CHAPTER 5: PLAN AREA

This section of the HCP defines and describes the Plan Area, the area within which authorization for take of covered species is being requested.

General Geographical Area

Walton County is located on the northwest coast of Florida between Okaloosa and Bay Counties (Figure 1). It has 25.6 mi (41.2 km) of beach and no ocean inlets or true barrier islands. However, the coastline is interrupted by fifteen natural coastal dune lakes that intermittently breach the dune system and discharge into the Gulf of Mexico (Figure 2).

Plan Area Boundaries

The Plan Area encompasses approximately 5,714 acres (2,312 hectares) of coastal habitat and developed lands.

North-South Boundaries

The Plan Area is bounded to the south by the Mean High Water Line (MHWL) of the Gulf of Mexico. The northern limit of the Plan Area is defined as "Old" U.S. Highway 98 (Scenic Gulf Drive) eastward from the Okaloosa County line to the intersection of Gulf Scenic Drive and U.S. Highway 98, then south and including U.S. Highway 98 to the intersection of U.S. Highway 98 and County Road 30A, then south and including County Road 30A eastward to the intersection of County Road 30A and U.S. Highway 98, then south and including U.S. Highway 98 to the Bay County line (Figure 2).

East-West Boundaries

The Plan Area extends from the Okaloosa/Walton County Line eastward to the Walton/Bay County Line.

Municipalities and State/Federal Parklands within the Plan Area

There are no municipalities within the Plan Area, and thus the County is solely responsible for managing all unincorporated lands along the coast exclusive of three State parks. Thus, County-managed beaches account for about 78 percent (20.0 mi; 32.1 km) of the coastline. The U.S. Bureau of Land Management owns five areas along the Gulf of Mexico beachfront that are leased to Walton County for public beach access. They are located at: Inlet Beach, Eastern Lake, Seagrove Beach, Dune Allen-Fort Panic, and Miramar Beach (Figure 3).

Location of Walton County and Habitat Conservation Plan Boundaries

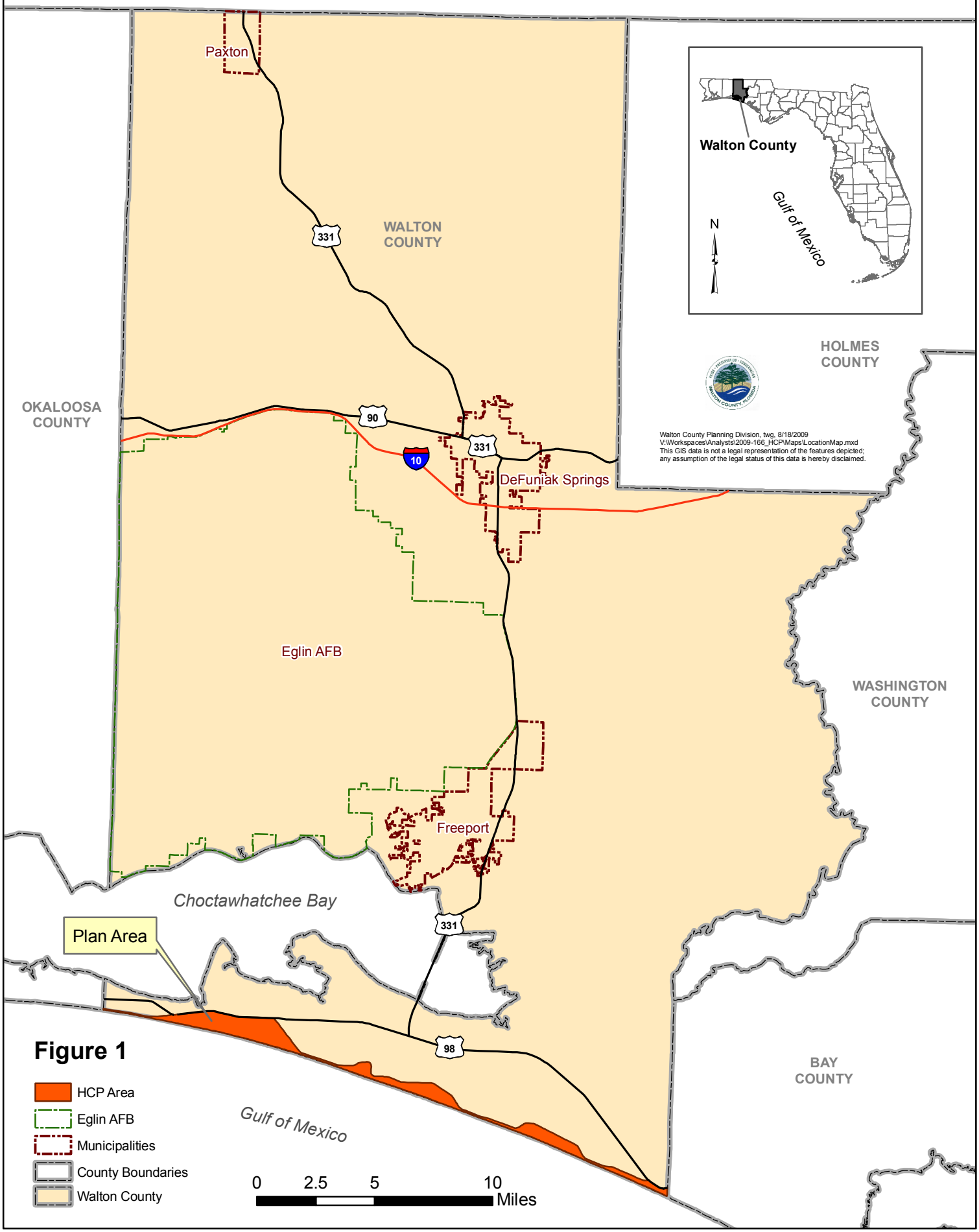

Figure 1

- HCP Area
- Eglin AFB
- Municipalities
- County Boundaries
- Walton County

Figure 2A

Aerial Photo of the Plan Area - West Walton County

N

1 inch = 2,000 feet

0 0.25 0.5 1 Miles

Plan Area

County Boundaries

Walton County Planning Division, twg, 7/30/2009
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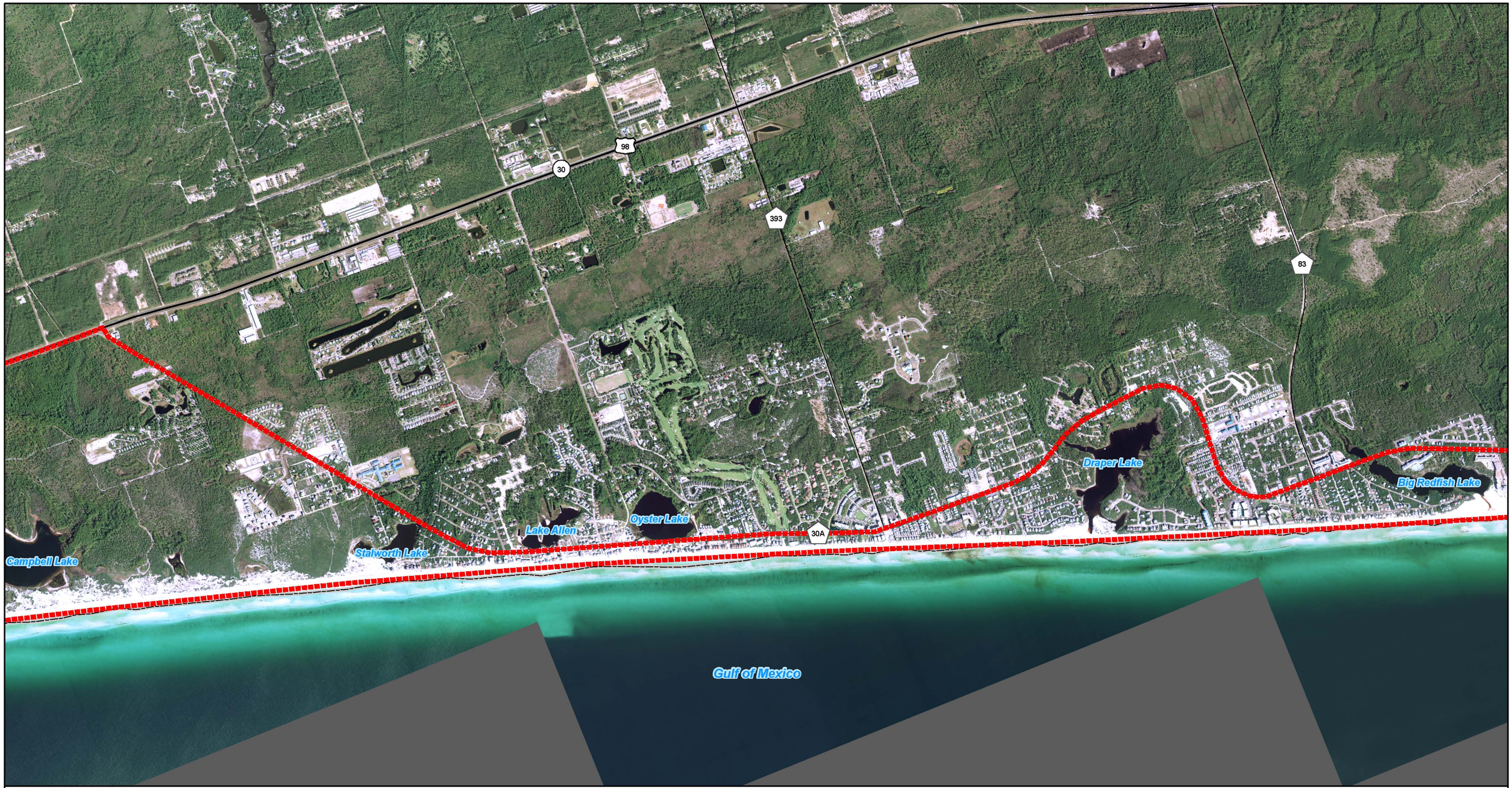

Figure 2B

Aerial Photo of the Plan Area - West Central Walton County

N

1 inch = 2,000 feet

0 0.25 0.5 1 Miles

Plan Area

County Boundaries

Walton County Planning Division, twg, 7/30/2009
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Figure 2C

Aerial Photo of the Plan Area - East Central Walton County

N

1 inch = 2,000 feet

0 0.25 0.5 1 Miles

Plan Area

County Boundaries

Walton County Planning Division, twg, 7/30/2009
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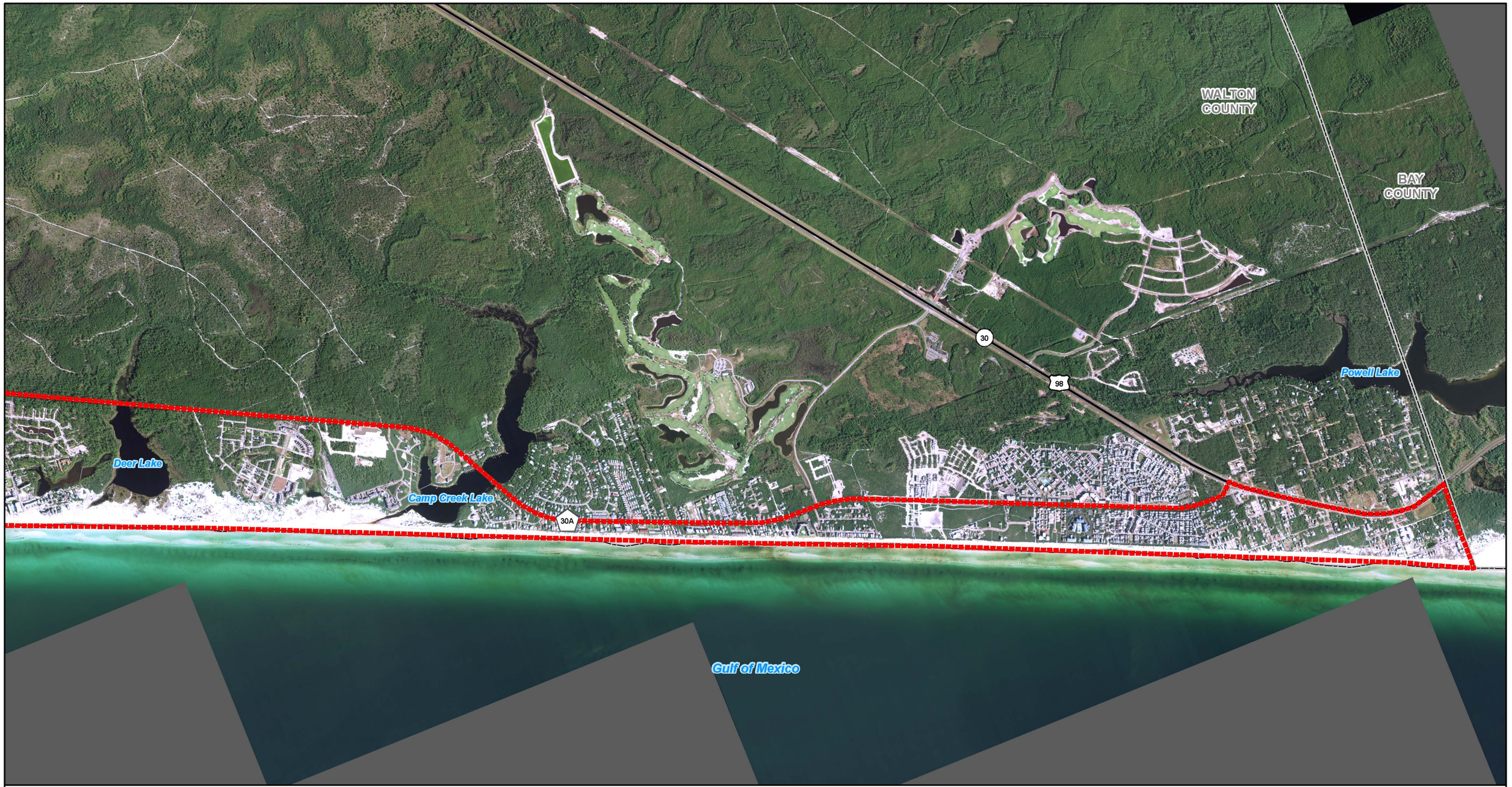

Figure 2D

Aerial Photo of the Plan Area - East Walton County

N

1 inch = 2,000 feet

0 0.25 0.5 1 Miles

Plan Area

County Boundaries

Walton County Planning Division, twg, 7/30/2009
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Choctawhatchee Bay

Horseshoe Bayou

SANDESTIN

POINT WASHINGTON STATE FOREST

457

98

30

TOPSAIL HILL PRESERVE STATE PARK

COFFEEN NATURE PRESERVE

Fuller Lake

Morris Lake

WALTON COUNTY

2378

GULF PINES

MIRAMAR BEACH

Gulf of Mexico

OKALOOSA COUNTY

MIRAMAR BEACH BLM BEACH ACCESS

FRANGISTA BEACH

SEASCAPE

Figure 3A

County, State and Federal lands within the Plan Area - West Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Beach Access

- Neighborhood
- Regional
- Permit Driving Area
- Plan Area
- Coffeen Nature Preserve
- State Land
- County Land
- Federal Land-Bureau of Land Management (BLM)
- County Boundaries

Walton County Planning & Development Services, twg, 2/23/2010
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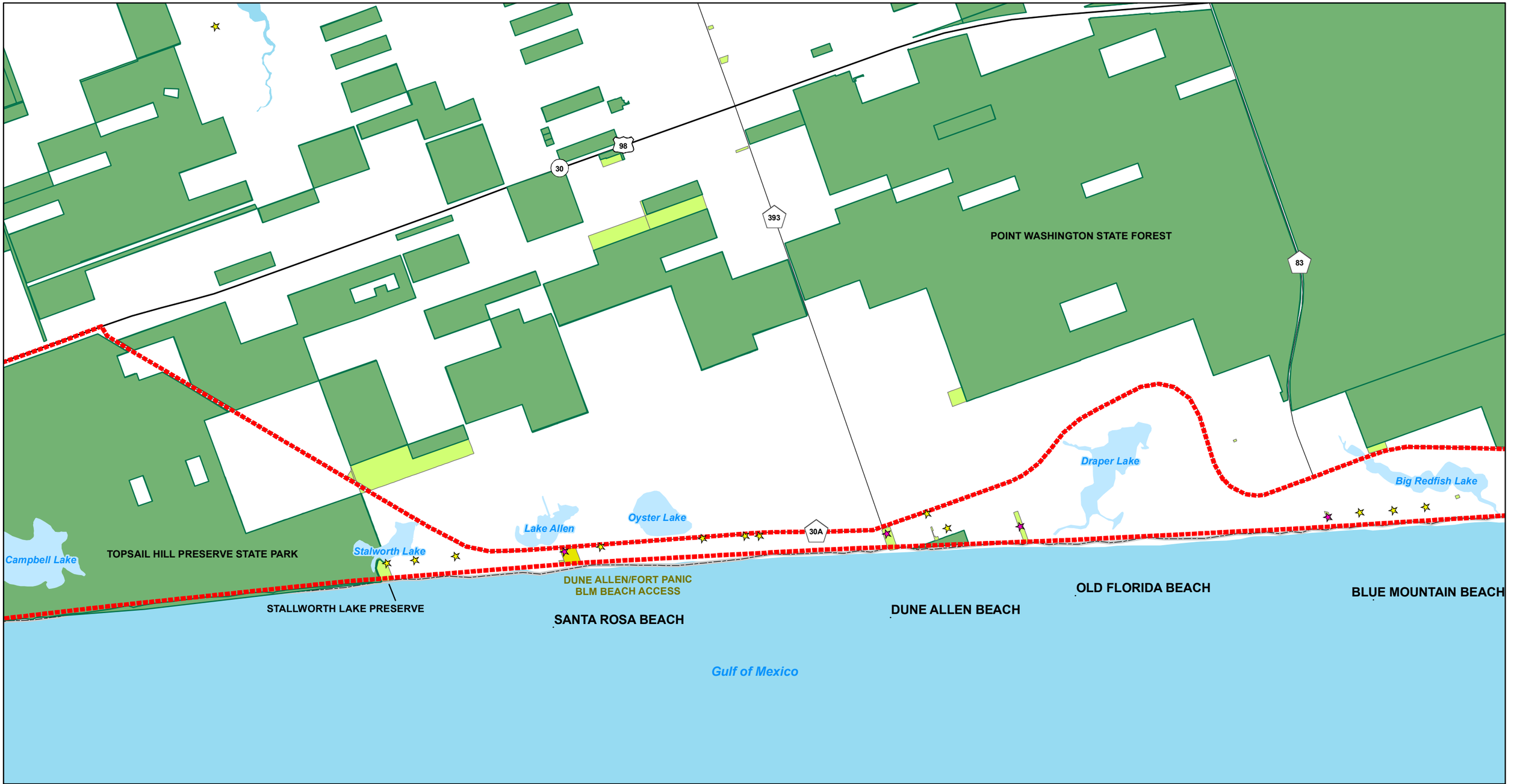

Figure 3B

County, State and Federal lands within the Plan Area - West Central Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Beach Access

- Neighborhood
- Regional
- Permit Driving Area
- Plan Area
- Coffeen Nature Preserve
- State Land
- County Land
- Federal Land-Bureau of Land Management (BLM)
- County Boundaries

Walton County Planning & Development Services, twg, 2/23/2010
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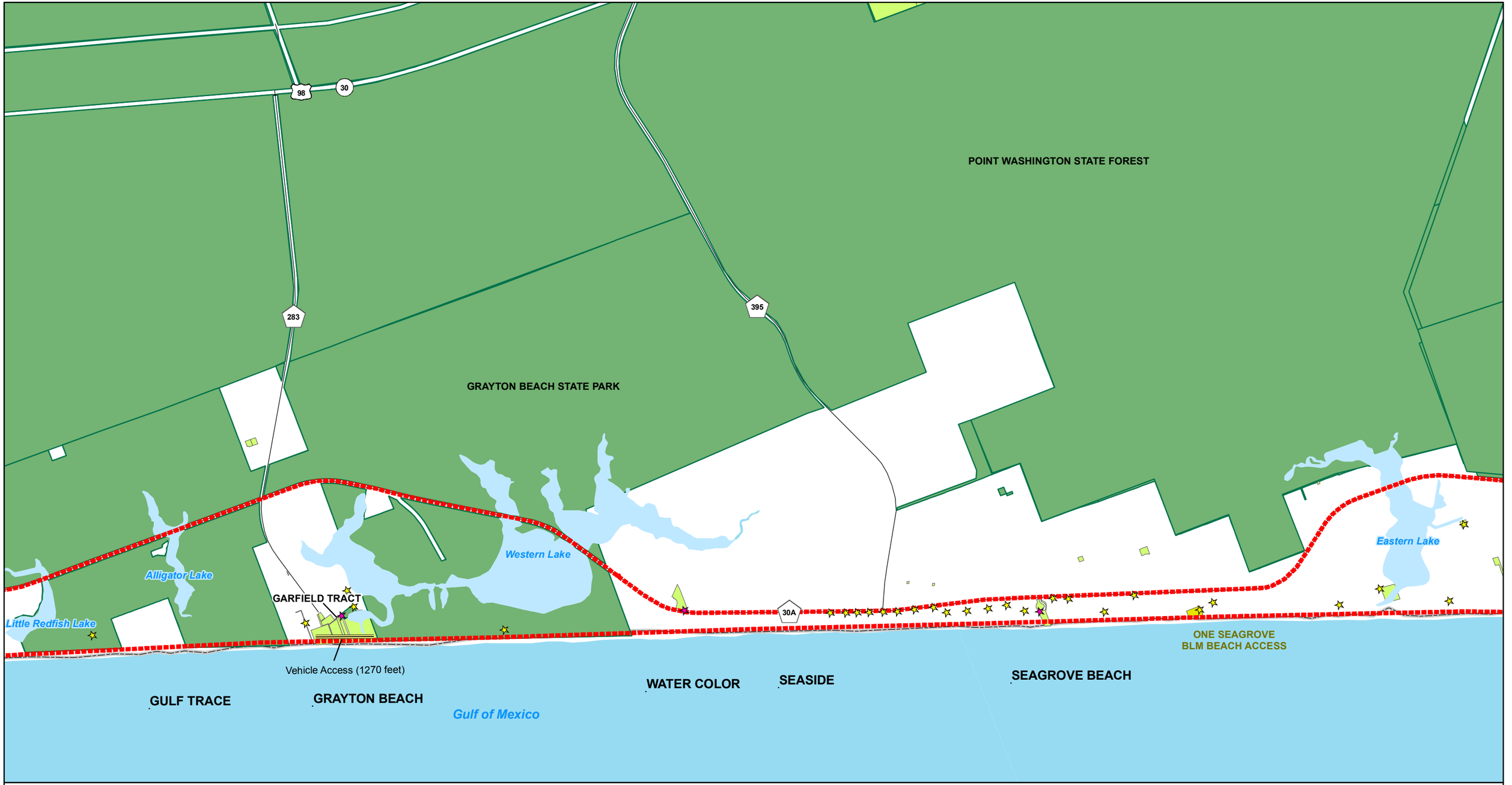

Figure 3C

County, State and Federal lands within the Plan Area - East Central Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Beach Access

- Neighborhood
- Regional
- Permit Driving Area
- Plan Area

- Coffeen Nature Preserve
- State Land
- County Land
- Federal Land-Bureau of Land Management (BLM)
- County Boundaries

Walton County Planning & Development Services, twg, 2/23/2010
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POINT WASHINGTON STATE FOREST

DEER LAKE STATE PARK

WALTON COUNTY

BAY COUNTY

30

98

Powell Lake

Deer Lake

Camp Creek Lake

30A

INLET BEACH
BLM BEACH ACCESS

WALTON DUNES
BLM BEACH ACCESS
(undeveloped)

Vehicle Access (66 feet)

WATER SOUND

ALYS BEACH

SEACREST BEACH

ROSEMARY BEACH

INLET BEACH

Gulf of Mexico

N

Figure 3D

County, State and Federal lands within the Plan Area - East Walton County

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Beach Access

- Neighborhood
- Regional
- Permit Driving Area
- Plan Area

- Coffeen Nature Preserve
- State Land
- County Land
- Federal Land-Bureau of Land Management (BLM)
- County Boundaries

Walton County Planning & Development Services, twg, 2/23/2010
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State parks include Topsail Hill Preserve State Park, Grayton Beach State Park, and Deer Lake State Park (Figure 3). Collectively, these properties encompass approximately 5.6 mi (9.0 km) or about 22 percent of the coastline and encompass approximately 5,865 acres (2,373 hectares), 42 percent of which lies within the Plan Area. Although Walton County has no jurisdiction over any activities that occur within State park boundaries, the County Sheriff's Office and beach maintenance crews do occasionally operate vehicles there in response to calls for assistance related to public health and safety issues. The only activity for which take authorization is requested within these parks is for vehicular impacts to protected species when County staff travel through the parks or are summoned for assistance.

Climate

The Florida panhandle experiences a mild, subtropical climate as a result of its latitude and the stabilizing effects of the Gulf of Mexico (Bradley 1972). The waters of the Gulf moderate the climate by acting as a heat source during the winter and by providing cool sea breezes during the summer. Within Walton County, daily low temperatures range from 40-71°F (4.4-21.7ºC) and average daily high temperatures range from 63-92°F (17.2-33.3ºC). The County receives about 64 inches (163 cm) of rain in an average year, mostly during the summer (Source: Walton County Economic Development Council).

Population

As of 2005, there were 50,110 residents in Walton County. The population is expected to increase to approximately 75,000 residents by the year 2020 (Source: University of West Florida Haas Center for Business Research and Economic Development). Based on population size, Walton ranks 43rd of the 67 Florida Counties. Approximately one-quarter of the County's residents live within 5.0 mi (8.0 km) of the beach.

There are three municipalities within Walton County: the City of DeFuniak Springs, the City of Freeport, and the Town of Paxton (Figure 1). DeFuniak Springs has the largest population of any municipality within the County and also serves as the County Seat. None of these municipalities have boundaries that overlap the Plan Area.

Coastal Characterization

Upland Development and Land Uses

Within the Plan Area, the Walton County coastline is largely developed, primarily with a mixture of single and multi-family residential properties (Figure 4). Commercial development is largely restricted to the western portion of the County. There is no industry within the Plan Area.

Areas of particularly dense development include the western end of the County between the communities of Seascape and Sandestin, the Seagrove Beach area in the central portion of the County (including the communities of WaterColor and Seaside), and the

eastern portion of the County in the vicinity of Rosemary Beach (Figure 4). The remainder of the Plan Area is somewhat less intensely developed and consists primarily of single-family residences. There is very little vacant undeveloped beachfront property, and those properties are primarily confined to small sections of beach on either side of Topsail Hill Preserve State Park, in the vicinity of Big Redfish Lake, Grayton Beach State Park, the WaterSound development east of Deer Lake State Park, and Seacrest (Figure 4). In addition, the County leases five areas along the Gulf of Mexico from the U.S. Bureau of Land Management. These parcels, which collectively encompass approximately 3,406 ft (1,038 m) of beachfront, are located at Inlet Beach, Eastern Lake, Seagrove Beach, Dune Allen-Fort Panic, and Miramar Beach.

Natural Resources

Natural communities along the County coastline have been highly fragmented by development. Within the Plan Area there are seven primary natural community types, as defined by the Florida Natural Areas Inventory (FNAI): beach/dune, coastal strand, scrub, upland pine forest, coastal dune lake, floodplain forest, and freshwater marsh.

Beach/Dune

The beach and dune system is likely the largest intact natural community remaining within the Plan Area, although it has been impacted by development. The FNAI characterizes the beach/dune as a dynamic and mobile environment, consisting of a wind-deposited foredune and wave deposited upper beach. The shifting beach sand zone is typically unvegetated, while the foredune and lands farther inland can be sparsely to densely vegetated with a variety of xeric, pioneer plant species. Within the Florida panhandle, typical vegetation includes sea oats (*Uniola paniculata*), beach morning glory (*Ipomoea* spp.), evening primrose (*Oenothera humifusa*), sand spur (*Cenchrus tribuloides*), sea purslane (*Sesuvium portulacastrum*), panicgrass (*Panicum amarum*), Spanish bayonet (*Yucca aloifolia*), and saw palmetto (*Serenoa repens*).

Despite the harsh environment of the beach/dune system, this community provides extremely important habitat for a variety of species. The most conspicuous and characteristic resident animal species on the beach is the ghost crab (*Ocypode quadrata*). CBM inhabit the primary, secondary, and occasionally tertiary sand dunes; however, their known distribution is largely limited to those undeveloped sections of coastline within the State parks. A variety of infaunal macroinvertebrates, including the coquina crab (*Donax* spp.) and mole crab (*Emerita talpoida*) inhabit the swash zone and intertidal sands, and these same areas provide important juvenile developmental habitat for a variety of surf fish, including pompano. Migratory song birds feed upon the sea oats along the dunes and shorebirds utilize the beach for resting, foraging and nesting. Although sea turtles depend on the beach as nesting habitat, they are present only during summer months.

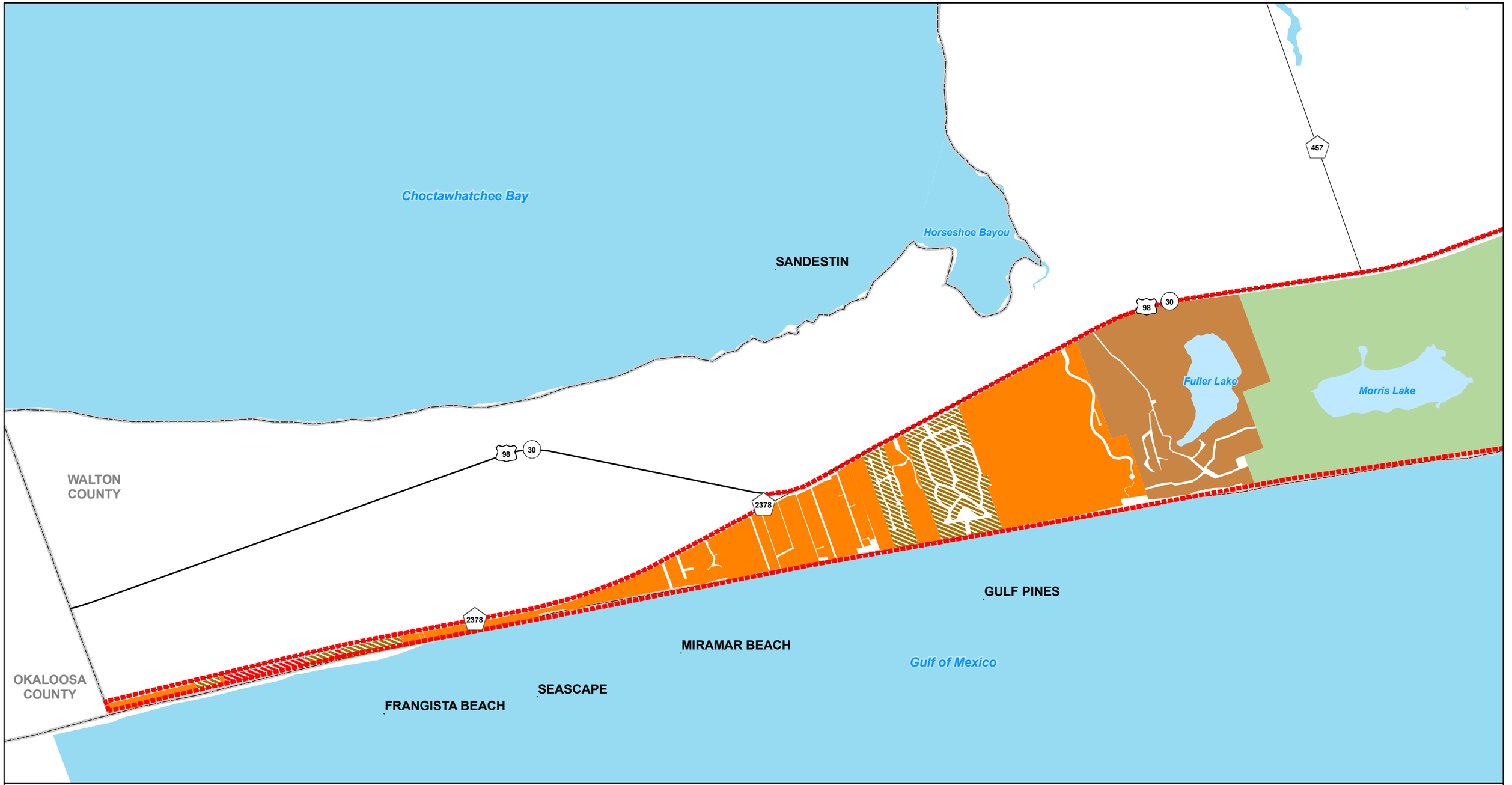

Figure 4A

Land uses within the Plan Area - West Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Plan Area

County Boundaries

Future Land Use Districts

- Coastal Center
- Conservation
- Court Ordered Overlay
- Parks and Recreation
- CR 1/10 (1 unit per 10 acres)
- Village Mixed Use
- Infill
- Residential Preservation
- Small Neighborhood
- Traditional Neighborhood

Walton County Planning Division, twg, 8/19/2009
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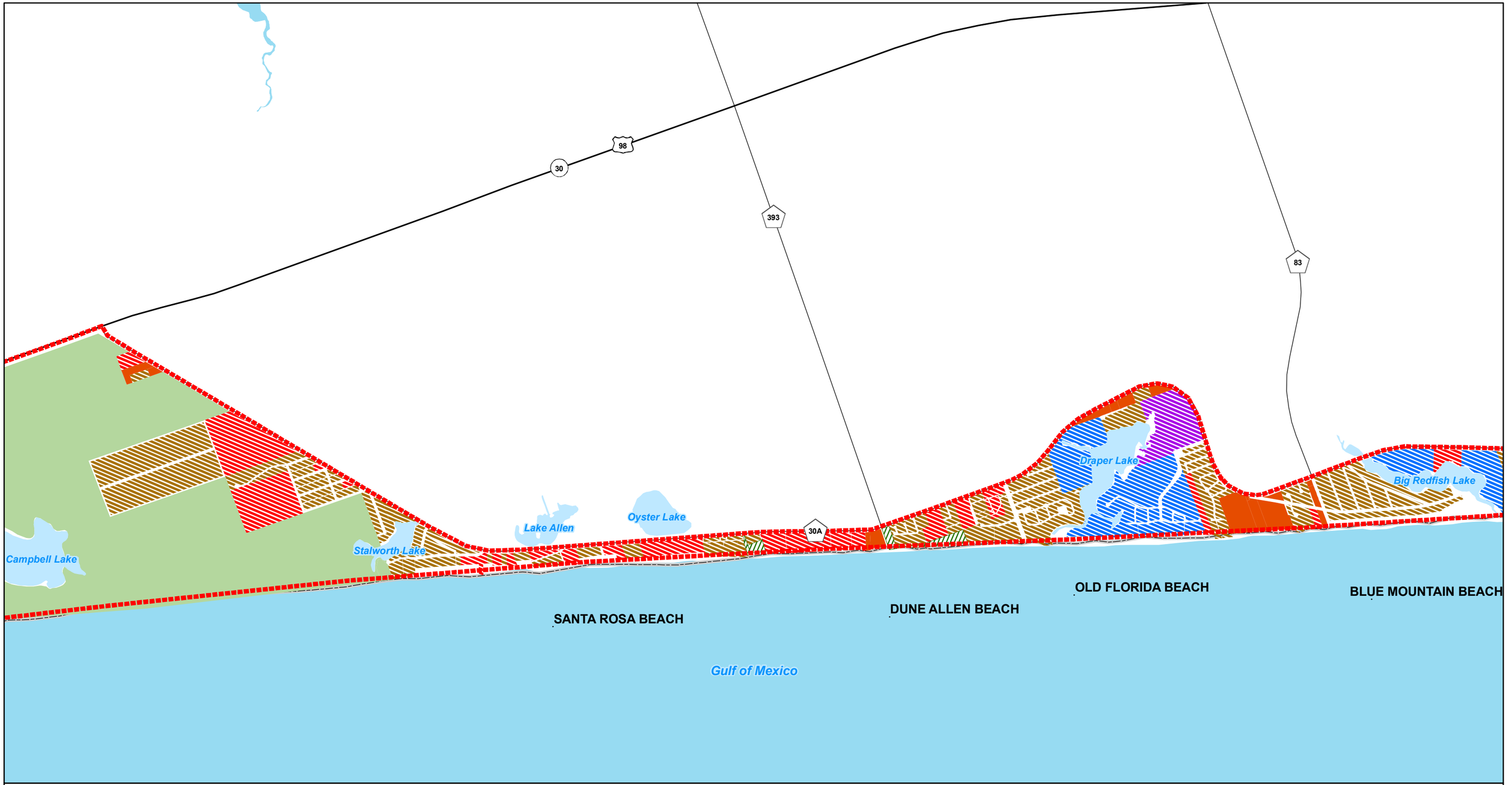

Figure 4B

Land uses within the Plan Area - West Central Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Plan Area

County Boundaries

Future Land Use Districts

- Coastal Center
- Conservation
- Court Ordered Overlay
- Parks and Recreation
- CR 1/10 (1 unit per 10 acres)
- Village Mixed Use
- Infill
- Residential Preservation
- Small Neighborhood
- Traditional Neighborhood

Walton County Planning Division, twg, 8/19/2009
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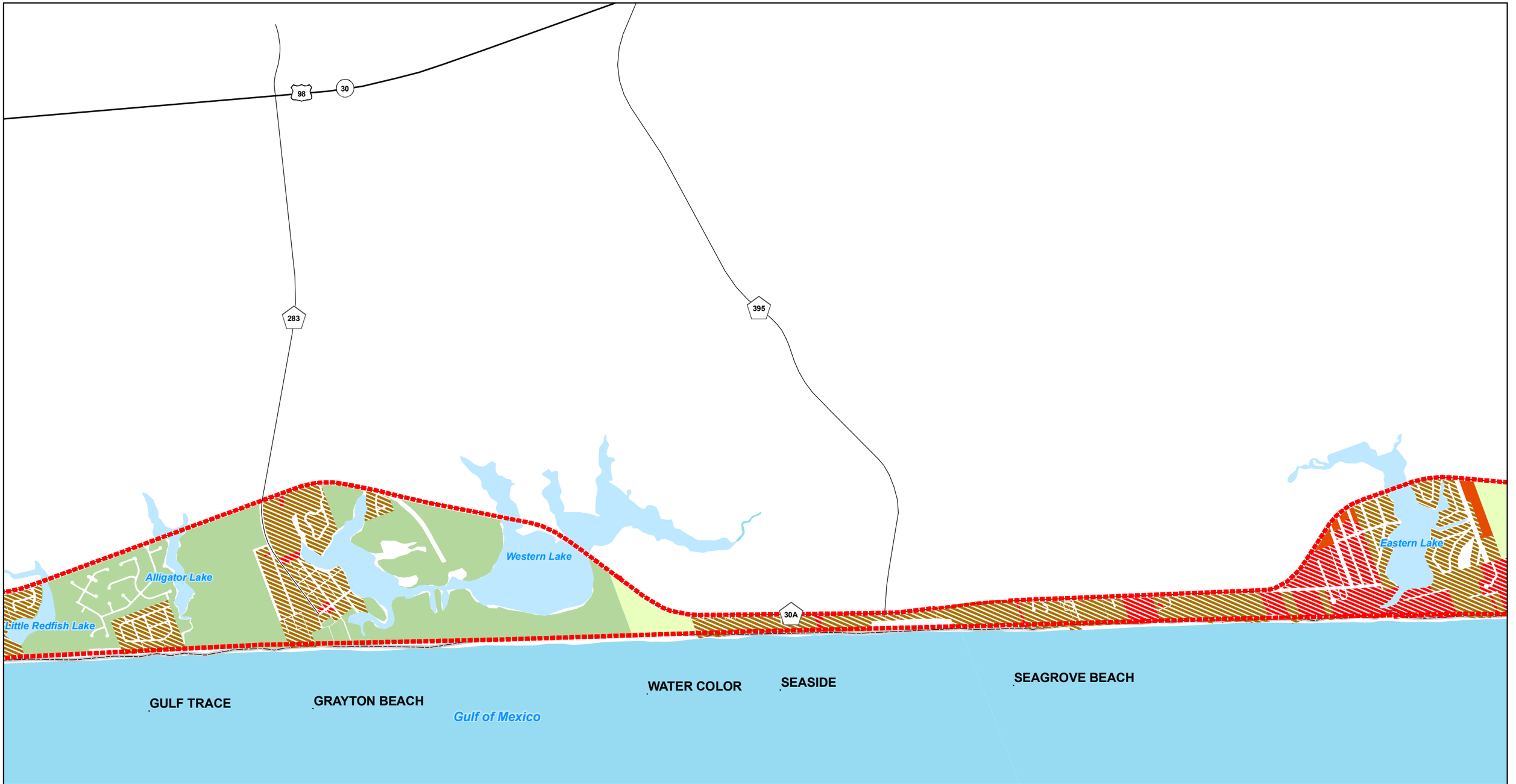

Figure 4C

Land uses within the Plan Area - East Central Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Plan Area

County Boundaries

Future Land Use Districts

- Coastal Center
- Conservation
- Court Ordered Overlay
- Parks and Recreation
- CR 1/10 (1 unit per 10 acres)
- Village Mixed Use
- Infill
- Residential Preservation
- Small Neighborhood
- Traditional Neighborhood

Walton County Planning Division, twg, 8/19/2009
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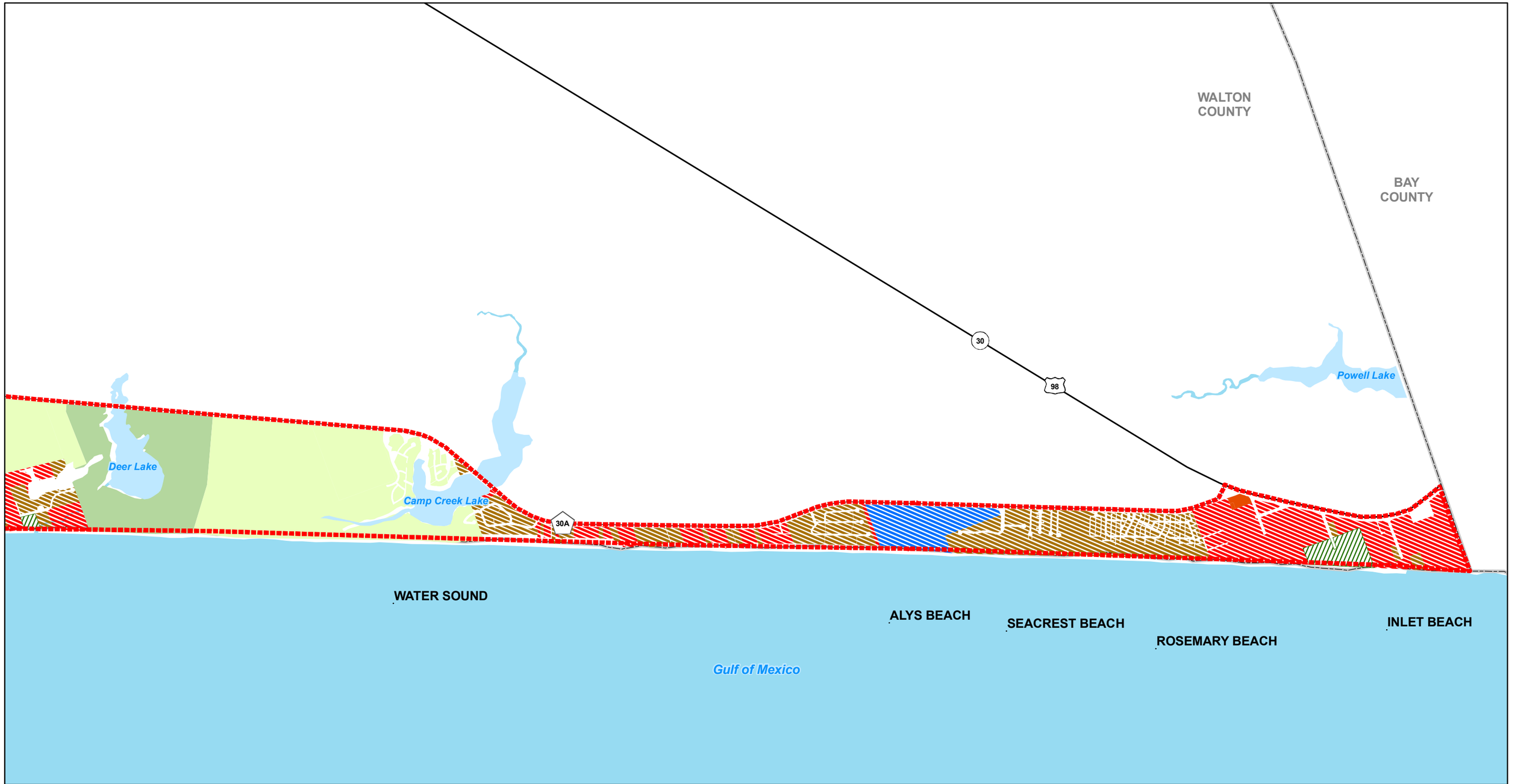

Figure 4D

Land uses within the Plan Area - East Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Plan Area

County Boundaries

Future Land Use Districts

- Coastal Center
- Conservation
- Court Ordered Overlay
- Parks and Recreation
- CR 1/10 (1 unit per 10 acres)
- Village Mixed Use
- Infill
- Residential Preservation
- Small Neighborhood
- Traditional Neighborhood

Walton County Planning Division, twg, 8/19/2009
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Coastal Strand

The FNAI defines coastal strand (a.k.a. coastal scrub) as stabilized, wind-deposited coastal dunes that are vegetated with dense thickets of xeric, evergreen shrubs. Coastal strand communities typically occur immediately landward of the beach/dune system. This community type is common throughout the Plan Area in relatively small, remnant pockets and in one large private parcel in the Seacrest area. Dominant vegetation within this community includes various xeric oaks (*Quercus* spp.), fetterbush (*Lyonia lucida*), rosemary (*Ceratiola* spp.), saw palmetto, and gopher apple (*Licania michauxii*). Due to the arid conditions, coastal strand fauna is dominated by reptiles, such as the gopher tortoise (*Gopherus polyphemus*), garter snake (*Thamnophis sirtalis*), black racer (*Coluber constrictor*), and pygmy rattlesnake (*Sistruris miliarius*). Mammals common within the coastal strand include the eastern mole (*Scalopus aquaticus*), cotton rat (*Sigmodon hispidus*), and cottontail rabbit (*Sylvilagus palustris*).

Scrub

Small pockets of scrub habitat are found throughout the Plan Area. The FNAI characterizes scrub as a closed to open canopy forest of sand pines with thickets of xeric oaks dominating the understory and sparse groundcover. Open patches of bare sand are also common. Scrub habitats typically form on sand ridges along former shorelines. Soils are composed of well-washed, deep sands that drain rapidly, thus creating very dry conditions. Typical plants include sand pine (*Pinus clausa*), sand live oak (*Quercus geminata*), Chapman's oak (*Quercus chapmanii*), saw palmetto, fetterbush, rosemary, and magnolia (*Magnolia* spp.). The faunal composition of the scrub is very similar to that occurring within coastal strand habitats.

Upland Pine Forest

Small patches of upland pine forest are present throughout much of the Plan Area, but are most common adjacent to public and private conservation areas. The FNAI describes upland pine forest as a fire-maintained forest of widely spaced pines with few understory shrubs and a dense groundcover of grasses and herbs. This community type occurs only in northern Florida on sandy-clay soils. The clay component of the soil is essential in that it helps retain moisture and thus creates more mesic conditions. Pristine areas are dominated by longleaf pine (*Pinus palustris*) and wiregrass (*Aristida stricta*). Other common vegetation includes bluestems (*Andropogon* spp.), bracken fern (*Pteridium aquilinum*), runner oaks (*Quercus pumila* and *Q. minima*), and various forbs (*Eupatorium* spp., *Soildago* spp.) and grasses (*Sporobolus* spp., *Aristida* spp.). Representative animal species found within the upland pine forest include the red-tailed hawk (*Buteo jamaicensis*), great-horned owl (*Bubo virginianus*), fox squirrel (*Sciurus niger*), eastern diamondback rattlesnake (*Crotalus adamanteus*), pine snake (*Pituophis melanoleucas*), gopher tortoise, and bobwhite quail (*Colinus virginianus*).

Coastal Dune Lake

Coastal dune lakes are extremely rare, occurring in the United States only in the Florida panhandle. There are fifteen of these lakes within Walton County. The FNAI characterizes the lakes as shallow, sandy-bottomed interdunal depressions occurring within coastal communities. Water is largely derived from the seepage of fresh ground water from the surrounding coastal sands. Many of the lakes within Walton County also have intermittent connections with the Gulf of Mexico. As a result, salinity in the lakes can be quite variable over time, ranging from nearly fresh to nearly marine.

The unique feature of coastal dune lakes is their proximity to the Gulf. Depending on sea conditions and precipitation in the drainage basin, water levels within the lakes fluctuate and their connections to the Gulf periodically open and close. During periods of heavy rainfall, fresh water from adjoining tributaries can cause lake levels to rise. Once a critical threshold is reached, the dunes separating the lake from the Gulf react like a bursting dam. The sand gives way to water pressure allowing the lake to briefly connect with the sea. When the water level stabilizes, salty seawater will rush back into the lake. The resulting change in salinity creates a rare biological ecosystem for marine species.

Given the cyclical nature of their hydrology, these lakes are known to have a high biodiversity, with species characteristic of fresh, estuarine, and marine environments. The lakes are important breeding areas for insects that form the basis of the food chain, provide watering holes for small animals and feeding habitat for wading birds, and are important stopovers for migrant birds returning from cross-Gulf migrations (USFWS 1988a). In Walton County, the highest concentrations of shorebirds typically occur around coastal dune lake outfalls.

Floodplain Forest

Within the Plan Area, this community type is relatively rare but can be found adjacent to several of the coastal dune lakes. Floodplain forests are forested, hardwood wetlands with a variably dense understory that occur along the margins of lakes and rivers. As the name suggests, this natural community type is typically flooded for a portion of the growing season. Dominant canopy trees within this community are generally mixed mesophytic hardwoods, such as overcup oak (*Quercus lyrata*), swamp chestnut oak (*Quercus michauxii*), and water hickory (*Carya aquatica*). Other common vegetation includes water tupelo (*Nyssa aquatica*), bald cypress (*Taxodium distichum*), Carolina ash (*Fraxinus caroliniana*), and sweetgum (*Liquidambar styraciflua*).

Floodplain forests are capable of supporting a diverse fauna. Many wetland hardwoods have leaves that are palatable to insects, which in turn support a variety of insectivorous birds such as warblers. They also provide a food source to a great variety of frogs, toads, and salamanders. Common mammals within this community type include the eastern wood rat (*Neotoma floridana*), opossum (*Didelphis virginiana*), and raccoon (*Procyon lotor*).

Freshwater Marsh

Freshwater marshes are associated with several of the coastal dune lakes within the Plan Area. This community type is defined as a vegetated non-forested wetland that is usually flooded. Sawgrass (*Cladium jamaicense*), cattail (*Typha* spp.), panic grasses (*Panicum* spp.), and various rushes are the predominant plant species within the freshwater marsh. These communities support a wide variety of amphibian, reptile, and wading bird species.

Publicly Held Lands

County Lands

Walton County owns approximately 35.1 acres (14.2 hectares) of land within the Plan Area (Figure 3). Most of these County properties are situated directly along the beach and have a combined shoreline frontage of roughly 0.6 mi (0.9 km). The County currently maintains 61 public beach accesses, although not all of these sites provide parking or other facilities (Figure 3).

State Lands

The following State lands occupy portions of the Walton County coastline:

Topsail Hill Preserve State Park

Topsail Hill Preserve State Park, located within the west-central portion of the County, comprises 1,648 acres (667 hectares), all of which lies within the Plan Area, and approximately 3.3 mi (5.3 km) of beachfront (Figure 3). The Park features a variety of upland and wetland habitats, including beaches and dunes, old-growth longleaf pine forest, coastal dune lakes, cypress domes, and wet prairies. It is known to provide habitat to a variety of protected species, including the CBM, sea turtles, migratory shorebirds, and several State-listed plant species.

Grayton Beach State Park

Grayton Beach State Park is located within the central portion of the County and contains approximately 2,195 acres (888 hectares), of which 592 acres (240 hectares) lie within the Plan Area, including 1.9 mi (3.1 km) of beachfront (Figure 3). The Park contains numerous distinct natural communities, including beach/dune, mesic flatwoods, sandhill, scrub, scrubby flatwoods, baygall, depression marsh, cypress dome, seepage slope, wet flatwoods, coastal dune lake, and estuarine tidal marsh. It is known to provide habitat to a variety of protected species, including the CBM, sea turtles, migratory shorebirds, and several State-listed plant species.

Deer Lake State Park

Deer Lake State Park, located in eastern Walton County, shares its name with the coastal dune lake within its boundaries (Figure 3). It contains roughly 2,023 acres (819 hectares), 178 acres (72 hectares) of which lie within the Plan Area, including 0.5 mi (0.8 km) of beachfront. This conservation area contains a variety of natural communities, including beach/dune, mesic flatwoods, sandhill, scrub, basin swamp, depression marsh, cypress dome, coastal dune lake, and blackwater stream. It is known to provide habitat to a variety of protected species, including the CBM, sea turtles, migratory shorebirds, and several State-listed plant species.

Federal Lands

The U.S. Bureau of Land Management owns five areas collectively encompassing approximately 30 acres (12 hectares) within the Plan Area along the Gulf of Mexico beachfront (Figure 3). These properties are leased to Walton County to provide public beach access. They are located at Inlet Beach (1,419 ft; 433 m), Eastern Lake (345 ft; 105 m), Seagrove Beach (322 ft; 98 m), Dune Allen-Fort Panic (346 ft; 105 m), and Miramar Beach (974 ft; 297 m).

Private Conservation Lands

Coffeen Nature Preserve

The Coffeen Nature Preserve is an approximately 220-acre (89-hectare) conservation area located between Sandestin and Topsail Hill Preserve State Park in western Walton County (Figure 3). Although the entire property is contained within the Plan Area, it has no direct beachfront. The Preserve, which is owned and managed by the Coffeen Land Trust, is comprised primarily of mesic flatwoods, but also contains some scrub, wet flatwoods, hydric hammock, and baygall habitat. Lake Fuller, one of the County's 15 coastal dune lakes, is also found within the Coffeen Nature Preserve. However, it is fronted along the beach by Four Mile Village, a low-density single family subdivision.

Economic Importance of Beaches

Recreation and Tourism

Walton County considers its beaches to be a vital economic asset. The area encompassed by the Plan Area affords a variety of recreational opportunities, such as sunbathing, fishing, boating, and golfing. Approximately one-quarter of the County's residents reside within 5 mi (8.0 km) of the beach. Each year, the beaches also attract 2.3 million visitors, who spend approximately $684.9 million within the County. This tourism industry supports over 10,000 jobs and generates $257 million in local income (TDC 2007). These values can only be expected to grow as the County expands its tourism base. Maintaining

the quality of the County's beaches is paramount to ensuring preservation of the tourist economy.

Tax Base

It is estimated that seasonal visitors contribute over $27 million in County ad valorem, sales, and tourist development (bed) tax revenue per year (Harper and Neal 2003). This represents approximately 30 percent of the total annual County revenue. Clearly, local beaches and the residents and visitors they attract represent a driving force in the economy of Walton County.

Beachfront properties also contribute greatly to the County tax base in the form of property taxes. The total value of these properties in 2008 was over 1.5 billion dollars, or about nine percent of the total taxable property in Walton County.

Topography and Hydrology

Southern Walton County lies within the Gulf Coastal Lowlands physiographic region, which extends along the panhandle coastline from Escambia to Leon County. As its name implies, the Gulf Coastal lowlands are generally low in elevation within their eastern extent, but rise to form a sandy, well-drained plateau within Walton County (USFWS 1988a). The topography of the Plan Area varies considerably, from sea level along the shoreline and coastal dune lakes, to over 33 ft (10 m) above sea level along the highest dune ridges. Dune bluffs are typically highest within the eastern portion of the County.

The Floridan aquifer underlies much of the Florida panhandle, and supplies most of the potable water supply for Walton County. The coastal portions of Walton County lie within two watersheds: Choctawhatchee River and Bay and St. Andrew Bay. The Choctawhatchee River and Bay watershed, which covers 5,350 mi^2 (13,586 km^2) in Florida and Alabama, occupies the western portion of the Plan Area. Surface water drainage within this basin flows through the Choctawhatchee River and Bay and ultimately into the Gulf of Mexico (USFWS 1998a). The St. Andrew Bay watershed occupies the eastern portion of the Plan Area and a total of about 1,172 mi^2 (3,035 km^2) within Florida. St. Andrew Bay is the ultimate outfall for this watershed. Locally, however, the majority of surface water within the Plan Area likely seeps through the well-drained sandy soils and is collected within the various coastal dune lakes.

There are no natural rivers within the Plan Area; however, numerous small streams extend into the Plan Area and provide surface water to the coastal dune lakes. Water collected within these lakes eventually either evaporates or is discharged into the Gulf of Mexico.

Coastal Processes

Beach Sediment Characteristics

The beaches of Walton County are widely renowned for their powdery-white sands, characteristics that reflect the composition, size, and coloration of the native beach material. Panhandle beach sediments are composed almost exclusively of quartz sand (USFWS 1988a) with a typical white color of 5Y 8.5/0.5 (Taylor Engineering, Inc. 2003). Slight variations of this color can be found in localized areas of the County and within unexposed beach sediments.

Beach sediment grain sizes within Walton County are fairly uniform, and are classified as medium sand with an average mean grain size of 0.29 mm (±0.02 mm). They contain only minor amounts of carbonates (Taylor Engineering, Inc. 2003). Sediments within the tidal portion of the beach are slightly coarser.

Causes of Erosion

As elsewhere in Florida, the behavior of beaches within Walton County is governed by a complex interaction of physical beach characteristics and sediment transport mechanisms. Physical mechanisms that can contribute to erosion primarily are a function of waves, winds, and tides.

Winds are capable of transporting sand directly off the dry beach (Aeolian transport). Surface winds in Walton County blow the highest percentage of the time from the east and the lowest percentage of the time from the northwest. Wind speeds are typically less than 15 mph (24 km per hour). Winds also provide the principal wave generating mechanism, which in turn transport sand cross-shore and longshore within the subaqueous regions of the beach. Waves offshore Walton County predominately approach the beach from a south to southeast direction and are less than 3 ft (0.9 m) in height about 80 percent of the time (Taylor Engineering, Inc. 2003). Average wave heights are higher during the winter months (December through March), although absolute maximum wave heights often occur during the summer and early fall as a result of tropical weather events.

The principal erosive influence of wave energy on beaches is through the littoral drift of sediment within the nearshore zone. Wave energy is responsible for longshore sediment transport which can either remove or deposit sediments within the nearshore portion of the beach. Sediments in the nearshore are mobilized through breaking wave energy dissipation, while wave energy flux generates surf zone currents that transport sediments along the shoreline. The volume of longshore transport is dependent upon many parameters, including wave height, period, and direction, as well as sediment and beach profile characteristics. Within Walton County, there is a net westerly migration of sand along the coastline. It is estimated that the net longshore sediment transport potential (i.e.,

the potential amount of longshore sediment transport given all necessary conditions) is between 40,000 to 60,000 cubic yards per year (Taylor Engineering, Inc. 2003).

The erosive effects of wind, wave and storm surge are compounded by extra-tropical weather events. Large wave heights, above-average water levels (i.e., storm surge), and strong on-shore winds associated with hurricanes and other tropical storm events can cause exaggerated damage to the beach and dune system. Since 1975, the beaches of the Florida panhandle have been impacted by 12 hurricanes: Eloise (1975), Frederic (1979), Elena (1985), Erin (1995), Opal (1995), Danny (1997), Earl (1998), Georges (1998), Ivan (2004), Dennis (2005), Katrina (2005), and Rita (2005).

Erosional Trends

Analysis of MHWL elevation data is useful in demonstrating the historical behavior of the dry beach in Walton County. Data compiled by Taylor Engineering, Inc. (2003) show that County beaches have experienced periods of both erosion and accretion during the recent past. Beaches throughout the County generally eroded at modest rates from 1970 to 1993 and then experienced a brief but significant period of accretion until 1995. Overall between 1973 and 1995, the dry beach within the County expanded at rates between 1.8 and 2.7 ft (0.5 and 0.8 m) per year.

Retreat of the Walton County shoreline in recent years has been defined by the passage of the hurricanes listed above, as well as several tropical storms. Largely as a result of Hurricanes Erin and Opal in 1995, and Hurricane Georges in 1998, beaches throughout the County experienced significant erosion. Between 1995 and December 1997, the MHWL position receded landward at rates of 6.3 to 15.0 ft (1.9 to 4.6 m) per year (Taylor Engineering, Inc. 2003).

County beaches experienced a relatively calm period between 1998 and 2004 (Taylor Engineering, Inc. 2006), advancing somewhat in the eastern and west-central portions of the County and receding elsewhere. The erosive effects of storm events were once again demonstrated by Tropical Storm Arlene and Hurricane Ivan in 2004. Following the passage of these storms, the entire coastline receded landward from 5 to 24 ft (1.5 to 7.3 m), with the most severe erosion occurring between FDEP Reference Monuments R-20 and R-26 in the western portion of the County. Erosion was exacerbated by Hurricane Dennis in 2005. Following this storm, the shoreline again receded in all areas of the County a distance ranging from 9 to 52 ft (2.7 to 15.8 m), with the worst erosion occurring between R-63 and R-78 in the central portion of the County. Between 1998 and 2005, the overall MHWL position receded in all areas of the County at rates of 2.7 to 8.4 ft (0.8 to 2.6 m) per year. Net erosion during this time period was particularly severe within the western (R-1 to R-25) and east-central (R-56 to R-107) portions of the County.

Identification of the changes in beach volume calculated between recent historical beach profile surveys is important in understanding the behavior of the County's dry sandy (subaerial) beaches. These surveys also provide a means for quantifying changes to the intertidal (between the MHWL and Mean Low Water Line; MLWL) and subaqueous

(below the MLWL) portions of the beach. Net changes in beach volume were calculated for the period of December 1997 to September 2005 (Taylor Engineering, Inc. 2006). These data showed that the subaerial and intertidal portions of the beach lost a considerable volume of sand throughout the County from December 1997 to September 2005. However, this material was not lost from the active beach system. Most of it was transported to and remained within the subaqueous portion of the beach, where it is thus available to facilitate accretion during periods of relative calm.

Location of Eroded and Critically Eroded Beaches

The FDEP designates certain areas of Florida coastline as "critically" and "non-critically" eroded. Non-critically eroded areas represent sections of coastline that may have historic or contemporary erosion conditions, but the erosion conditions do not threaten public or private interests. The FDEP has not designated any areas of Walton County's coastline as non-critically eroded.

The term critically eroded is applied to beaches where natural processes or human activity have caused erosion to such a degree that upland development, recreational interests, wildlife habitat, and/or cultural resources are being lost or threatened. The designation of a critically eroded beach is a planning requirement of the State of Florida's Beach Erosion Control Funding Assistance Program. A segment of beach must first be designated as critically eroded in order to be eligible for State funding for beach nourishment. At the time of preparation of this HCP, there were eight segments of State-designated critically eroded beaches within Walton County totaling 14.3 mi (23.0 km; FDEP 2008). The erosion within these sections of beach threatens development interests and/or public infrastructure. Figure 5 shows the locations of all critically eroded beaches within the County. The FDEP describes the critically eroded areas as follows:

- Western Walton County, R1-R22.8 – A 5.0-mi (8.0-km) segment of beach adjoining critically eroded beaches in adjacent Okaloosa County that includes unincorporated Miramar Beach, Tang-O-Mar Beach, Gulf Pines, Sandestin, and Four Mile Village. The Walton County Beach Restoration Project, completed in January 2007 using 1,900,000 cubic yards of sand obtained from offshore borrow areas, encompassed this entire stretch of beach;
- Beach Highlands/Dune Allen Beach, R41-R54.5 – 2.7 mi (4.3 km);
- Blue Mountain Beach, R58-R63 – 1.0 mi (1.6 km);
- Gulf Trace, R67.3-R68.3 – 0.2 mi (0.3 km);
- Grayton Beach, R70.95-R71.4 – 0.1 mi (0.2 km)
- Seagrove Beach, R82-R98 – 3.1 mi (5.0 km);
- Seacrest Beach, R105.5-R114.7 – 1.8 mi (2.9 km); and
- Inlet Beach, R122-R124 – 0.4 mi (0.6 km).

Choctawhatchee Bay

Horseshoe Bayou

SANDESTIN

Fuller Lake

Morris Lake

WALTON COUNTY

R020

R010

GULF PINES

MIRAMAR BEACH

Gulf of Mexico

OKALOOSA COUNTY

R001

SEASCAPE

FRANGISTA BEACH

Figure 5A

Critically eroded beaches within the Plan Area - West Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

Range Monuments (10th)

Shoreline Armoring

Critically Eroded Beach

Planned Future Beach Restoration Projects

Existing Beach Restoration Projects

County Boundaries

Walton County Planning Division, twg, 8/19/2009
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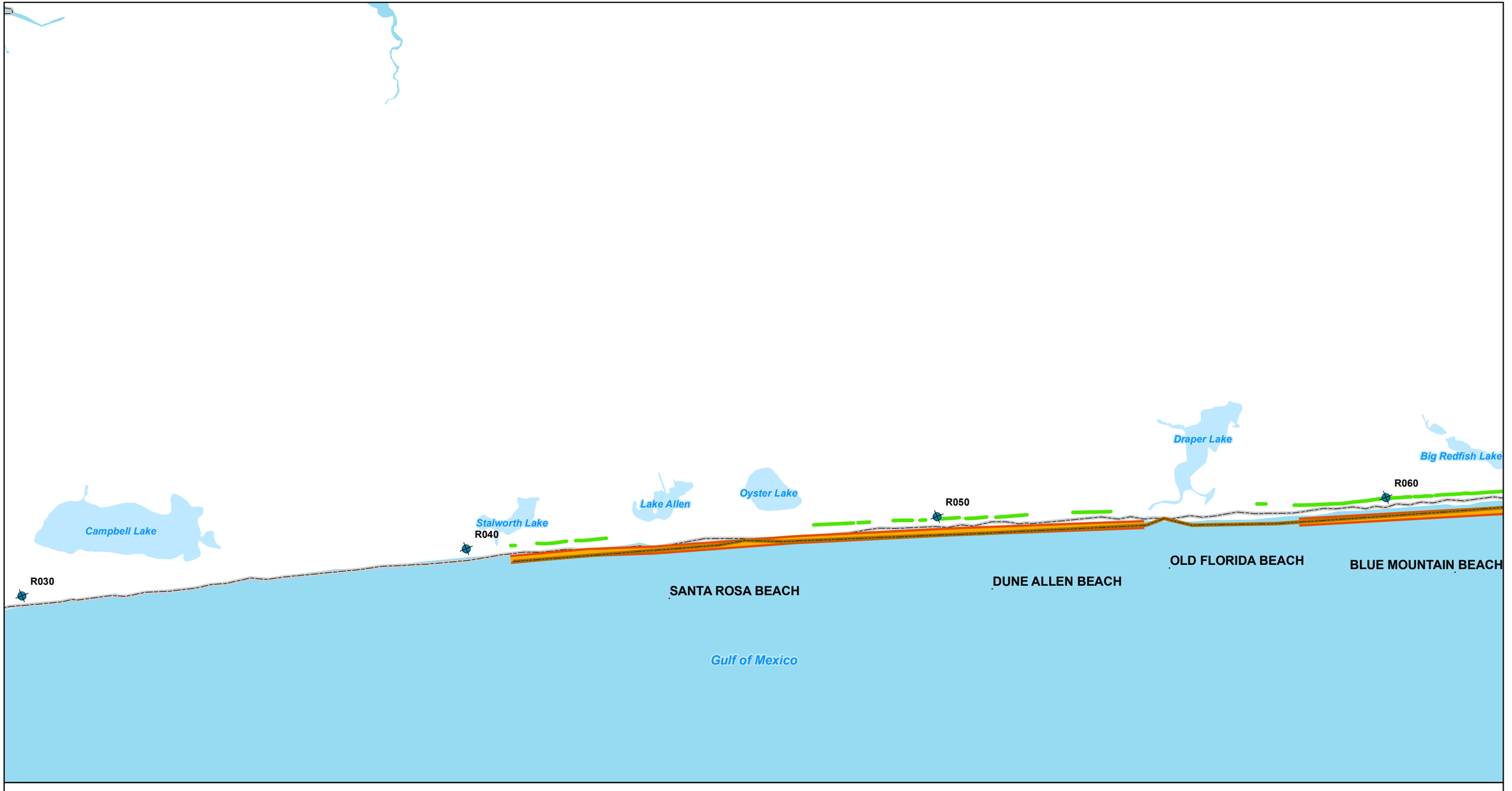

Figure 5B

Critically eroded beaches within the Plan Area - West Central Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

- Range Monuments (10th)
- Shoreline Armoring
- Critically Eroded Beach
- Planned Future Beach Restoration Projects
- Existing Beach Restoration Projects
- County Boundaries

Walton County Planning Division, twg, 8/19/2009
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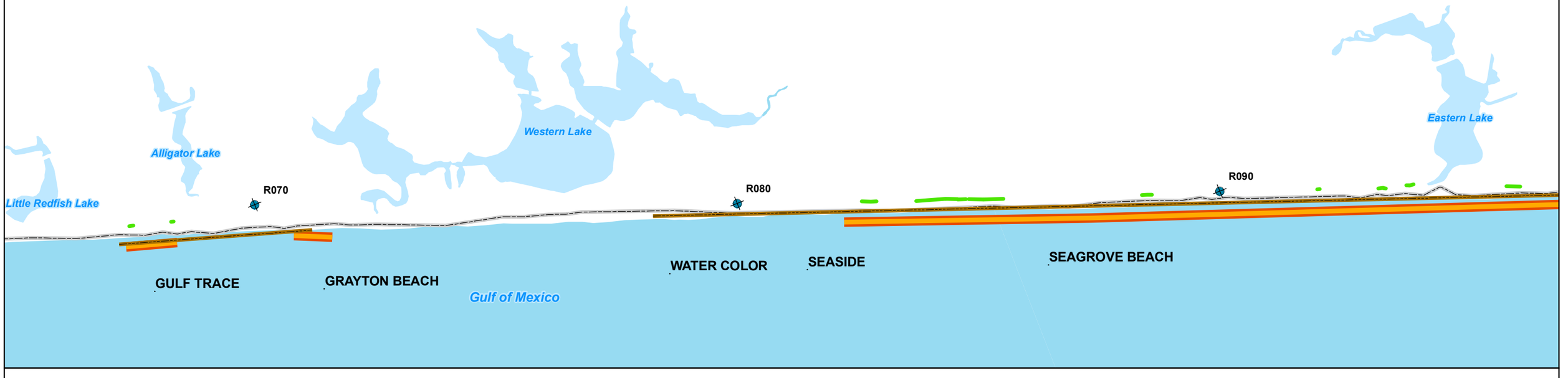

Figure 5C

Critically eroded beaches within the Plan Area - East Central Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

- Range Monuments (10th)
- Shoreline Armoring
- Critically Eroded Beach
- Planned Future Beach Restoration Projects
- Existing Beach Restoration Projects
- County Boundaries

Walton County Planning Division, twg, 8/19/2009
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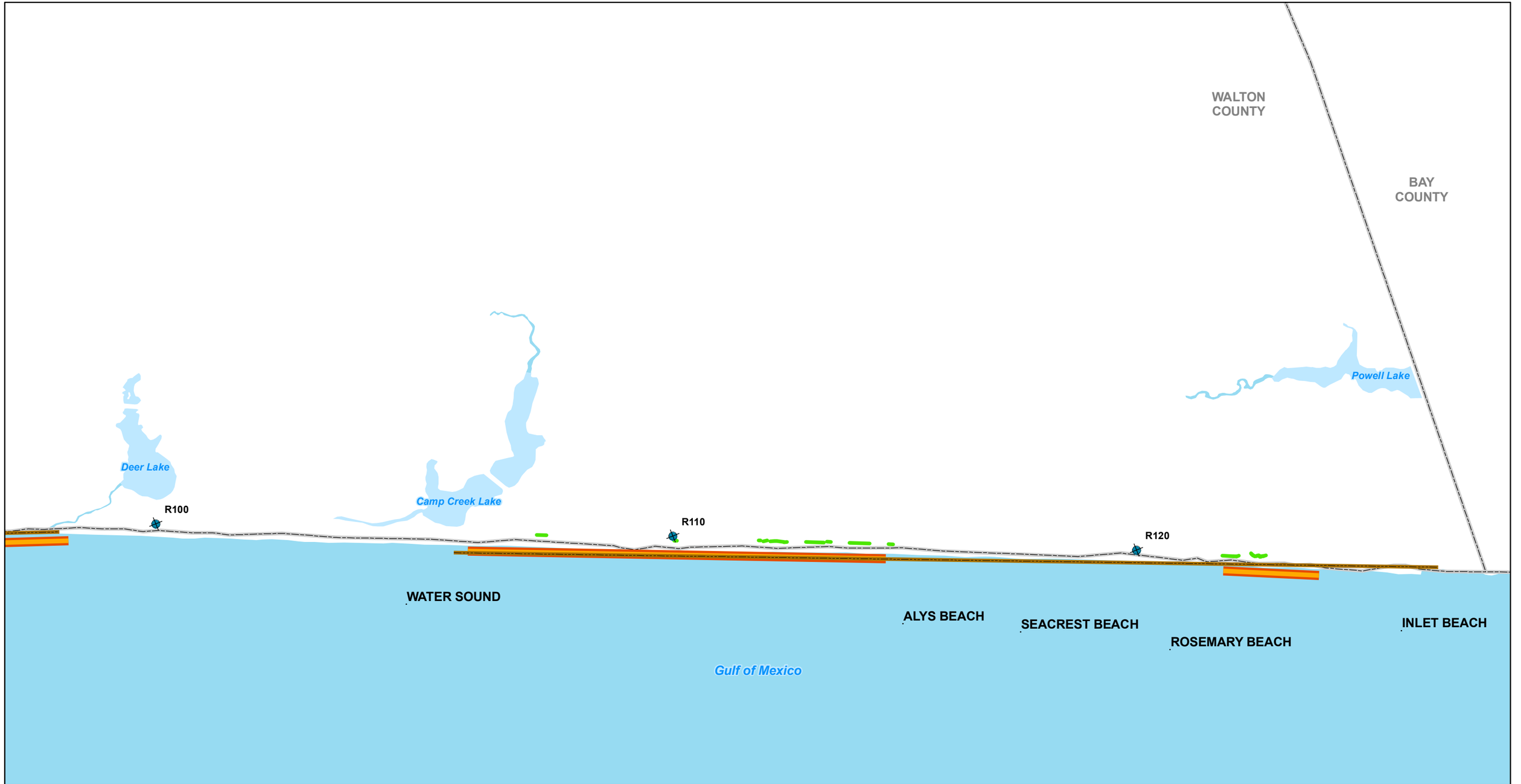

Figure 5D

Critically eroded beaches within the Plan Area - East Walton County

N

1 inch = 2,000 feet

2,000 1,000 0 2,000 Feet

- Range Monuments (10th)
- Shoreline Armoring
- Critically Eroded Beach
- Planned Future Beach Restoration Projects
- Existing Beach Restoration Projects
- County Boundaries

Walton County Planning Division, twg, 8/19/2009
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Location and Quantification of Existing Shoreline Armoring

There is presently 4.0 mi (6.4 km) of armored shoreline in Walton County (Figure 5; Table 1). That represents about 16 percent of the County's entire coastline, including the State parks where no armoring is present. Slightly less than 90 percent (3.5 mi; 5.6 km) of that armoring was installed under the County's emergency permitting authority following the passage of Hurricane Dennis in 2005.

Armoring structures along Walton County's coastline consist of wood bulkheads, steel and vinyl sheetpile, fiberglass composite and Hesco Concertainer walls, and geotextile tubes. The west-central portion of the County, near the communities of Santa Rosa Beach and Blue Mountain Beach, is the most densely armored with an average of 0.42 mi (0.68 km) of armoring per mile of beach. The eastern portion of the County is the least densely armored, with an average of only 0.08 mi (0.13 km) of armoring per mile of beach.

Permitted by State

A total of 27 properties within the Plan Area are fronted with permanent armoring structures permitted by the FDEP through its CCCL program (Table 1). Nine of these properties were issued permits through the standard CCCL permitting process, two prior to Hurricane Dennis (357 ft: 109 m), and seven following Hurricane Dennis (535 ft: 163 m). An additional 18 CCCL permits (1,892 ft; 577 m) were issued for the permanent retention of temporary structures installed between July 15, 2005 and April 30, 2006 under Walton County's emergency authorization.

Permitted by County Under Emergency Authorization

Temporary armoring structures were installed on 196 properties under an emergency permit issued by Walton County following the passage of Hurricane Dennis (Table 1). Structures on these properties collectively encompass approximately 3.5 mi (5.6 km) of beachfront. All but four of the property owners issued emergency permits subsequently applied to the FDEP for the permanent retention of their temporary structures. As of December 31, 2008, CCCL permits had been issued for 18 of those properties (0.4 mi; 0.6 km), 52 applications (1.0 mi; 1.6 km) were denied, applications for the remaining 122 properties were pending at the time of preparation of this HCP.

Installed Without Either FDEP or County Authorization

Following the passage of Hurricane Dennis, armoring was installed on an additional 19 properties collectively fronting 1,576 ft (480 m) of beach without either an emergency permit or authorization from the FDEP (Table 1). All of these property owners subsequently applied to the FDEP for the permanent retention of their temporary structures. Seven (7) of the applications were denied, while the remaining 12 were pending at the time of preparation of this HCP.

Planned Beach Restoration Projects

The Western Walton County Beach Restoration Project was completed during the winter of 2006/2007. This project restored about 5.0 mi (8.0 km) of beach within Walton County, from the Okaloosa County line to Topsail Hill Preserve State Park (Figure 5). Walton County currently has an initiative to nourish an additional 12.8 mi (20.6 km) of beach within the eastern portion of the County as part of the proposed Phase II Beach Restoration for the 30-A Corridor project (Figure 5). The project is currently awaiting State and Federal permits as well as a source of funding.