evacuation time to shelter is maintained for a category 5 storm event as measured on the Saffir-Simpson scale and shelter space reasonably expected to accommodate the residents of the development contemplated by a proposed comprehensive plan amendment is available; or

3. Appropriate mitigation is provided that will satisfy the provisions of subparagraph 1. or subparagraph 2. Appropriate mitigation shall include, without limitation, payment of money, contribution of land, and construction of hurricane shelters and transportation facilities. Required mitigation shall not exceed the amount required for a developer to accommodate impacts reasonably attributable to development. A local government and a developer shall enter into a binding agreement to memorialize the mitigation plan.

Depending on speed and direction, hurricane landfall will vary. According to the ARPC, a Category 1 or 2 storm event (vulnerability A) has an evacuation time frame which ranges front 11-22 hours. A Category 3, 4, or 5 storm event (vulnerability B) has an evacuation time frame which ranges from 13 to 28 hours prior to landfall. The worst case scenario is a storm moving in a northwesterly direction.

There are two “special needs” groups which are addressed. The first is the elderly. Some in this age group will require special assistance during storm events due to medical and transportation

needs. However, a good portion of these people live with other family members. The second is the Wakulla Manor Nursing Home in Medart. According to the County Emergency Medical Services Department, the residents of the nursing home were evacuated onto school buses with wheelchair accessibility in approximately 40 minutes during Hurricane Elena. Considering the nursing home has a capacity of 120 beds, this may not represent a tactical problem in the future.

4. Future Needs :

This portion of the Comprehensive Plan concerning Hurricane evacuation analysis is based on projected residential populations of approximately 20,000 by the year 000. At least 90% of the projected population will be living in the central corridor in the County between U.S. 319 and Highway 363. This is similar to the current population trend because the Apalachicola National Forest is to the West and St. Marks National Wildlife Refuge is to the East. Current trends also indicate that the majority of this projected population will reside in the northern part of the County. This will put the projected population out of range of the vulnerability A and B areas. A problem to be addressed is the influx of mobile homes into the northern areas of the County. However, it may be assumed that those residents will seek shelter North in Leon County as opposed to traveling South towards a storm event. Table 3 gives that projected number of evacuees in the year 2000 based on the percentage of people evacuating in 1982. In a category 1 or 2 storm event (vulnerability Level A) a projected population of 11,512 residents may require evacuation. In a Category 3, 4, or 5 storm event (vulnerability Level B) 13,588 residents will require evacuation. On examination of Table 4, the number of evacuees requiring shelter will not exceed current capacity, however, due to the overspill of residents from Franklin County, a new shelter will be designated by the year 1995 to add additional capacity for 500 more evacuees. Since the number of lanes on U.S. 98, U.S. 319, and Highways 373, 61, and 363 are not expected to change, evacuation time may increase due to population pressures. Early warning will become extremely important to the residents of Wakulla County. Whenever possible during roadway improvements, these roads will be elevated above the 100 year flood plain. The requirements for the elderly and nursing home residents is expected to remain constant.

TABLE 7
Total Population Evacuating

Vulnerability Level	Population Evacuating	% of Population
1982		
A	6,723	61%
B	7,928	72%
2000		
A	11,512	61%
B	13,334	72%

SOURCE: Wakulla County Planning Department, 1992

TABLE 8 NEEDED ACTUAL			
LEVEL	POP (APPROX.) EVACUATING	SHELTER	SHELTER CAPACITY
A	11,512 x 100%	11,512 x 28%	3,223 - 3,300
B	13,334 x 100%	13,334 x 28%	3,734 - 3,300

SOURCE: Wakulla County Planning Department, 1992.

IV. Post-Disaster Redevelopment

A. Existing Conditions

Since the St. Marks National Wildlife Refuge encompasses more than 60% of the land within the coastal zone, the scope of post-disaster redevelopment is limited. In the coastal zone, there are tour areas with existing development. They are the Ochlockonee Bay, Panacea, Spring Creek, and Shell Point/Live Oak Island areas.

Ochlockonee Bay is primarily residential interspersed with, some water dependent/related uses. Even though it is currently protected by the barrier known as Alligator Point, a direct landing by a Category 3 or larger hurricane could severely damage this area.

Panacea is an old, established fishing community with a minor port facility. With the advent of Port Panacea, Panacea may strengthen its economic base. Panacea (more than Ochlockonee Bay, Spring Creek, and Shell Point/Live Oak) has a severe mobile home problem, a majority of these are in the FEMA designated, Velocity Zones which are also known as the coastal high—hazard areas. Porter Island and Mashes Island help protect this community with a natural barrier.

Spring Creek is also an old, established fishing community with no recent significant development. The low building permit trend in Spring Creek projects nearly a zero growth rate. Existing structures include some mobile homes. There are a few barrier islands that may help protect this community from Gulf storms.

Shell Point/Live Oak Island is a resort community and is the most vulnerable area to hurricane damage. Structures in this area abide by FEMA regulations, however, there is an existing mobile home subdivision in this community.

There are natural coastal or shoreline protection structures in Wakulla County, however, mobile homes in the high-hazard area pose a problem and may be banned from locating in the FEMA/FIRM designated velocity zones. Because there are no manmade coastal or shore protection structures in Wakulla County, only natural vegetation on the coast serves as art anchor to keep sand in place and not allowing excess sand/wind erosion.

Beach and dune conditions can be found in the beach and dune section of this element. Measures which could be used to reduce exposure to hazards (in post-disaster redevelopment) include relocation, structural modification, and public acquisition. All mobile homes will be relocated out of the velocity zones designated by FEMA/FIRM. There will be no grandfathering of mobile

homes in post-disaster redevelopment. Building permits may not be issued in the coastal high-hazard zone for post-disaster redevelopment unless construction meets all federal, state, and county regulations. Because the St. Marks National Wildlife Refuge already encompasses the majority of land in the coastal high-hazard area, public acquisition is expected not to be a factor.

SOURCE: Department of Environmental Protection,Wakulla County Planning Department

Wakulla County has three scenic facilities including Fiddlers Point/Levy Bay, Mashes Sands, and Lighthouse Point. Mashes Sands and Lighthouse Point are in public ownership with no threat of development to obstruct the scenic view. Fiddlers Point/Levy Bay (commonly known as Porter Island) is in public ownership, but is currently designated for preservation. However, a small parcel located at the tip is privately owned. This parcel was zoned for townhouse (multi-family) uses. However, soil surveys indicate that land use may not be achievable.

B. Future Needs

Because Wakulla County has a small tourist based industry in the coastal area, thus it is important to have a surplus of recreational facilities. Wakulla County only makes up 4% of the region's population and caters to the needs of residents of the Tallahassee area as well as South Georgia. Hence, it is important to keep in mind that the County must plan for the needs and demands in excess of its own population.

V. PUBLIC ACCESS

A. Inventory of Existing Facilities

The following public or private facilities offer access to saltwater beaches or shores.

TABLE 9

Name	Public Access	Facility	Parking
Bays ide Marina	(private)	Marina	N/A
Fiddlers Point	(county)	Boat Ramp	*
Beach Fishing			Scenic Drive
Levy Bay	(county)	Boat Ramp	*
Lighthouse Point		Boat Ramp	40
Recreational Site	(federal)	Beach Fishing	Scenic Drive
Marsh Harbor Marina		Marina	N/A
Mashes Sands	(county)	Boat Ramp	30
Beach Fishing			Scenic Drive
Newport Recreation		Boat Ramp	*
Ochlockonee	(county)	Boat Ramp	*
Ochiockonee River State		Boat Ramp	25
Park	(state)		
St. Marks Park	(municipal)	Boat Ramp	*
Beach Fishing			Scenic Drive
Shell Island Fish		Camp/ Marina	N/A
Marina			

Shell Point Marina		Marina	N/A
Shields Marina		Marina	N/A
Wakulla Beach		Beach Fishing	*
Wakulla River	(county)	Boat Ramp	*

SOURCE: Wakulla County Planning ‘Department, 1992
N/A= Not currently available or insignificant
*= No designated parking area, FOOT right-of-way currently used

Even though all marinas are provided by the private sector, a majority of access is provided by the County. All access points are evenly distributed throughout the County. With the current unpaved access to Wakulla Beach, it is advisable not to attempt access after a rain storm. Parking facilities are a major problem in the public sector, Only three facilities provide designated parking. All others utilize FDOT or County rights-of-way.

SUMMARY OF COASTAL RECREATION FACILITY

Type	**Public**	**Private**	**Total**
Saltwater Beach	105,650	120,000	225,650
Square Feet, 4 sites	3	1	4
Saltwater Fishing Piers	0	0	0
Linear Feet, sites			
Saltwater Fishing Board	0	0	0
Walks, Linear Feet, sites			
Saltwater Jetty	30	0	30
Linear Feet, 1 site	1	0	1
Total Non-Boat Fishing	2,535	2,400	4,935
Linear Feet, 4 sites	3	1	4
Saltwater Boat Ramp	7	7	14
Lanes, 14 sites	7	7	14
Saltwater Marina slips	0	329	329
Saltwater Dry Storage	0	131	131
Slips,	2 sites	2	2
Scenic Facilities or Roads	3	3	3 sites

SOURCE: Department of Environmental Protections
Wakulla County Planning Department, 1992

B. Future Needs
As previously stated, the County has a minor tourist industry in the coastal area. Therefore, it is important to have a surplus of recreational facilities. Wakulla County only makes up 4% of the regions population and caters to the needs of residents of the Tallahassee area, as well as South Georgia.

TABLE 11

ESTIMATES OF NEEDS BY YEAR FOR THE REGION FACILITY 1990 1995

Saltwater Beach (miles)	0.0
Saltwater Non—Boat Fishing (Linear Feet)	2,940-3,125
Saltwater Boat Ramps (number)	0

SOURCE: Department of Environmental Protections ,Outdoor Recreation in Florida, 1987

ESTIMATES OF NEEDS BY YEAR FOR THE COUNTY FACILITY 1990-1995

Saltwater Beach (miles)	0.0
Saltwater Non-Boat Fishing {Linear Feet)	118-125
Saltwater Boat Ramps (number)	0

SOURCE: Wakulla County Planning Department, 1992
Calculated by multiplying figures above by 4% which is the percentage of population the County has in the region.

Department of Environmental Protections does anticipate a need for non-boat saltwater fishing in the region; however, fishing board walks and fishing piers would not be commercially viable due to low water depth off shore. Wakulla County will explore the possibility if locating a fishing pier in 1997.

TABLE 12

DEMAND FOR WET SLIPS IN WAKULLA COUNTY BY YEAR

1992-1997

Wetslips	382-428
Dry Storage	151-169

SOURCE: Wakulla County Planning Department, 1992

These figures were calculated using population percentage. With completion of Port Panacea, the County may exceed its need for marina wet slips and dry storage. Port Panacea could add as many as 60 wet slips and 60 dry storage spots. A dry storage facility is proposed for Shell Point that may have an additional 60 spots but approval has not been requested or received.

The County may explore the possibility of acquiring the privately owned land at the tip of Porters Island to enhance its supply of scenic facilities. Designated parking facilities are a major problem at publicly owned boat ramps. The County shall make arrangements to acquire Florida Department of Transportation rights-of-way for designated parking spaces. The County shall explore alternative siting of these ramps with designated parking as part of the criteria. The County may actively pursue grants and commit funding for studies to identify water related and dependent uses, and needed environmental protection and mitigation from marinas and boat ramp impacts. The County may amend its land development codes based on grant funding studies that will address shoreline protection and marine siting standards consistent with FDEP siting standards.