

DRAFT ENVIRONMENTAL ASSESSMENT
GUANA TOLOMATO MATANZAS
NATIONAL ESTUARINE RESEARCH RESERVE
BOUNDARY CHANGE
St. Johns and Flagler Counties, FL
May 2019



The GTM Research Reserve



National Ocean Service
Office for Coastal Management
1305 East-West Highway
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CONTENTS

ACRONYMS 4

CHAPTER 1	INTRODUCTION AND BACKGROUND	1
1.1	Historical Context for Boundary Expansion	3
1.2	Office for Coastal Management	4
1.3	Guana Tolomato Matanzas National Estuarine Research Reserve	6
1.4	Boundary Expansion Parcels: St. Augustine Florida Inlet/Submerged State Lands and Marsh View Preserve	6
1.5	What is the Purpose and Need of the Action?	7
1.6	Boundary Modification Review	8
1.7	Need for Action	8
1.8	Public and Agency Involvement	10
1.9	List of Preparers	10
Chapter 2	DESCRIPTION OF ALTERNATIVES	11
2.1	Alternative 1- No Action	11
2.2	Alternative 2- Preferred Alternative	11
Chapter 3	AFFECTED ENVIRONMENT	14
3.1	Physical Resources	14
3.1.1	Air Quality	14
3.1.2	Climate	15
3.1.3	Hydrology	15
3.1.4	Geology	15
3.1.5	Soils	16
3.1.6	Water Quality	16
3.2	Biological Resources	18
3.2.1	Wetland and Wetland Vegetation	18
3.2.2	Upland Vegetation	20
3.3	Wildlife Resources	21
3.3.1	Fish	21
3.3.2	Invertebrates	22
3.3.3	Threatened and Endangered Species	23
3.3.4	Migratory Birds	26
3.3.5	Essential Fish Habitat	26
3.3.6	Coastal Barrier Resources	30

3.4	Cultural and Historic Resources	31
3.5	Socioeconomics	33
3.5.1	Recreational Resources.....	33
3.5.2	Navigation	33
3.5.3	Noise	33
Chapter 4	ENVIRONMENTAL CONSEQUENCES	33
4.1	Alternative 1- No Action	34
4.2	Alternative 2- Preferred Alternative	34
4.2.1	Physical Resources	35
4.2.2	Biological Resources – Wetlands and Coastal Barrier Resources	36
4.2.3	Wildlife and Marine Resources	36
4.2.5	Cultural and Historic Resources.....	37
4.2.6	Socioeconomics Resources	38
4.3	Cumulative Effects Analysis and Conclusion	38
4.3.1	Economic Development: Population Growth	38
4.3.2	Economic Development: Tourism and Coastal Economy	41
4.3.3	Military Use	44
4.3.4	St. Johns County Habitat Conservation Plan	45
4.3.5	Projected Activity of the Guana Tolomato Matanzas National Estuarine Research Reserve	45
Chapter 5	COMPLIANCE WITH OTHER LAWS	47
Chapter 6	REFERENCES	47

ACRONYMS

CAMA	Coastal and Aquatic Management Areas
CELCP	Coastal and Estuarine Land Conservation Program
CZMA	Coastal Zone Management Act
DEP	Department of Environmental Protection
DEQ	Department of Environment Quality
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
GRMAP	Guana River Marsh Aquatic Preserve
GRWMA	Guana River Wildlife Management Area
GTMNERR	Guana Tolomato Matanzas National Estuarine Research Reserve
ICW	Intracoastal Waterway
NCB	Northern Coastal Basin
NERR	National Estuarine Research Reserve
NERRS	National Estuarine Research Reserve System
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
OCM	Office for Coastal Management
ORCP	Office of Resilience and Coastal Protection
PCAP	Pellicer Creek Aquatic Preserve
USFWS	United States Fish and Wildlife Service

CHAPTER 1 INTRODUCTION AND BACKGROUND

The Guana Tolomato Matanzas National Estuarine Research Reserve (GTMNERR or Reserve) attracts many tourists to Florida. The Reserve's relatively pristine condition and unique climate and biodiversity are ideal for scientific research and study. There are numerous species of subtropical and temperate plants and animals that co-inhabit the Reserve that make it a key location to study climate change and other global ecological processes as well. The Reserve is located south of the City of Jacksonville, in St. Johns and Flagler Counties, on the northeast coast of Florida. The GTMNERR is geographically divided into a northern and southern

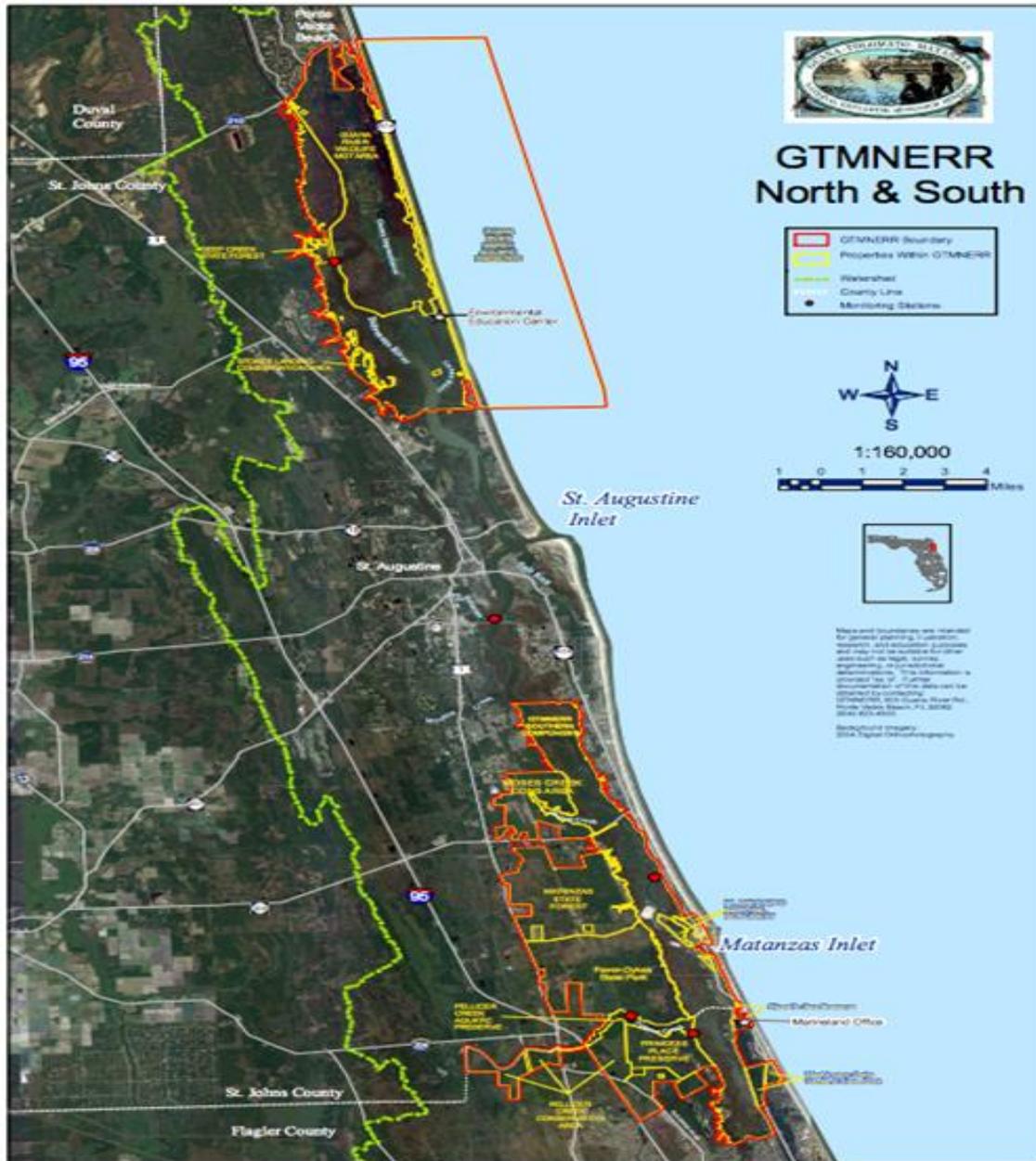


Figure 1.1: Guana Tolomato Matanzas National Estuarine Research Reserve (ICW)

component, separated by the City of St. Augustine. The Reserve is connected to the Atlantic Ocean via the St. Augustine Inlet and the Matanzas Inlet (Figure 1.1).

The Tolomato, Guana and Matanzas River estuaries form a system that extends south from Jacksonville in Duval County to below Marineland in Flagler County behind the barrier island system. The Guana River estuary runs parallel to the Tolomato River estuary on the seaward side, with the two lagoons joining just north of the St. Augustine inlet. The Intracoastal Waterway (ICW) runs through the Tolomato River estuary and is heavily used by vessels as a navigational route. The Matanzas River estuary extends approximately 20 miles south from the St. Augustine Inlet to about eight miles south of the Matanzas Inlet. Matanzas Inlet is one of the last “natural” inlets on Florida’s east coast. The inlet is characterized by a transitory offshore bar and inner shoal with high tidal currents. The GTMNERR covers approximately 73,352 acres of publicly owned uplands, tidal wetlands, estuarine lagoons and offshore areas (GTMNERR EIS 1999). These lands include salt marsh and mangrove tidal wetlands, oyster bars, estuarine lagoons, upland habitat and offshore seas. The estuarine ecological system produces an abundance of marine life including numerous commercially and recreationally valuable species (GTMNERR 2009).

A committee that included coastal managers, scientists and environmental educators selected the present day GTMNERR site because it met the overall needs of a relatively pristine habitat for scientific research and environmental education opportunities. The selection was supported by citizens and legislators of St. Johns and Flagler counties. The Governor and Cabinet of the State of Florida then nominated the estuaries comprising the Guana, Tolomato, and Matanzas including the Pellicer Creek Aquatic Preserve (PCAP) and Guana River Marsh Aquatic Preserve (GRMAP) as the now existing GTMNERR. The GTMNERR was designated in August 1999. In January 2004, management authority of Guana River State Park was conveyed to the Florida Department of Environmental Protection (DEP), Office of Resilience and Coastal Protection (ORCP) (formerly Office of Coastal and Aquatic Managed Areas (CAMA)). Within the Reserve, ORCP directly manages the PCAP, portions of the GRMAP including the lands that formerly made up the Guana River State Park, and other state sovereign submerged lands within the Matanzas River and its tributaries inside the GTMNERR designated boundary that were classified as Class II or Outstanding Florida Waters as of 1998 (Florida Department of Environmental Protection 1998). This area includes tidally submerged state sovereign lands adjacent to and within the Atlantic Intracoastal Waterway and its tributaries, excluding the Treasure Beach Canal System (from Intracoastal Waterway marker number 29, south to an east-west line through marker number 109).

The Reserve serves as an important habitat for migrating species including calving North Atlantic right whales (*Eubalaena glacialis*) and serves as a critical feeding and resting location for migrating shorebirds. Manatees (*Sirenia*), Wood storks (*Mycteria*), Roseate spoonbills (*Platalea ajaja*), Bald eagles (*Haliaeetus leucocephalus*), Sea turtles (*Chelonioidea*) and Peregrine falcons (*Falcon peregrinus*) find refuge in the GTMNERR.

In addition, the Reserve is located in a region of special sociological and archeological interests because of the rich assortment of cultural resources dating to the pre-Columbian era. There are 61 recorded archaeological sites within the boundaries of the Reserve. There are comprehensive records, commencing in the mid-sixteenth century of Native American, Spanish, French, British, and American inhabitants and their cultures (GTMNERR 2009).

The Reserve also contains the northernmost extent of mangrove habitat on the east coast of the United States (Zomlefer et al. 2006). The northern component (referred to locally as Guana) is associated with the Tolomato and Guana River estuaries. It consists of the GRMAP, Guana River Wildlife Management Area, Stokes Landing Conservation Area, and Deep Creek State Forest. The GRMAP extends three nautical miles into the Atlantic Ocean and encompasses the two estuarine (tidal) waters of the Tolomato and Guana Rivers, interior

impoundments, marshes, swamps and five artesian wells. The northern component also includes the upland areas of the former Guana River State Park.

The southern component is associated with the Matanzas River estuary, extending from Moultrie Creek to south of Pellicer Creek. The southern component of the Reserve consists of Pellicer Creek Aquatic Preserve (PCAP), Faver-Dykes State Park, Washington Oaks Gardens State Park, Moses Creek Conservation Area, Pellicer Creek Conservation Area, Fort Matanzas National Monument, Princess Place Preserve, The River to Sea Preserve at Marineland, and other State sovereign submerged lands adjacent to the Matanzas River within the GTMNERR boundary.

Both the north and south sections of the aquatic preserves managed by the GTMNERR previously have individual management plans in place. The GRMAP management plan was approved December 17, 1991 and the PCAP management plan was approved July 9, 1991. Uplands along the Guana River that are currently managed as part of the GTMNERR were previously managed as the Guana River State Park (management plan approved March 26, 1999). The GTMNERR management plan was approved by National Oceanic and Atmospheric Administration (NOAA) on July 1, 2009, and provides guidance for Guana River Marsh, Pellicer Creek, and additional managed lands.

1.1 Historical Context for Boundary Expansion

On March 8, 1994, the Governor and Cabinet of Florida, as the Board of Trustees responsible for decisions regarding management of state-owned land, approved the formal nomination proposal for Phase I of the GTMNERR, which is the Matanzas River portion, and directed staff to pursue nomination of the Phase II site which included the Guana/Tolomato region. NOAA designated Guana Tolomato Matanzas National Estuarine Research Reserve (GTMNERR) on August 19, 1999, originally consisting of the state-owned uplands and submerged lands, and the federal properties within the boundaries of GTMNERR (15 CFR Part 921). By the end of 2003, DEP/ORCP (then CAMA) had assumed responsibility for all protected areas within the GTMNERR boundary (Management Plan). Comprehensive resource protection and management for GTMNERR is described in the site's management plan, first developed in 1999 and last updated in 2009. The management plan addresses programs for science, education, outreach, regulation, enforcement, permitting, and coordination with other local, state, and federal agencies.

The ecology surrounding GTMNERR is formed across a network of public lands managed by seven groups including Florida Fish and Wildlife Commission, Flagler County, St. Johns River Water Management District, City of St. Augustine, Florida State Parks, the Florida Forest Service and the National Park Service. Several consultations and meetings between these groups led to a unanimously supported decision that connecting the southern and northern components of the Reserve will provide continuity in science-based management of the Reserve's coastal resources.

The proposed boundary expansion would extend the comprehensive conservation and management capacities identified in the NOAA-approved GTMNERR management plan to new areas, providing a mechanism for implementation of specific restoration, monitoring and research activities for important marine resources. The incorporation of places of national significance into the National Estuarine Research Reserve supports national ocean resource management objectives articulated by many publicly vetted and expert-driven strategic planning efforts under the administration of NOAA. At the same time, the opportunities for research, exploration, and education related to these significant ocean resources are critical for understanding changes occurring in the environment and understanding the ecosystem services these resources provide for communities throughout this region. Therefore, a comprehensive management

approach offered by NOAA designation is needed and the GTMNERR is uniquely positioned to provide a coordinated conservation program to protect the additional ecologically vital areas in its vicinity. Connecting the southern and northern components of the Reserve would provide continuity in science-based management of the Reserve's coastal resources that is compatible with its purpose to:

1. Increase opportunities for long-term scientific research and environmental education.
2. Provide a scientific research and monitoring program which is responsive to the resource management needs of the cooperators for ultimate improvement of the management of this coastal ecosystem.
3. Enhance public awareness and understanding of the estuarine environment through the implementation of environmental education programs in the local public schools and the nearby communities, and by conducting on-site interpretation of the natural and cultural resources within the Reserve.
4. Promote local, state, and federal government cooperation in the management of the Reserve.

1.2 Office for Coastal Management

The Coastal Zone Management Act (CZMA) is the guiding legislation for the Guana Tolomato Matanzas National Estuarine Research Reserve (Reserve or GTMNERR) (16 U.S.C. §§ 1451 *et seq.*) This Act, administered by NOAA's Office for Coastal Management (OCM), provides for the management of the nation's coastal resources, including the Great Lakes. The goal is to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." (16 U.S.C. § 1452). The CZMA outlines three national programs, the National Coastal Zone Management Program, the National Estuarine Research Reserve System, and the Coastal and Estuarine Land Conservation Program (CELCP). The National Coastal Zone Management Program aims to balance competing land and water issues through state and territorial coastal management programs. The Reserves serve as field laboratories that provide a greater understanding of estuaries and how humans affects them. CELCP provides matching funds to state and local governments to purchase threatened coastal and estuarine lands or obtain conservation easements (OCM 2017).

The National Estuarine Research Reserve (NERR) System is a network of 29 coastal sites designated to protect and study estuarine systems. An additional site is also being considered. Established through the CZMA, the Reserves represent a partnership program between NOAA and the coastal states. NOAA provides funding and national guidance, and a lead state agency or university with input from local partners manages each site. Figure 1.2 provides a map of the current and proposed reserves.

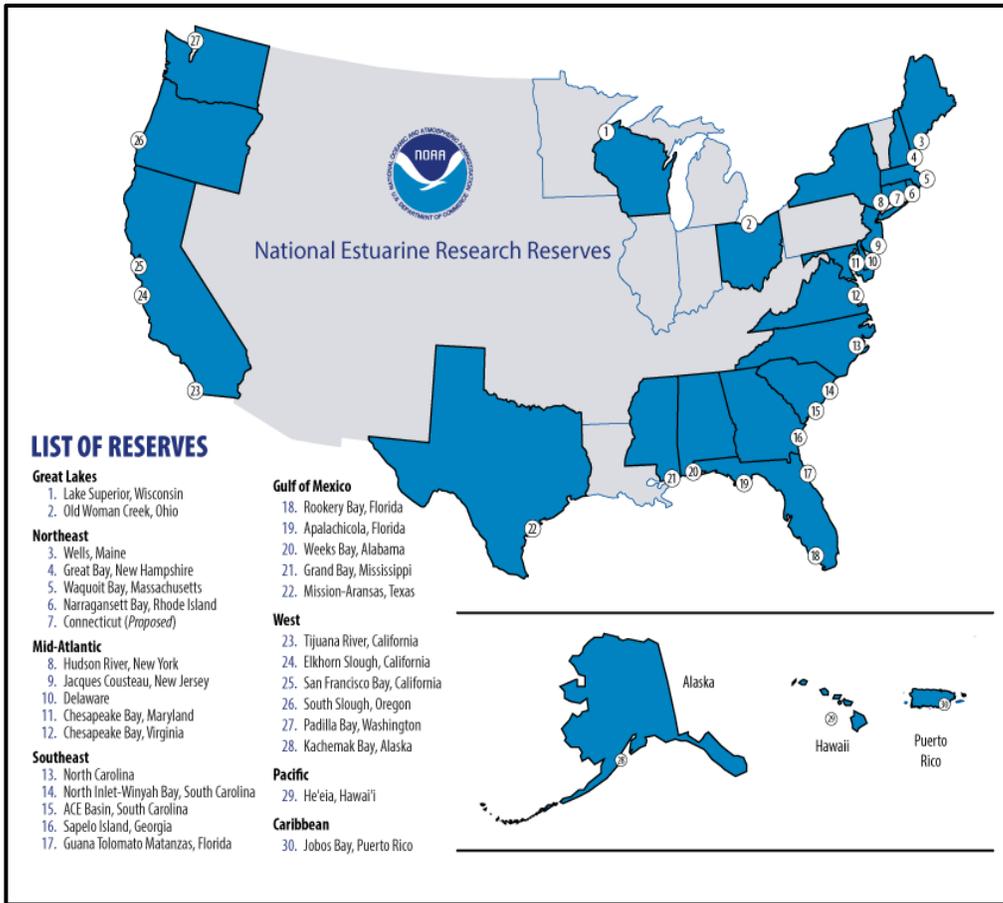


Figure 1.2: Map of the National Estuarine Research Reserves

The Research Reserves cover over 1.3 million acres of estuaries and are focused on the following:

- **Stewardship.** Each site undertakes the initiatives needed to keep the estuary healthy.
- **Research.** Reserve-based research and monitoring data are used to aid conservation and management efforts on local and national levels.
- **Training.** Local and state officials are better equipped to introduce local data into the decision-making process as a result of reserve training efforts.
- **Education.** Thousands of children and adults are served through hands-on laboratory and field-based experiences. School curriculums are provided online.

The OCM encourages public awareness of coastal resources and best ways to address storm preparedness, erosion, development, habitat loss, sea level rise, public access, and threats to water quality, to name a few. As a scientific organization, NOAA provides access to the science and environmental intelligence communities need for these tasks.

1.3 Guana Tolomato Matanzas National Estuarine Research Reserve

The GTMNERR protects 73,352 acres south of the City of Jacksonville, in St. Johns County and Flagler County on the northeast coast of Florida, one of the fastest-growing regions in the state. These protected areas provide habitat for a wide variety of fish and wildlife. A species list recently compiled for GRMAP indicates the presence of at least 44 mammal, 358 bird, 41 reptile, 21 amphibian, 303 fish and 580 plant species. The Reserve contains habitats essential to 48 protected animals and 8 protected plants (GTMNERR 2009). In addition, there are many species of subtropical and temperate plants and animals that co-inhabit the Reserve, making it a key location to study climate change and other global ecological processes.

1.4 Boundary Expansion Parcels: St. Augustine Florida Inlet/Submerged State Lands and Marsh View Preserve

St. Augustine Inlet/Submerged State Lands

The St. Augustine Inlet and its submerged State lands are located adjacent to the northern portion of the GTMNERR and act as a connector between the northern and southern components of the Reserve. St. Augustine, on the US southeastern Atlantic coast, is located at the northeastern corner of Florida. Founded in 1565 by Spanish explorers, it is the oldest continuously occupied European-established settlement within the borders of the continental United States. Access to the Atlantic Ocean is provided via the St. Augustine Inlet of the Matanzas River.

The northern component of the Reserve extends three miles into the Atlantic Ocean and encompasses the two estuarine (tidal) waters of the Tolomato and Guana Rivers, interior impoundments, marshes, swamps and five artesian wells. The northern component also includes the upland areas of the former Guana River State Park. The Tolomato River basin has a drainage area encompassing 84 square miles. The River is a component of the ICWICW and hence maintained, in part, as a public navigation channel. Dredging has straightened the course of the river at some points and established spoil islands which are now partially or entirely vegetated (GTMNERR 2009).

The St. Augustine Florida Inlet and its submerged lands are owned by the City of St. Augustine. Florida Department of Environmental Protection (FDEP) entered into a Memorandum of Agreement (MOA) with the City of St. Augustine on June 19, 2017, to incorporate portions of the submerged lands as buffer lands within the GTMNERR. The MOA acknowledges that the proposed submerged lands will participate in GTMNERR's environmental stewardship programs while the City of St. Augustine continues to have full ownership of the submerged lands (MOA 2017).

Marsh View Preserve

The Marsh View Preserve is located adjacent to the southern portion of the GTMNERR. The southern component is associated with the Matanzas River estuary, extending from Moultrie Creek to south of Pellicer Creek. The habitats found within this southern parcel are a continuation of the same habitats found along the Matanzas and Tolomato Rivers within the current GTM boundary.

Moses Creek and the Matanzas River support extensive undisturbed areas of this tidal marsh area. Moses Creek drains a large area of wet flatwoods and swamps in western St. Johns County. As the creek forms, it flows east and enters the Moses Creek Conservation Area in the northwestern portion of the property. The creek continues southwest, eventually emptying into the Matanzas River. Moses Creek lies within the Matanzas River Basin, a sub-basin of the Northern Coastal Basin (NCB; GTMNERR, 2009).

1.5 What is the Purpose and Need of the Action?

The purpose and need for the action are based on legislative requirements of the CZMA to accommodate administrative lines delineating areas within the designated boundary and the need to expand the boundary to include the estuarine ecosystem boundaries of the submerged lands of the City of St. Augustine and additional submerged aquatic lands owned by the state located in the northern section of the GTMNERR. In addition, the Marsh View Preserve, which is located adjacent to the southern section of the Reserve, would be included in the boundary expansion.

Expanding the boundary to include the above locations would allow and enhance the Reserve's ability to:

1. Educate the Community
2. Protect and manage the estuaries and their watersheds
3. Provide aquatic/upland management
4. Research and monitor the area

1.5.1 Purpose for Taking the Action

The proposed action is to expand, as appropriate, the network of protected areas within the GTMNERR (i.e., those areas in which existing Reserve regulations and management actions would apply). The boundary expansion proposed in this action, to include St. Augustine Inlet/Submerged State Lands and Marsh View Preserve, is targeted towards achieving strategic resource management efforts at GTMNERR. The CZMA of 1972 provides for the management of the nation's coastal resources, including the Great Lakes. The goal is to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." With the primary mandate to provide protection for the resources of these special oceans and Great Lakes areas, the CZMA identifies six purposes and policies:

1. To preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations;
 2. To encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and aesthetic values as well as the needs for compatible economic development;
 3. To encourage the preparation of special area management plans which provide for increased specificity in protecting significant natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, including those areas likely to be affected by land subsidence, sea level rise, or fluctuating water levels of the Great Lakes, and improved predictability in governmental decision-making;
 4. To encourage the participation and cooperation of the public, state and local governments, and interstate and other regional agencies, as well as of the Federal agencies having programs affecting the coastal zone, in carrying out the purposes of this chapter;
 5. To encourage coordination and cooperation with and among the appropriate Federal, State, and local agencies, and international organizations where appropriate, in collection, analysis, synthesis, and dissemination of coastal management information, research results, and technical assistance, to support State and Federal regulation of land use practices affecting the coastal and ocean resources of the United States; and
-

6. To respond to changing circumstances affecting the coastal environment and coastal resource management by encouraging States to consider such issues as ocean uses potentially affecting the coastal zone.

The CZMA also states that changes in the boundary of a Reserve and major changes to the final management plan, including State laws or regulations promulgated specifically for the Reserve, may be made only after written approval by NOAA. NOAA may require public notice, including notice in the Federal Register and an opportunity for public comment before approving a boundary or management plan change. Changes in the boundary of a Reserve involving the acquisition of properties not listed in the management plan or Final EIS require public notice and the opportunity for comment; in certain cases, an environmental assessment and possibly an environmental impact statement may be required.

The NOAA requirements for the preparation of management plans are outlined in the National Estuarine Research Reserve Program Regulations (CZMA section 315, and 15 CFR Part 921). The GTMNERR management plan will be updated in a separate process from this boundary change.

1.6 Boundary Modification Review

Enhanced protection and management of the natural and cultural resources within, and associated with, the existing GTMNERR estuarine ecosystem consistent with the Reserve's education, research, and management goals are provided through the acquisition of environmentally important lands.

The Secretary of Commerce may designate an area as an NERR if the site meets the (4) conditions:

- (A) the area is a representative estuarine ecosystem that is suitable for long-term research and contributes to the biogeographical and typological balance of the System;
- (B) the law of the coastal state provides long-term protection for reserve resources to ensure a stable environment for research;
- (C) designation of the area as a reserve would serve to enhance public awareness and understanding of estuarine areas, and provide suitable opportunities for public education and interpretation; and
- (D) the coastal state in which the area is located has complied with the requirements of any regulations issued by the Secretary to implement this section.

Reserve boundaries must include an adequate portion of the key land and water areas of the natural system to approximate an ecological unit and to ensure effective conservation of those resources (15. C.F.R. Section 921.10). The proposed boundary expansion areas, including the St. Augustine Inlet area and the Marsh Preserve parcel fulfill each of the listed criteria above.

1.7 Need for Action

The need for the proposed action is to expand the boundary to include the estuarine ecosystem boundaries of the submerged lands of the City of St. Augustine and additional submerged aquatic lands owned by the State that are located in the northern section of the GTMNERR. In addition, the Marsh View Preserve, which is located adjacent to the southern section of the Reserve, would also be included in the boundary expansion. Figure 1.1 provides the boundaries of the existing GTMNERR Reserve. The proposed boundary of GTMNERR is presented in Figure 2.1.

Expanding the boundary to include the above locations would continue and enhance the ability of the reserve to conduct new research, education, and management programs to address coastal management issues within

the state. The expansion would also further the national goal to ensure that the system reflects the wide range of estuarine types within the state of Florida.

The expansion would also use existing authorities to ensure a stable environment for long-term research and provide a coordination and oversight mechanism for achieving reserve goals. Significant considerations with respect to maintaining a research reserve include its widespread viability, its ability to promote partnership among entities conducting research in the area, and the accessibility of facilities (e.g., monitoring infrastructures, field laboratories). The expansion also would accomplish the following:

Educating Communities. Expand the community environmental appreciation and scientific literacy, allowing for science-based decisions that positively affect estuaries, watersheds, and coastal communities. The education and outreach program is a tool used to increase public awareness and promote informed stewardship by local communities. K-12 educators and students can visit the Reserve and participate in field studies about environmental protection and education (The National Estuarine Research Reserve System Strategic Plan, 2017).

Protecting. Expand stewardship, protection, and management of estuaries and their watersheds in coastal communities through place-based approaches. Provide information about ecosystem services and apply knowledge in resilience-related training events to support protection and restoration of coastal habitats. Maintain and enhance protection and management of reserve lands, waters, and facilities to support the function of estuaries and reserve operations (The National Estuarine Research Reserve System Strategic Plan, 2017).

Managing Aquatic/Upland Resources. Expand habitat restoration to protect shoreline erosion along the banks of the Intracoastal Waterway (www.gtmnerr.org). Continue to participate in oyster shell recycling to promote services such as filtering nutrients from the water column.

Research and Monitoring. Improve the scientific understanding of estuaries and their watersheds through the development and application of reserve research, data, and tools. Maintain and enhance the System-Wide Monitoring Program to collect long-term data on water quality, weather, biological communities, habitat, land-use, and land cover characteristics. Additionally, develop monitoring modules to address emerging issues, including climate stressors such as climate change. Finally, increase reserve capacity to collect, synthesize, and

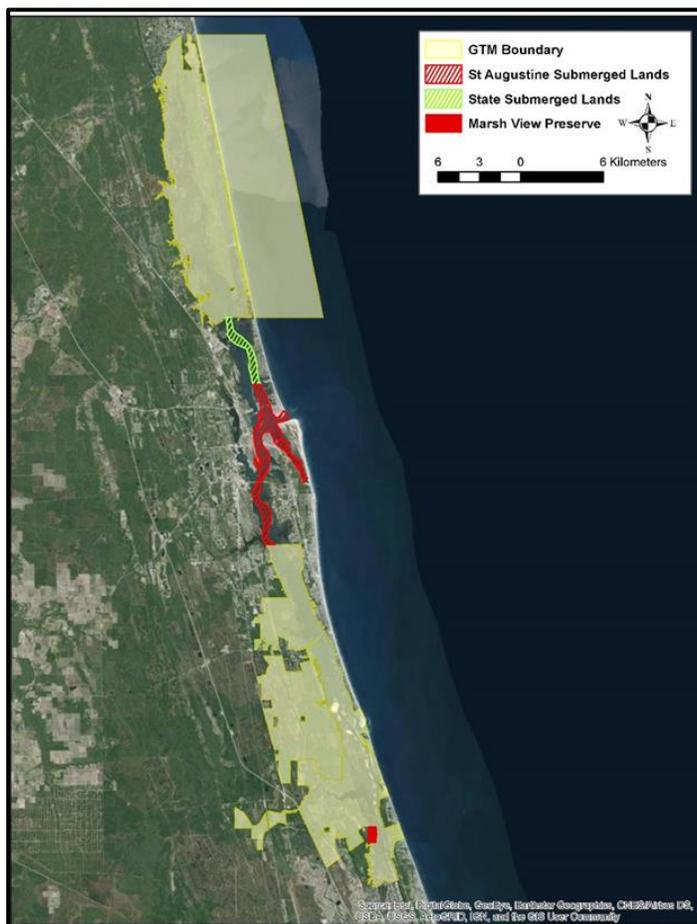


Figure 2.1: GTMNERR Boundary Expansion Parcels

deliver environmental indicators data and monitor changes and trends in ecosystem health and preparedness based on user need (The National Estuarine Research Reserve System Strategic Plan 2017).

1.8 Public and Agency Involvement

During a regular meeting of the St. Augustine City Commission, the Florida Department of Environmental Quality (DEQ) signed a Memorandum of Agreement (MOA) with the City of St. Augustine, Florida for the cooperative management of portions of the City of St. Augustine sovereign submerged lands and waters within the GTMNERR. The City Commission on June 19, 2017, unanimously approved the decision that connecting the southern and northern components of the Reserve will provide continuity in science based-management of the Reserve's coastal resources.

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Chapter 2 DESCRIPTION OF ALTERNATIVES

This chapter describes the two alternatives for action considered by NOAA. Alternative 1, leaving the boundary as is (No Action); and Alternative 2 (Preferred Alternative), expanding the GTMNERR boundary to include the City of St. Augustine Submerged Lands and additional State-owned lands, and Marsh View Preserve parcel.

2.1 Alternative 1- No Action

Under the No Action alternative, NOAA would not approve the boundary expansion. Therefore, there would not be a change to the current boundary for GTMNERR. The boundary would remain the same as approved in the GTMNERR February 1999 EIS and the GTMNERR Management Plan May 2009-April 2014. The original biological, aesthetic, and socioeconomic needs to protect the natural resources would continue. Additionally, the management actions described above including education, research activities and protection would continue. However, these benefits would not be afforded to the proposed expansion parcels (the submerged lands of the City of St. Augustine, the submerged State-owned lands, and the Marsh View Preserve). This Alternative was rejected because failure to designate expansion parcels as GTMNERR would not meet state and Federal goals for protecting, managing and studying estuarine ecosystem as a single integrated unit.

2.2 Alternative 2- Preferred Alternative

Under the Preferred Alternative, NOAA would approve the addition of 3,346.44 acres to the existing GTMNERR for a total of 73,413.53 acres. The acquired land added into the existing boundaries would further the GTMNERR mission and goals *“To assess and acquire land to better protect and manage the natural and cultural resources within and associated with the GTM Research Reserve estuarine ecosystem consistent with reserve education, research and management tools”* (GTMNERR EIS 1999). The Preferred Alternative emphasizes to facilitate natural and cultural resources protection in the expansion parcels through long-term ecological research, environmental monitoring, environmental education and resource stewardship. As explained in Chapter 1, the site selection process involved an extensive consultation with the local and state jurisdictional agencies. The St. Augustine submerged lands and Marsh Preserve area were selected as GTMNERR expansion areas based on their ability to contribute to the NERR program through their biogeographical and ecological characteristics, value for scientific research and environmental education, and land acquisition and management considerations. This alternative is preferred by NOAA because it models the balance of research, public use and recreation by exemplifying conservation legacies into additional areas surrounding the existing NERRS.

Under the Preferred Alternative, the City of St. Augustine’s submerged lands, managed by FDEP, would connect the North and South portions of the GTMNERR; and the Marsh Preserve Tract will be included in the GTMNERR boundaries (Figure 2.1). The expansion of the boundary would provide a wider range for Reserve’s research, monitoring, and education programs, that researchers believe is essential to have a thorough quantitative understanding of the hydrodynamic process in the estuarine system (Shen, Tutak, and Paramygin 2008). This expansion would provide a mechanism for more coordination and integrated ecosystem management that would help the Reserve attain its mission of conserving natural biodiversity and cultural resources, as well as promoting research, monitoring, and education programming.

The St. Augustine Inlet is ecologically and hydrologically part of the GTMNERR centered at the core of the Reserve. This buffer is an important migration route for species moving between the North and South Reserve components and to and from the ocean. In addition, the State-owned submerged lands are not under any conservation designation currently. This results in the discontinuity and hampers the protection of these areas

as one ecological unit. Under the Preferred Alternative, the St. Augustine submerged lands will be added as GTMNERR's buffer areas. They will remain under the ownership of the City of St. Augustine but would be able to participate in the strategic resource management programs of the GTMNERR.

By adding the Marsh View Preserve, located at the boundary of the southern portion of the Reserve, the parcel would be considered a key land and water area, which would ensure long-term viability of the Reserve for research on natural processes. This additional land would provide a range of physical, chemical, and biological factors that contribute to the diversity of natural processes occurring around the estuary (GTMNERR 2009). The City property and State lands along the Tolomato would be a continuation of the same habitats found along the Guana, Matanzas and Tolomato Rivers (salt marsh, mangroves, oyster reefs and unconsolidated substrate, e.g., sand and mud flats).

The proposed expanded boundary is illustrated in the Figure 2.1. The parcel indicated by red diagonal lines shows the City of St. Augustine submerged lands, and the State-owned submerged lands are indicated with the diagonal green line. The Marsh View Preserve boundary is illustrated in the parcel shown in solid red. The current GTMNERR boundary is shown in solid yellow. Alternative 2 (the Preferred Alternative) includes an expansion of 3,346.44 acres to the GTMNERR site.



Figure 2.1: View of GTMNERR Boundary Alternatives

St. Augustine Inlet/State Submerged Lands

In the GTMNERR February 1999 EIS, the St. Augustine Inlet including portions of the submerged land was considered as an alternative boundary. The segment was excluded from the final boundary primarily because the City of St. Augustine opted to have its submerged lands removed from consideration as part of the final Reserve designation in 1999. The EIS states that the property was a relatively undisturbed estuary with true potential for the collection of scientifically valid research data to use as a national basis for the effective management of the estuarine ecosystem of the U.S and territories (GTMNERR EIS 1999).

However, the City of St. Augustine recently decided in the 2017 MOA between the Department of Florida and The City of Augustine (reference in Chapter 1) that having its submerged aquatic lands within the GTMNERR boundary provide continuity in science-based management of the Reserve's coastal resources. This would continue to support the Reserve's mission to preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone. Through various staff outreach and public meetings, the elected city officials approved the expansion parcels. The proposed expansion parcels would have a significant

and positive impact on the Reserve’s ability to manage the natural ecosystem, as well as providing enhanced opportunities for research, monitoring, and educational programs. Additionally, there would be opportunities to inform coastal decision makers and public audiences by comparing/contrasting water quality between the various water bodies within the Reserve (comparing less developed areas to more urban areas). Both the City and the Reserve also believe that adding the City’s submerged lands to the Reserve’s boundary would allow for increased partnerships and a better understanding of impacts to estuarine systems.

Marsh View Preserve

The Marsh View Preserve would add a small amount of land adjacent to the southern component of the GTMNERR boundary. The parcel is within the southern component of the reserve and the same habitats are found along the Matanzas and Tolomato Rivers (salt marsh, mangroves, oyster reefs and unconsolidated substrate). The parcel was identified by the State as a priority conservation acquisition due to its pristine nature, and the fact that it is contiguous with other State conservation lands (specifically the GTMNERR). Using conservation funds, the parcel was acquired by the State when it became available and was immediately turned over to the managing partners of the adjacent GTMNERR.

The area is characterized as an undeveloped remote area. The Marsh View Preserve has a dynamic ecosystem that includes streams, freshwater marshes, forested wetlands, and saltwater ponds. The area is heavily vegetated with herbs, grasses and low shrubs, which can be subject to periodic flooding. The number of species may be relatively low. However, the area provides a dynamic habitat for a wide range of organisms.

The size of the parcels being considered for Reserve expansion are presented in Table 2.1.

Table 2.1: Preferred and No Action Alternatives

Preferred Alternative	Size (acres)
St. Augustine Inlet	2,473.41
Marsh View Preserve	187.00
State Submerged Lands	686.03
Total	3,346.44
No Action Alternative (No changes to the existing boundary)	
	0

The Preferred Alternative is expected to achieve the purpose and need explained in Chapter 1. GTMNERR management boundaries would be expanded, as appropriate, increasing the network of protected areas; i.e., those areas in which existing Reserve regulations and management actions would apply. The ecological integrity of the GTMNERR would be maintained through an active resource protection and management program, to provide a stable environment for research and education. One element of resource protection is the acquisition and management of public lands for conservation and recreational purposes (GTMNERR FEIS 1999). The GTMNERR is composed entirely of public lands. Additional lands may be acquired and included in the existing boundaries, if necessary, to further Reserve’s mission and goals. The Preferred Alternative is consistent with NOAA’s policy for acquisition and access to public lands; which is determined by establishing minimum level of control required to ensure long term protection of Reserve’s resources, in accordance with NERRS Program Regulations (15CFR Part 921.13).

Chapter 3 AFFECTED ENVIRONMENT

This chapter provides an environmental baseline for the proposed action and surrounding areas that are potentially impacted by the proposed action to expand the Reserve. Each of the following subsections provides an overview of the current conditions found in the area of the proposed action.

3.1 Physical Resources

3.1.1 Air Quality

The Clean Air Act (CAA) of 1970 requires states to adopt air quality standards. The standards were established to protect the public from potentially harmful amounts of pollutants. The US Environmental Protection Agency (EPA) has established primary and secondary air quality standards. EPA has set National Ambient Air Quality Standards (NAAQS) for the following six criteria pollutants: ozone (O₃), nitrogen dioxide (NO₂), carbon monoxide (CO), sulfur dioxide (SO₂), lead (Pb) and particulate matter (PM_{2.5}, PM₁₀). According to Environmental Protection Agency (EPA), current nonattainment/ maintenance counties for all criteria pollutants do not include Flagler and St. Johns Counties (EPA 2019). The Florida Spatial Air Quality System (SAQS) displays the current Air Quality Index (AQI) for all ambient air quality monitors in the state. The AQI is an index for reporting daily air quality, and it is calculated based on monitored concentrations of the NAAQS. Figure 1 indicates that the AQI data at the Jacksonville and Palm Coast monitoring stations, which are the closest stations from the expansion parcels, is in the “good” category. Urbanization around the City of St. Augustine and the popularity of the beaches contribute to large numbers of motorized vehicles near the northern boundary expansion area. Because of the sea breezes that are usually present along the St. Johns and Flagler County shores, airborne pollutants are readily dispersed by the ocean-generated winds. Air quality within and around the boundary expansion area remains higher than the national average.

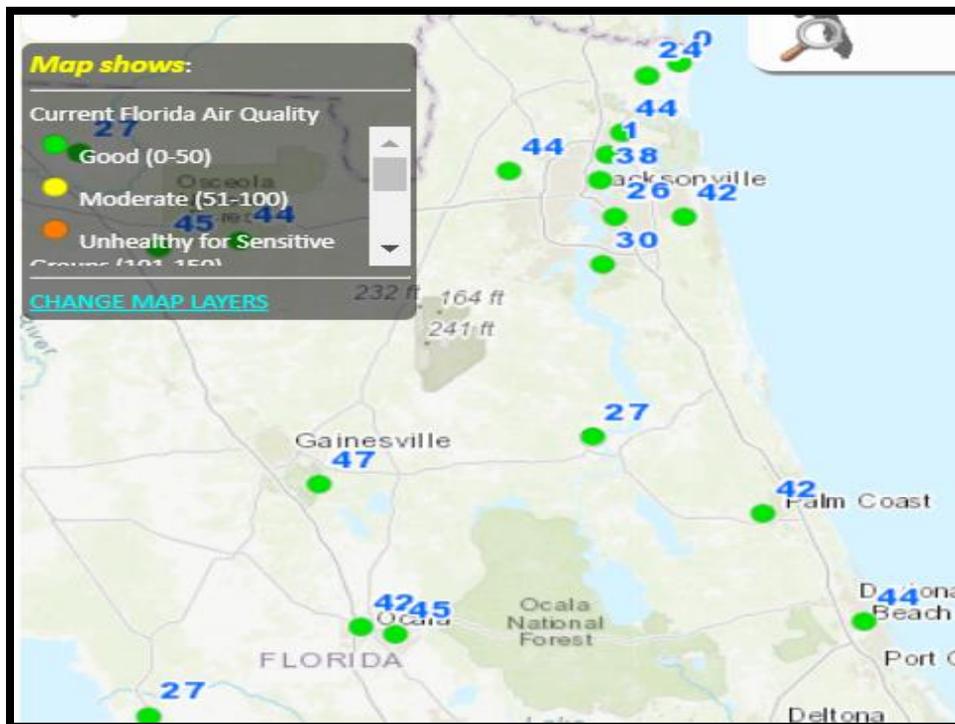


Figure 3.1: Air Quality Index Source: FDEP 2019

3.1.2 Climate

The boundary expansion area is located in humid subtropical marine climates. The weather is warm and humid with mild winters. Summer and winter temperatures in the area are moderated due to the close proximity to the Atlantic Ocean. Average annual precipitation is 55 inches, with approximately 56% occurring from June through mid-October as afternoon and evening thundershowers (GTMNERR 2009). In summer, afternoon temperatures often rise to 90°F or higher, while nighttime temperatures drop into the low 70s. Winter temperatures may range from the 70s in the middle of the day to freezing in the early morning. The prevailing winds in the area are easterly, however winds from the southwest and northwest are also frequent. Storm events at GTMNERR include thunderstorms, northeasters, tropical storms, and hurricanes. Storms are often the cause of major shoreline changes, exacerbating the impact of other factors (e.g., sea level rise, inlet management, beach renourishment and channel dredging) on natural sediment dynamics (Michener, 1997). The influence of global warming on sea level rise and the GTMNERR's habitat and species composition will need to be monitored closely to guide future long-term management strategies (GTMNERR 2009).

3.1.3 Hydrology

The GTMNERR is located in the Upper East Coast Drainage Basin (part of the Florida East Coast Basin) which covers 467,196 acres. The basin has been further divided into two major drainage sub-basins: the Tolomato River (53,802 acres) and the Matanzas River (167,599 acres) drainage basins. The natural hydrodynamics of this system has been altered by water control structures, such as the ICW which runs through it, as well as dikes, inland wells, drainage ditches and a dam placed across the headwaters of the Guana River Estuary. The Tolomato, Guana and Matanzas River estuaries form a system of "bar-bounded" estuaries that extend south from Jacksonville in Duval County to below Marineland in Flagler County behind the barrier island system. The Guana River estuary runs parallel to the Tolomato River estuary on the seaward side, with the two lagoons joining just north of the St. Augustine Inlet. Oceanic exchange occurs through the St. Johns River Inlet, a major navigational channel to the north, and the St. Augustine Inlet to the South. The Matanzas River estuary extends approximately 20 miles south from the St. Augustine Inlet to about eight miles south of the Matanzas Inlet. These tidal inlets form the oceanic exchange for the estuarine ecosystem (GTMNERR, 2009).

The majority of the northern boundary expansion encompassing the City of St. Augustine Submerged Lands, as well as State owned submerged lands, lies in estuarine benthic habitat and tidal marsh along the Tolomato and Matanzas Rivers. The Tolomato River Basin flows from the north and converges with the Matanzas River Basin from the south, before flowing to the Atlantic Ocean through the St. Augustine Inlet. The northern boundary expansion also includes St. Augustine Inlet, a critical migration route connected to the Atlantic Ocean, centered at the core of the Reserve. The Marsh View Preserve portion of the southern boundary expansion lies adjacent to the Matanzas River.

3.1.4 Geology

According to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey of St. Johns County, Florida, St. Johns County is in the lower part of the Atlantic coastal plain. St. Johns County can be divided into four general physiographic regions: Atlantic Beach Ridges, Atlantic Coastal Lagoons, Atlantic Coastal Ridge and the Eastern Valley. The Atlantic Beach Ridge is made up of the beach and a series of dunes, the present shoreline ridge. The geologic material of this area consists of quartz sand mixed with varying amounts of shell fragments. The Atlantic Coastal Lagoons consist of the Matanzas River, San Sebastian River, North River, Tolomato River and Guano Lake. This region consists of open water and flat grassy marshes that are subject to daily flooding by normal high tides. The Atlantic Coastal Ridge is a narrow Ridge lying west of and parallel to the Atlantic Coastal Lagoons. The soils in this region are mostly well drained to excessively drained.

Some of this area has been used for community development; including City of St. Augustine and the communities south and southwest of St. Augustine. The Eastern Valley occupies the largest area of St. Johns County, occurring west of the Atlantic Coastal Ridge and extends westward to the St. John's River. The soils in this region are poorly drained or very poorly drained sandy and loamy soils (NRCS 1983). According to the NRCS Soil Survey of Flagler County, Florida, Flagler County is located in the Atlantic Coastal Lowlands physiographic zone. Six geomorphic features have been delineated in Flagler County: Atlantic Beach Ridges, Atlantic Coastal Lagoons, Atlantic Barrier Chain, Atlantic Coastal Ridge, Eastern Valley, and Espanola Hill. Flagler County is underlain by a foot of sedimentary rocks that overlie the upper Precambrian and lower Cambrian beginning at approximately 5,000 feet in depth. The Avon Park Formation is the oldest geologic formation in the county. The limestone of the Ocala Group and the phosphatic clays, sands and limestone of the Hawthorne Group (NRCS 1997) overlie it.

3.1.5 Soils

The GTMNERR boundary expansion is located in the Coastal Plain physiographic province of Florida. The topography of this portion of St. Johns and Flagler Counties is derived from former marine terraces which are underlain by hundreds of feet of marine sands, clays, and carbonates.

NRCS Web Soil Survey was used to determine the soil data in the expansion area. The St. Augustine Submerged Lands are connected to the Atlantic Ocean via the St. Augustine Inlet. Water from the Tolomato and Matanzas Rivers makes up the majority of the expanded boundary area, with Pellicer silty clay loam, St. Augustine- Urban land complex and Satellite fine sand making up the majority of the soils adjacent to these waterways. These soils are very poorly drained, frequently flooded, have slopes of less than one percent, and are associated with tidal marshes on marine terraces (NRCS Web Soil Survey 2019a).

The Marsh View Preserve area is comprised primarily of Myakka-Myakka wet and fine sand and Smyrna fine sand associated with tidal salt marshes on marine terraces. These very poorly drained soils, with less than one percent slope, frequently flood and pond. Myakka-Myakka soils are comprised of herbaceous organic material over sandy and clayey estuarine deposits. According to NRCS Soil Data, these soils make up over fifty percent of the Marsh View Preserve area. Placid fine sand makes up the majority of the flatwood areas of the Marsh View Preserve. Cassia fine sand makes up a small portion of the flatwoods within the Preserve. The Placid fine sand and Cassia sands in the flatwood areas is considered poorly drained, with slopes of less than two percent, and are comprised primarily of sandy and loamy marine deposits (NRCS Web Soil Survey 2019b).

3.1.6 Water Quality

A 2014 study by NOAA's National Center for Coastal Ocean Science integrated water quality, sediment quality, and biological condition measures to assess the current status of the reserve ecosystem. Thirty stations throughout the Northern and Southern portions of the GTMNERR, and near the City of St. Augustine were monitored and accessed. The combined overall habitat quality, along with generally low levels of chemical contamination measured in the Reserve's oysters and finfish, suggest that the majority of the Reserve is in good ecological condition. The study establishes an important baseline of ecological condition within the Reserve that can be used to evaluate any future changes and to trigger appropriate management actions.

The Integrated Assessment of Ecosystem Condition and Stressor Impacts in Submerged Habitats of the GTMNERR study collected biota for contaminant body-burden analysis. All work was staged out of St. Augustine from the GTMNERR facilities. Sampling was conducted from July 28 – August 8, 2014 at 30 stations throughout submerged habitats of the northern and southern reserve and St. Augustine area (NOS NCCOS 2017) (Figure 3.2).

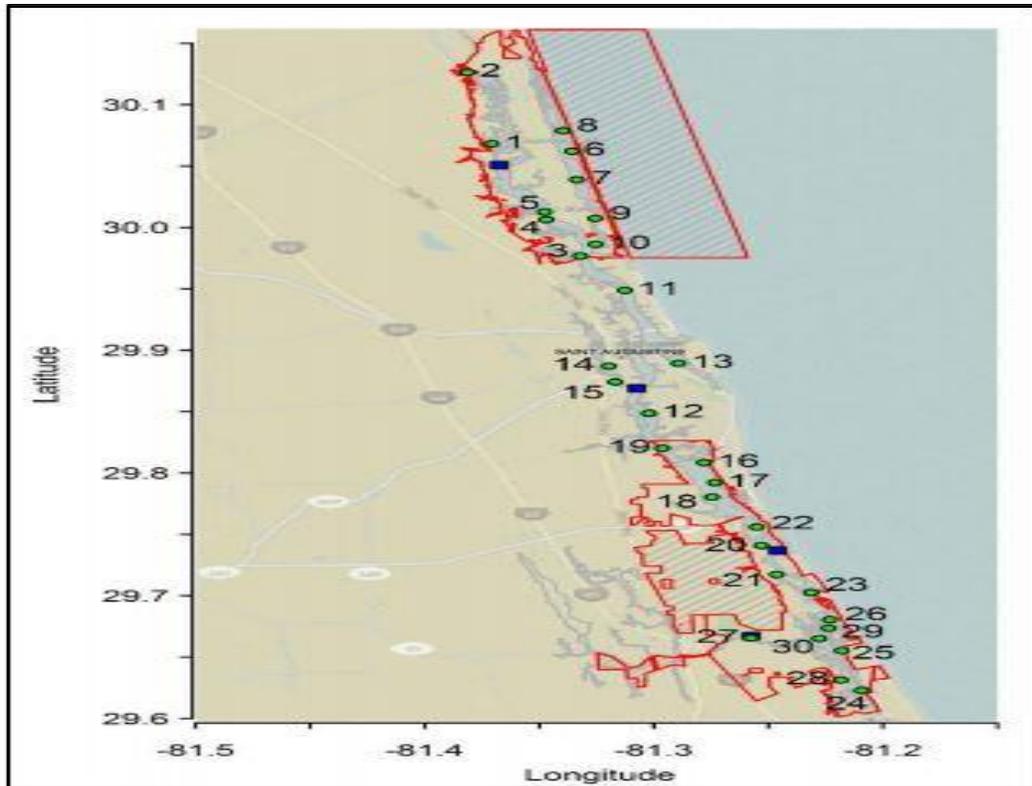


Figure 3.2: Locations of Sampling Units in GTMNERR and St. Augustine Areas. The current GTMNERR Boundaries are outlined in red with portions excluded from the study area indicated by gray hatching; Source: GTMNERR Site Profile 2009

Multiple ecological indicators were sampled synoptically at each station, including:

- General habitat characteristics: Water-column depth, temperature, salinity, dissolved oxygen (DO), pH, turbidity, total suspended solids (TSS), nutrients (ammonium, nitrate/nitrite, total nitrogen, orthophosphate, total phosphorus), phaeophytin, and chlorophyll a; sediment grainsize (% silt+clay) and total organic carbon (TOC).
- Stressor levels: Chemical contaminants in sediments (metals, pesticides, PCBs, PAHs), hypoxia/anoxia, organic over-enrichment (elevated TOC).
- Sediment toxicity: Microtox solid-phase assay, Microtox organic extract assay, and reporter gene assay.
- Health of resident benthic infaunal communities (animals sampled with 0.04-m² grab, sieved on 0.5-mm screen, and identified to species where possible).
- Human-health risks: Water-column fecal coliforms; chemical contaminants in oysters and finfish (spotted seatrout, mangrove snapper, striped mullet, summer flounder, red drum).
- Aesthetics: Water clarity, incidence of noxious sediment odor, oily sediment, marine debris.

Indications of environmental stress were detected at some sites – e.g., poor sediment quality in at least one of the three Sediment Quality Triad components at two sites and elevated levels of fecal-coliform bacteria at five sites. This suggests that the Reserve may not be free from pressures that originate from within or outside its boundaries and that long-term monitoring is warranted in order to track potential changes in the future (NOS NCCOS 2017).

3.2 Biological Resources

The Reserve contains a wide variety of biotic habitats ranging from estuarine, to upland, to freshwater aquatic communities. There are currently 580 plant species identified within the GTMNERR covering marine, littoral, estuarine, wetland and upland habitats (GTMNERR 2009a).

3.2.1 Wetland and Wetland Vegetation

The GTMNERR is comprised of many wetland types and contains a wide variety of wetland vegetation. According to the U.S. Fish and Wildlife Service (USFWS), National Wetlands Inventory (NWI), the majority of the northern boundary expansion is located within Estuarine and Marine Deepwater habitat under classification code E1UBL (Estuarine, Subtidal, Unconsolidated Bottom, Subtidal) (See Figure 4.3).

The Marsh View Preserve area, included in the Preferred Alternative, is in a mixed wetland and upland environment. Much of the Preserve area is classified as Estuarine and Marine Wetland under classification codes E2EM1N, E2USM and E2EM1P. Areas of Estuarine and Marine Deepwater habitat classified as E1UBL occur along eastern portions of the Preserve area. The Southwest corner of the Preserve is comprised of Freshwater Forested/Shrub Wetland under classification codes PFO4R and PSS1/EM1R. Two small areas of Freshwater Emergent Wetland habitat, classified as PEM1F and PEM1C, occur along the western edge of the Preserve.

Marine and estuarine tidal marshes are floral based natural communities generally characterized as expanses of grasses, rushes, and sedges along coastlines of low wave energy and river mouths. The vegetation of this marsh community consists of a number of species in the grass (Poaceae), sedge (Cyperaceae), and rush (Juncaceae) families. The marsh area within the Reserve is dominated by smooth cordgrass (*Spartina alterniflora*). Smooth cordgrass is well adapted to sea strength salinity, 35 parts per thousand (ppt), and occurs in the regularly flooded or low marsh zone (between mean low water (MLW) and mean high water (MHW)). Smooth cordgrass becomes mixed with glasswort (*Salicornia spp*), saltwort (*Batis maritima*), sea purslane (*Sesuvium portulacastrum*), and salt grass (*Distichlis spicata*) on sandy substrates near the high-water mark.

Areas of high marsh (zone between MHW and MLW spring tide) occur where tidal flow is restricted and are dominated by black needlerush (*Juncus roemerianus*). Other commonly occurring species in the high marsh include sea oxeye (*Borrichia frutescens*), sea lavender (*Limonium carolinianum*), marsh elder (*Iva frutescens*), and groundsel tree (*Baccharis halimifolia*) (GTMNERR 2009). The Reserve monitors the health of the marshes extensively from six sites watching for change in types and density of vegetation, sediment accretion, and elevation (Figure 3.4).

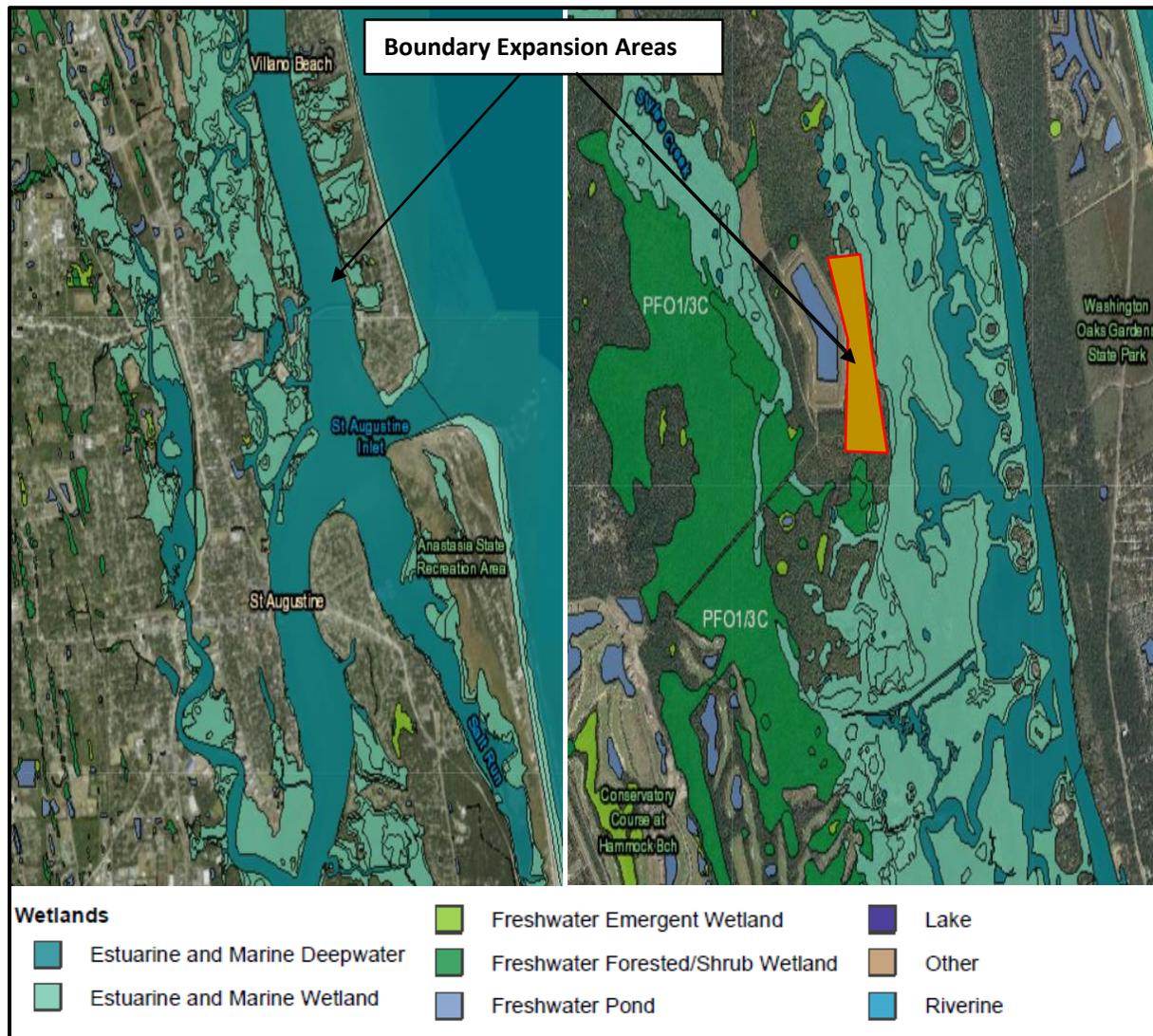


Figure 3.3: Wetlands in GTMNERR Boundary Expansion Areas Source: USFWS NWI Mapper

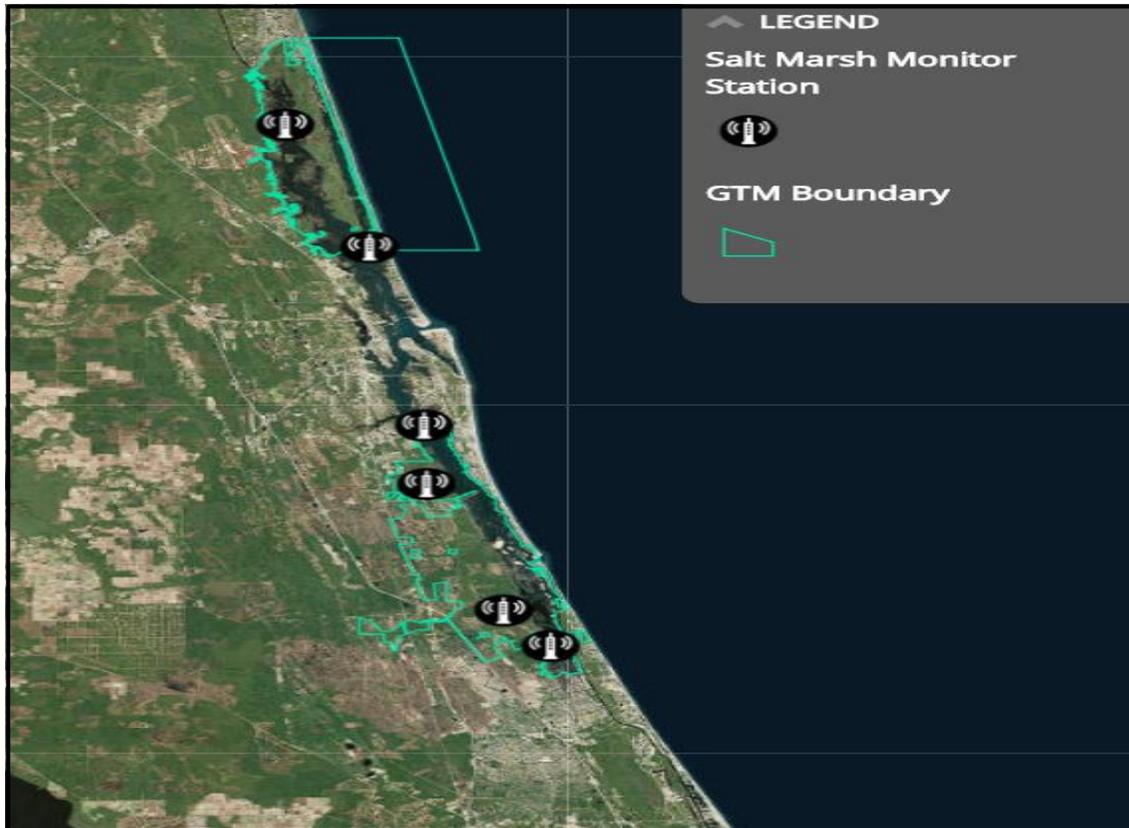


Figure 3.4: Salt marsh monitoring at GTMNERR. Source: GTMNERR Management Plan 2009-2014

3.2.2 Upland Vegetation

The GTM River estuarine ecosystem exhibits a wide variety of habitat types. Pinelands (30%) are the predominant upland habitat type within the drainage basin, followed by shrub and brushlands (14%), and hardwood hammocks (10%). Barren (mostly disturbed) lands make up only 10% of the watershed. Coastal salt marsh and open water habitat comprise nearly 15% of the estuarine watershed of the GTMNERR (GTM Site Profile 2009). The Marsh Preserve area transitions from salt marsh to maritime forest species—characterized by live oak and palmetto trees, and then transitions into longleaf pine flatwoods (Table 3.1). The longleaf flatwoods tend to have wiregrass, saw palmetto, and galberry.

Table 3.1: Marsh View Parcel Overview

LCCODE	SJRWMD Classifications	FNAI Classifications	Acres	% of Parcel
6420	Saltwater Marsh	Estuarine Tidal Marsh	103	55%
4110	Pine Flatwoods	Mesic Flatwoods	41	22%
5100	Streams & Waterways	Streams & Waterways	22	12%
3200	Shrub & Brushland	Scrub	8	4%
6410	Freshwater Marsh	Depression Marsh	6	3%
6460	Mixed Shrub	Xeric Hammock	3	2%
6300	Wetland Forested	Flatwood/Prairie/Marsh Lake	2	1%
5430	Saltwater Pond	Estuarine Tidal Marsh	1	1%
6250	Hydric Pine Flatwoods	Mesic Flatwoods	1	1%
		Total Acres	187	100%

Depression marsh is characterized as a shallow, usually rounded depression in sand substrate with herbaceous vegetation often in concentric bands. A number of small isolated wetlands are scattered throughout the interior portion of the northern component of GTMNERR northern component and St. Augustine Inlet area. These wetlands are filled by direct rain fall, runoff, or seepage from surrounding uplands and are dominated by sand cordgrass, maiden cane, and a rich variety of other herbaceous plants (GTMNERR Site Profile 2009). A portion of the Marsh View Preserve is located within upland area. The area is made up primarily of Mesic Flatwoods (Pine Flatwoods) located to the west of the Matanzas River. There are several other supporting vegetative species found in the flatwoods. Nearly all plants and animals inhabiting the Mesic Flatwood community are adapted to periodic fires several species depend on fire for their continued existence (GTMNERR 2009a).

3.3 Wildlife Resources

The GTMNERR expansion areas that comprise the Preferred Alternative encompass a broad variety of habitat types and a wide assortment of wildlife species.

3.3.1 Fish

The fish communities within the Reserve are a mixed assemblage of freshwater, estuarine and coastal marine species often coexisting together depending on salinity, temperature, and time of year. A total of 303 fish species have been identified in the Reserve habitats that include freshwater, brackish, and marine waters. Recreational and commercial fishing are major activities within the GTMNERR with most effort focused on edible game fishes (GTMNERR 2009a).

Fish species of commercial and recreational importance found within the GTMNERR and boundary expansion areas include tarpon (*Tarpon atlanticus*), spotted sea trout (*Cynoscion nebulosus*), weakfish (*C. regalis*), snook (*Centropomus undecimalis*), red drum (*Sciaenops ocellata*), black drum (*Pogonias cromis*), spot (*Leiostomus xanthurus*), croaker (*Micropogon undulatus*), sheepshead (*Archosargus probatocephalus*), crevalle jack (*Carynx hippos*), gag grouper (*Myctoperca microlepis*), black seabass (*Centropristis striata*), gray snapper (*Lutjanus griseus*), lane snapper (*L. synagris*), pinfish (*Lagodon rhomboides*), whiting (*Menticirrhus americanus*), Florida pompano (*Trachinotus carolinus*), flounder (*Paralichthys spp.*), striped mullet (*Mugil cephalus*), sailor’s choice (*Haemulon parri*) and Mummichog (*Fundulus heteroclitus*).

3.3.2 Invertebrates

More than 95% of the Earth's animal species are invertebrates, and representative phyla can be found in some form or another in all the habitats within the Reserve. More than 500 different invertebrates have been identified within the Reserve (GTMNERR 2009a). Some of the more prominent invertebrate species inhabiting the reserve include:

American oysters (*Crassostrea virginica*)

The American oyster is a bivalve mollusk, meaning it has two valves, or shells. The hinge connecting the two valves is an elastic cushion held together by a thick, strong muscle. American oysters can provide a great volume of the hard substrate found in estuaries, often aggregating in clusters known as oyster bars. Oysters are a keystone species within the estuarine ecosystem and they provide a number of critical ecosystem services such as filtering nutrients from the water column, food for shorebirds and marine animals, reefs are habitat for numerous fish and marine invertebrates, and can also break up wave energy that would otherwise contribute to marsh or shoreline erosion (www.gtmnerr.org/). At GTMNERR, oysters occur along the full length of the estuary. The Reserve encourages recreational oyster and hard clam harvesting within the two delineated shellfish harvest areas. There are currently four oyster aquaculture leases within the Reserve (GTMNERR Site Profile 2009)

White and brown shrimp (*Penaeus setiferus* and *Penaeus aztecus*)

White shrimp commonly inhabit estuaries and the inner littoral zone along coasts to depths of approximately 30m. In the Gulf of Mexico, they can be found in depths as great as 80m; however, they are most abundant in brackish wetlands with connections to shallow, coastal areas. White shrimp is of commercial importance with 2015 landings totaling more than 95 million pounds valued at \$178 million.

The Brown shrimp is a species of grooved, burrowing shrimp, common in Florida waters. Brown shrimp occur along the Western Atlantic coast from approximately Martha's Vineyard, MA through Florida and the Gulf of Mexico to the lower Yucatan Peninsula (Williams 1984). Brown shrimp are commonly found in estuaries and littoral zones along coasts. The white shrimp and brown shrimp are both commercially harvested in northeast Florida and spend part of their lifecycles within the estuaries of the Reserve. Both species are important in estuarine and saltmarsh environments and are considered as one of the commercially valuable species occurring in GTMNERR (GTMNERR Site Profile 2009).

Blue crab (*Callinectes sapidus*)

The blue crab is a decapod crustacean of the family Portunidae, which includes swimming crabs. It is easily identified by its body color which is generally a bright blue along the frontal area, especially along the chelipeds (claws). The remainder of the body is shaded an olive brown color. In Florida, monitoring of commercial and recreational fisheries shows that blue crabs are plentiful. The blue crab inhabits estuaries and is a high value commercial and recreational fishery species within both Florida and the Reserve. Blue crabs are harvested within the Reserve using crab traps or pots as a primary method of harvest (GTMNERR Site Profile 2009).

Fiddler crabs (*Uca spp.*)

Fiddler crabs are one of the most thoroughly studied shore crabs in North America because of their ecological role in salt marshes. The geographic range of the fiddler crab extends from the inter tidal marshes from Providencetown, MA to Daytona Beach, FL. Fiddler crabs are sensitive to pollutants and their behaviors influence the health of salt marsh ecosystems by affecting the nutrient cycle through their burrowing, feeding and waste generation activities (Sequeira 2002). Two common species of fiddler crab occur within the GTMNERR, the Atlantic mud fiddler, (*Uca pugnax*), and the sand fiddler, (*Uca pugilator*). Mud fiddlers are

brownish-yellowish color, and prefer muddy areas, whereas sand fiddlers inhabit sandy habitats of the Reserve (GTMNERR Site Profile 2009).

Marsh periwinkle (*Littorina irrorata*)

The marsh periwinkle is an abundant snail in the salt marshes of the western Atlantic. The shell is elongate conic in shape, longer than it is wide (Andrews 1994). Coloration of the shell is dull grayish white with tiny dashes of reddish brown on the ridges of the spiral. The marsh periwinkle ranges from New York to Texas (Abbott & Morris 1995, Bequaert 1943), and shares a similar distribution with the salt marsh cordgrass, *Spartina alterniflora* (Hamilton 1978). Individuals are found above the water line on and around vegetation throughout salt marsh areas of the Reserve (GTMNERR Site Profile 2009).

Asian green mussel (*Perna viridis*)

The invasive Asian green mussel has been documented to occur in several locations in the Matanzas and Tolomato Rivers near St. Augustine Inlet. This invasive bivalve competes with oysters and other native shellfish for habitat and presents the threat of significantly reducing populations of these commercially valuable resources (GTMNERR Site Profile 2009).

3.3.3 Threatened and Endangered Species

The Reserve encompasses a variety of different local, regional and state regulatory jurisdictional lands, each governed by specific protective rules and regulations. The Florida Fish and Wildlife Conservation Commission (FWC) manages the Guana River Wildlife Management Area (GRWMA). The FWC also has jurisdiction over listed species found in Florida under the Fish and Wildlife Conservation Act of 1980 (FWCA). The Reserve's current management plan indicates that these habitats are essential to many protected species (eight plants and forty-eight animals); including the Anastasia Island beach mouse (*Peromyscus polionotus phasma*), gopher tortoise (*Gopherus polyphemus*), least tern (*Sterna antillarum*), marine turtles: loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*) and green turtle (*Chelonia mydas*), and North Atlantic right whale (*Eubalaena glacialis*). In addition, the striped newt (*Notophthalmus perstriatus*), one of Florida's rarest vertebrate species, occurs within the GTM Research Reserve. Some of the many rare listed birds of the GTM Research Reserve include: great egret (*Ardea alba*), white ibis (*Eudocimus albus*), black-crowned night heron (*Nycticorax nycticorax*), least tern (*Sterna antillarum*), bald eagle (*Haliaeetus leucocephalus*), tricolored heron (*Egretta tricolor*), wood stork (*Mycteria americana*) and roseate spoonbill (*Ajaia ajaja*). The rare Atlantic geoduck (*Panopea bitruncata*) has also been recorded in the GTM Research Reserve (GTMNERR Management Plan 2009).

USFWS IPaC review process was used to identify listed species within the boundary expansion area. On mapping the St. Augustine Submerged Lands and Marsh Preserve Area, the USFWS IPaC review process identified the potential presence of eleven threatened or endangered species within the boundary expansion. The Marsh Preserve area of the boundary expansion indicates the presence of one additional threatened bird species including the Florida Scrub-jay (*Aphelocoma coerulescens*). FWC Florida Natural Areas Inventory (FNAI) listed species database in Flagler and St. Johns counties, and species distribution map were used to identify the state listed species occurring in the boundary expansion area. Threatened and endangered species that may occur in the boundary expansion area are listed in Table 3.2.

Table 3.2. Listed Species Located in the Boundary Expansion Area

Common Name	Scientific Name	Listing Status under ESA	Listing Status under FWCA
Mammals			
Anastasia Island Beach Mouse	<i>Peromyscus polionotus phasma</i>	Endangered	Endangered
West Indian Manatee	<i>Trichechus manatus</i>	Threatened	Threatened
North Atlantic Right Whale	<i>Eubalaena glacialis</i>	Endangered	Endangered
Birds			
Piping Plover	<i>Charadrius melodus</i>	Threatened	Threatened
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Not listed under FWCA
Red-cockaded Woodpecker	<i>Picoides borealis</i>	Endangered	Not listed under FWCA
Wood Stork	<i>Mycteria americana</i>	Threatened	Threatened
Florida Scrub-jay	<i>Aphelocoma coerulescens</i>	Threatened	Threatened
Reptiles			
Eastern Indigo Snake	<i>Drymarchon corais couperi</i>	Threatened	Threatened
Green Sea Turtle	<i>Chelonia mydas</i>	Threatened	Threatened
Hawksbill Sea Turtle	<i>Eretmochelys imbricata</i>	Endangered	Not identified
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	Endangered	Endangered
Loggerhead Sea Turtle	<i>Caretta caretta</i>	Threatened	Threatened
American Alligator	<i>Alligator mississippiensis</i>	Threatened	Threatened
Fishes			
Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	Endangered	Endangered
Atlantic Sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i>	Endangered	Endangered

Source: <https://ecos.fws.gov/ipac/project/> and <https://www.fnai.org/bioticsearch.cfm>

Anastasia Island Beach Mouse - The GTMNERR contains approximately 13 miles of beachfront property including nearly five miles of virtually undeveloped Atlantic Ocean beach dune habitat. This unique habitat has some of the highest dunes in Florida. Beach dunes in Northeast Florida are potential habitat for the endangered Anastasia Island beach mouse. Monitoring of habitat for this species has been a priority for the Reserve's resource management program. The Anastasia Island beach mouse was reintroduced to the GTMNERR's beach dunes in 1992 as part of the recovery plan (USFWS 1993). The founder population consisted of 55 individuals.



Figure 3.5: Anastasia Island beach mouse Source: Florida Fish and Wildlife Conservation Commission

GTMNERR staff continues to monitor for the presence of this species; although recent catch results suggest the reintroduction was unsuccessful (GTMNERR Management Plan 2009).

West Indian Manatee - Manatees are found throughout St. Johns County, including the boundary expansion areas. They are occasionally observed in the Guana River and Pellicer Creek during their seasonal migrations along the ICW.

North Atlantic Right Whale - The Reserve serves as an important habitat for migrating species including calving North Atlantic right whales. Due to their coastal nature, right whales are often visible from the beach, and are often seen seaward of the Reserve (GTM Site Profile 2009).

Birds – The boundary expansion area includes five listed bird species including the Piping Plover, Red Knot, Red-cockaded Woodpecker, Wood Stork and Florida Scrub-jay. These coastal birds prefer to forage in habitats that include sand flats adjacent to inlets or passes, sandy mud flats along prograding spits (areas where the land rises with respect to the water level), ephemeral pools, and overwash areas. Since these substrate types have a richer fauna than the foreshores of high energy beaches, they often attract large numbers of shorebirds. While Piping Plover, Red Knot, Red-cockaded Woodpecker and Wood Stork are known to occur in the North Florida area, they are more likely to be found in the both portions of the boundary expansion: northern St. Augustine Inlet area and southern Marsh Preserve area near the Matanzas Pass. The Florida Scrub-jay, which has been indicated to exist in the southern GTMNERR region and Marsh Preserve area, lives only in the scrub and scrubby flatwoods habitats of Florida. This type of habitat grows only on nearly pure, excessively well-drained sandy soils, and occurs along present coastlines in Florida (USFWS 2018).

Eastern Indigo Snake – The threatened Eastern Indigo Snake is endemic to Florida and is indicated to occur in the boundary expansion areas. It frequents flatwoods, hammocks, dry glades, stream bottoms, cane fields, riparian thickets, and high ground with well-drained, sandy soils (ECOS 2018).

Sea Turtles - The GTMNERR and the proposed boundary expansion area provides habitat for four listed species of sea turtles: Green Sea Turtle, Hawksbill Sea Turtle, Leatherback Sea Turtle and the Loggerhead Sea Turtle. Sea turtles use the sandy beach between the high tide line and the base of the dunes for nesting, with nesting occurring between May and October. The GTMNERR staff monitors sea turtle nesting activity. The Reserve's beach habitat is an active nesting beach that is part of the statewide Index Nesting Beach Survey compiled annually by the FWC. Most of the nests are deposited by loggerhead sea turtles, but nests of the endangered green and leatherback sea turtles have also been documented. Nests are marked and, after hatching, are

excavated for evaluation of hatching success and hatchling emergence. The only sea turtle species for which the USFWS and National Marine Fisheries Service (NMFS) have designated critical habitat is the loggerhead. The GTMNERR and the proposed boundary expansion is in the designated loggerhead nearshore reproductive critical habitat (GTMNERR Management Plan 2009).

Fish – Although identified by the USFWS and FWC databases occurring in the boundary expansion area, it is unlikely that Atlantic and Shortnose sturgeon are found at the GTM NERR. Shortnose sturgeon is restricted to the lower St. Johns River basin. The FWC report indicates that the Shortnose sturgeon species may no longer occur in Florida (FNAI 2001). Atlantic sturgeon occurs along the northeast Atlantic Coast to Cape Canaveral. However, their occurrence is not demonstrated in the Reserve’s management plan.

3.3.4 Migratory Birds

Wading birds, shorebirds, and waterfowl utilize the varied habitats within the GTMNERR extensively. The existing Reserve supports over 250 species of birds, ranging from hummingbirds to wild turkeys. The Reserve serves as important habitat for migrating species of birds and serves as a critical feeding and resting location along the North American Atlantic flyway. The USFWS database identified several migratory birds which have the potential to exist in the boundary expansion area, including the American kestrel, Bald Eagle, Black Skimmer, Clapper Rail, Common Ground-dove, Least Tern, Limpkin, Prairie Warbler, Ruddy Turnstone, Swallow-tailed Kite, Willet, and Yellow Warbler.

3.3.5 Essential Fish Habitat

The tidal inlets (including their ebb and flood tide shoals) are designated as Essential Fish Habitats (EFH) for penaeid shrimp and species within the snapper-grouper complex, as well as EFH for coastal migratory pelagic species. The ecological function of tidal inlets is widely recognized for its contributions to spawning, egg and larval dispersal, juvenile recruitment, and as foraging habitat. Therefore, the St. Augustine Inlet and some vegetated and non-vegetated bottoms, live bottoms, and water columns within the boundary expansion area provide the EFH for several species. EFH species and their life stages found in the boundary expansion in the table below (Table 3.3).

Table 3.3. St. Augustine Inlet Complex EFH Species/ Management Units

Species/ Management Unit	Lifestage(s) Found at Location
Bluefish	ALL
Atlantic Butterfish	Adult, Juvenile
Summer Flounder	Larvae, Juvenile, Adult
Bull Shark	Juvenile/Adult
Spinner Shark	Juvenile/Adult, Neonate
Lemon Shark	Adult, Juvenile, Neonate
Sailfish	Adult, Juvenile
Sandbar Shark	Adult
Great Hammerhead Shark	ALL
Scalloped Hammerhead Shark	Juvenile/Adult, Neonate
Tiger Shark	Juvenile/Adult, Neonate
White Shark	Juvenile/ Adult
Blacktip Shark (Atlantic Stock)	Juvenile/Adult
Blacknose Shark (Atlantic Stock)	Juvenile/Adult
Atlantic Sharpnose Shark (Atlantic Stock)	Juvenile/Adult, Neonate
Bonnethead Shark (Atlantic Stock)	Juvenile/ Adult, Neonate
Finetooth Shark	ALL
Sand Tiger Shark	Neonate/ Juvenile, Adult

Source: NOAA EFH Mapper tool (<http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html>)

Bluefish – Bluefish (*Pomatomus saltatrix*) is a migratory, oceanic species found throughout the world in most temperate, coastal regions, except the eastern Pacific. Bluefish generally school by size, with schools that can cover tens of square miles of ocean. Bluefish are fast growers and opportunistic predators. Bluefish are predominantly a recreational fishery, with recreational harvest accounting for approximately 80% of total removals in recent years (ASMFC 2018). EFH for all lifecycles of the Bluefish exists in the expansion parcels.

Atlantic Butterfish – Atlantic butterfish (*Peprilus triacanthus*) is distinguished by its very thin, deep body, resembling a flounder on edge. The butterfish is a small fish with the largest weighing in at just over one pound and a foot long. It ranges along the North American coast as far south as Florida and as far north as Newfoundland. They typically travel in small bands or loose schools and prefer inshore areas and sandy seafloors. They mature at two years old and begin to spawn in the Gulf of Maine in June (NOAA 2018).

Summer Flounder- Summer flounder (*Paralichthys dentatus*) are found in inshore and offshore waters from Nova Scotia, Canada to the east coast of Florida, and are most abundant in the Mid-Atlantic region from Cape Cod, Massachusetts to Cape Fear, North Carolina. Summer flounder usually begin to spawn at age two or three, at lengths of about 10 inches. Spawning occurs in the fall while the fish are moving offshore. As in their seasonal migrations, spawning summer flounder in the northern portion of the geographic range spawn and move offshore earlier than those in the southern part of the range. Larvae migrate to inshore coastal and estuarine areas from October to May. The larvae, or fry, move to bottom waters upon reaching the coast and spend their first year in bays and other inshore areas. At the end of their first year, some juveniles join the adult offshore migration. Adults spend most of their life on or near the sea bottom burrowing in the sandy substrate. They are quick and efficient predators with well-developed teeth allowing them to capture small fish, squid, sea worms, shrimp, and other crustaceans (ASMFC 2016).

Bull Shark - The Bull shark (*Carcharhinus leucas*) is a large, shallow water shark that is cosmopolitan in warm seas and estuaries (Castro, 1983). It often enters fresh water and may penetrate hundreds of kilometers upstream; bull sharks are the only shark species that is known to be physiologically capable of spending extended periods in freshwater (Thorson et al. 1973). EFH for all lifecycles of the Bull shark exists in the expansion parcels.

Spinner Shark - The Spinner shark (*Carcharhinus brevipinna*) is a common, coastal-pelagic, warm-temperate and tropical shark of the continental and insular shelves. It is a migratory species, but its patterns are poorly known. EFH for all lifecycles of the Spinner shark exists in the St. Augustine Inlet system sand source area.

Lemon Shark - The lemon shark (*Negaprion brevirostris*) is common in the American tropics, inhabiting shallow coastal areas, especially around coral reefs. During migration, this species can be found in oceanic waters but tends to stay along the continental and insular shelves (Morgan, 2008). Lemon sharks are reported to use coastal mangroves as nursery habitats, although this is not well documented in the literature. EFH for all lifecycles of the Lemon shark exists in the expansion parcels.

Sailfish – The Sailfish (*Istiophorus platypterus*) is a highly recognizable fish that can grow to be over 10 feet long, including its elongated bill and its forked caudal fin (Figure 4.6). In the western Atlantic Ocean, its highest abundance is in the Gulf of Mexico, the Atlantic coast of Florida, and the Caribbean Sea. In this region, distribution is apparently influenced by wind conditions as well as water temperature. In the western North Atlantic Ocean, spawning may begin as early as April, but occurs primarily during the summer months (Florida Museum 2017).



Figure 3.6: Sailfish Source: Britannica.com

Sandbar Shark – The Sandbar shark (*Carcharhinus plumbeus*) inhabits inshore shallow coastal waters, including bays, harbors, and estuaries of Florida. The sandbar shark has a brownish or dark gray body with a whitish belly. It has a rounded snout and triangular, saw-like teeth. It has a tall, triangular dorsal fin that increases its swimming stability, and a thick, narrow ridge of skin runs along its back between its two dorsal fins (NEFSC 2017). EFH for juvenile and adult life stages for Sandbar shark exists in the St. Augustine Inlet system and surrounding area.

Great Hammerhead Shark – Great Hammerhead sharks (*Sphyrna mokarran*) have a stout body and are classically shark-shaped with a markedly tall, curved, first dorsal fin. This large coastal/semi-oceanic shark is found far offshore but are commonly in shallow coastal areas. EFH for all lifecycles of the Great Hammerhead shark exists in the expansion parcels.

Scalloped Hammerhead Shark - The Scalloped hammerhead (*Sphyrna lewini*) is a very common, large, schooling hammerhead of warm waters. Scalloped hammerhead sharks are widely distributed, but they are also dependent on discrete coastal nursery areas. Neonate and Young-of-the-Year (YOY) would be more common within and near the St. Augustine Inlet during the summer months. EFH for all lifecycles of the Scalloped hammerhead exists in the St. Augustine Inlet area (USACE 2017).

Tiger Shark - The Tiger shark (*Galeocerdo cuvier*) inhabits warm waters in both deep oceanic and shallow coastal regions. The Tiger shark is one of the larger species of sharks, reaching over 550 cm TL and over 900 kg. Its characteristic tiger-like markings and unique teeth make it one of the easiest sharks to identify. EFH for juveniles/adults and neonates is located in the expansion parcels.

White Shark - The White shark (*Carcharodon carcharias*) is the largest of the lamnid, or mackerel, sharks. It is a poorly known apex predator found throughout temperate, subtropical, and tropical waters. Its presence is usually sporadic throughout its range, although there are a few localities (e.g., off California, Australia, and South Africa) where it is seasonally common (USFWS 2017). EFH for juveniles/adults and neonates is located in the expansion parcels.

Blacktip Shark - The Blacktip shark (*Carcharhinus limbatus*) is circumtropical in shallow coastal waters and offshore surface waters of the continental shelves. In the southeastern U.S it ranges from Virginia to Florida and the Gulf of Mexico. The Blacktip shark is fast moving and is often seen at the surface, frequently leaping and spinning out of the water. It often forms large schools that migrate seasonally north-south along the coast and exhibit a strong diel pattern in their aggregations thought to be related to predator avoidance or improved feeding efficiency (USACE 2017). EFH for juveniles and adults of the Blacktip shark exists in the expansion parcels.

Blacknose Shark - The Blacknose shark (*Carcharhinus acronotus*) is a common coastal species that inhabits the western north Atlantic from North Carolina to southeast Brazil. It is very abundant in coastal waters from the Carolinas to Florida and the Gulf of Mexico during summer and fall. EFH for juveniles and adults of the Blacknose shark exists in the expansion parcels.

Atlantic Sharpnose Shark - The Atlantic Sharpnose shark (*Rhizoprionodon terraenovae*) is a small coastal carcharhinid, inhabiting the waters of the northeast coast of North America. It is a common year-round resident along the coasts of South Carolina, Florida, and in the Gulf of Mexico and an abundant summer migrant off Virginia. EFH for all lifecycles of the Atlantic Sharpnose shark exists in the expansion parcels.

Bonnethead Shark – The Bonnethead (*Sphyrna tiburo*) is a small hammerhead shark that inhabits shallow coastal waters where it frequents sandy or muddy bottoms. It is confined to the warm waters of the western hemisphere. Bonnethead sharks feed mainly on benthic prey such as crustaceans and mollusks. They do not appear to exhibit long distance migratory behavior and thus, little or no mixing of populations (NEFSC 2017). EFH for all lifecycles of the Bonnethead shark exists in the expansion parcels.

Finetooth Shark - The Finetooth shark (*Carcharhinus isodon*) is a common inshore species of the western Atlantic. It ranges from North Carolina to Brazil. It is abundant along the southeastern United States and the Gulf of Mexico. Finetooth sharks generally prefer water temperatures reach 22°C (mid-May) and remain until

water temperatures drop to 20°C (October) (Florida Museum 2018). EFH for all lifecycles of the Finetooth shark exists in the expansion parcels.

Sand Tiger Shark – The Sand Tiger sharks (*Carcharias Taurus*) are large, slow-moving, coastal sharks that have a flattened, conical snout. The Sand Tiger shark can be found in most warm seas throughout the world except for the eastern Pacific. Sand tigers are commonly found inshore in a variety of habitats including the surf zone, shallow bays, coral and rocky reefs and deeper areas around the outer continental shelves. It is migratory within its region, moving poleward during the summer while making equatorial movements during the fall and winter months (Florida Museum 2017). EFH for neonates, juvenile and adult life stages for Sand Tiger shark exists in the St. Augustine Inlet system and the surrounding area.

3.3.6 Coastal Barrier Resources

In the early 1980s, Congress recognized that certain Federal actions and programs historically subsidized and encouraged development in coastal areas. To remove any Federal incentives to develop in these areas, Congress passed the Coastal Barrier Resources Act of 1982 (Public Law 97-348; CBRA). Administered by the USFWS, CBRA designated relatively undeveloped coastal areas along the Atlantic and Gulf of Mexico coasts of the United States as part of the John H. Chafee Coastal Barrier Resources System (CBRS), and made these areas ineligible for most new Federal expenditures and financial assistance. CBRA encourages the conservation of hurricane prone, biologically-rich coastal resources by restricting Federal expenditures that encourage development, such as Federal flood insurance. The CBRA includes both CBRS units and “Otherwise Protected Areas.” CBRS units are any undeveloped coastal barrier, or combination of closely-related undeveloped coastal barriers, included within the CBRS. Otherwise Protected Areas are undeveloped coastal areas established under Federal, State, or local law, or held by a qualified organization, primarily for wildlife refuge, sanctuary, recreational, or natural resource conservation purposes.

The CBRS units that currently overlap the GTMNERR include Parcels P05AP, P05A, and FL-06P intersecting in the southern portion; and Parcel FL-03P intersecting in the northern portion of the Reserve. The two CBRS units and one Otherwise Protected Area intersecting in the proposed boundary expansion area are (Figure 4.7):

- Usinas Beach Unit, P04A (CBRS unit)
- Conch Island Unit, P05 (CBRS unit)
- Washington Oaks Unit, FL 06P (Otherwise Protected Area)

Portions of the Vilano Beach reach of the expansion area are within the CBRS Unit P04A while the southern portion of the Summer Haven reach lies within CBRS Unit P05A, Matanzas River. The eastern boundary of Marsh Preserve partially intersects within the CBRS Unit FLO6P, Washington Oaks Unit (see Figure 4.5). The St. Augustine Inlet system is almost entirely located within a CBRS unit. The purposes of the CBRA includes minimizing the loss of human life, wasteful expenditure of Federal revenues, and damage to fish, wildlife, and other natural resources associated with CBRS units. There are limits, and certain exemptions, to direct Federal expenditures and subsidies related to actions that could affect the natural conditions of a unit. Section 6 of the CBRA (16 U.S.C. § 3505) permits certain federal expenditures and financial assistance within system units of the CBRS after consultation with USFWS.

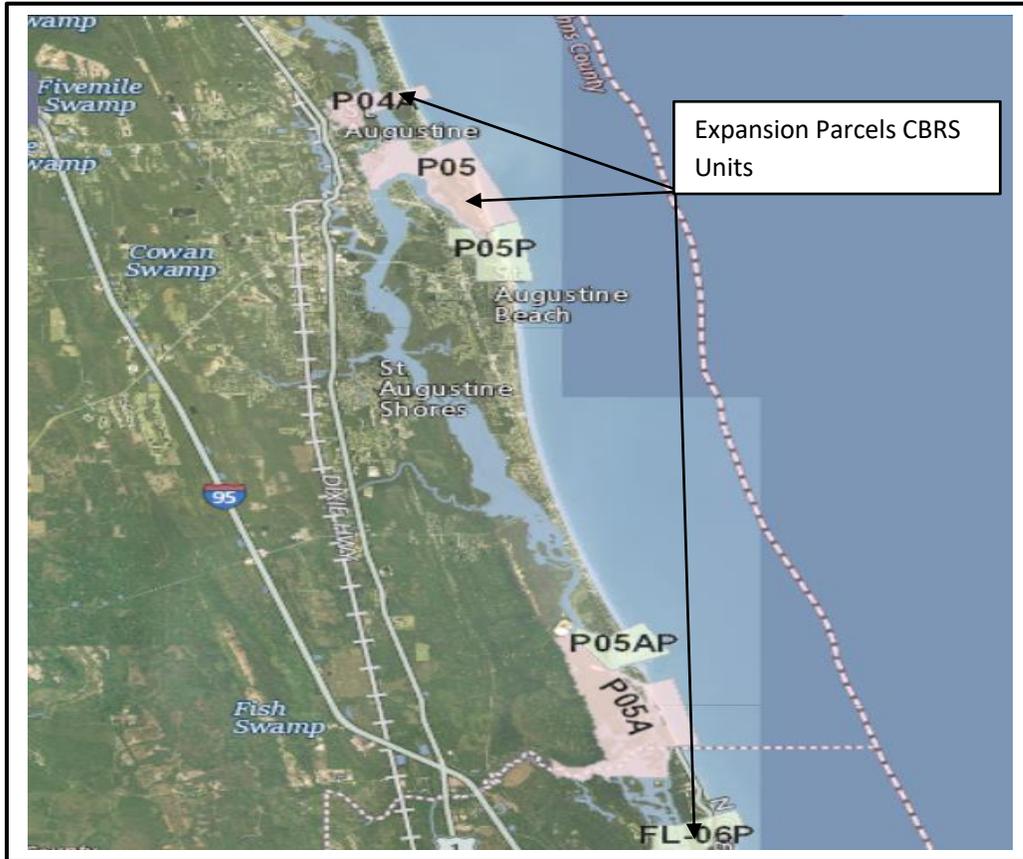


Figure 3.7: Location of CBRS Units in the Expansion Parcels

3.4 Cultural and Historic Resources

Great varieties of cultural and historic resources of significance are present throughout the Reserve and the proposed boundary expansion area. The modern appearance of northeast Florida is the result of a long interaction of humans and nature. The region is of special interest because of the comprehensive documentary record of human settlement and landscape modifications beginning at an early date (Miller 1991). The Reserve area is of special sociological and archeological interest because of the comprehensive documentary record of human settlement and landscape modifications. There are currently 61 recorded archaeological sites within the existing GTMNERR boundary. Known sites include a burial mound, numerous shell middens, a Spanish mission (probably La Natividad de Nuestra Senora de Tolomato), and homestead sites from the British, Second Spanish and Territorial Periods (Newman 1995). One of the GTMNERR's goals is to enhance regional understanding, interpretation and preservation of cultural resources by proactively working with State, Federal and local agencies, academic institutions, private industry and citizens (GTMNERR, 2009).

Two of the major prehistoric and historic cultural sites in the GTMNERR include:

- Princess Place Preserve in Flagler County is located on a knoll overlooking the confluence of Pellicer Creek and the ICW, the estate was once home to a Russian Princess. It was built as a hunting lodge in 1886 by Henry Cutting and is the oldest standing structure in the county. Princess Place has a rich history and contains 1500 pristine acres.

- Fort Matanzas National Monument located near Matanzas Inlet signifies the scene of crucial events in Spanish colonial history (Figure 3.8). The defeat of French soldiers here in 1565 initiated Spain's establishment of its first permanent colony in Florida.



Figure 3.8: Fort Matanzas National Monument Source: NPS

The proposed boundary expansion would include the current St. Augustine Inlet, which was created by the U.S. Army Corps of Engineers (USACE) in 1940, when a land cut was made across the southern tip of Vilano Point. Historic maps suggest, that the current inlet location is in close proximity to the location of the inlet during the time Menendez first colonized Florida. Considering the extensive, maritime history of the St. Augustine region, archaeological and historical resources of the coastal area have been widely studied (USACE 2017). Although likely to be significant, much less is known about underwater archaeological resources in the GTMNERR. The Reserve recently cosponsored, along with the Lighthouse Archaeological Maritime Program (LAMP) in St. Augustine, a symposium on underwater archaeology to bring together experts in this field and to promote collaboration on future research and educational initiatives within the GTMNERR. USACE surveyed South Ponte Vedra, Vilano, and Summer Haven beaches for the presence of cultural resources in 2010. Two archaeological sites (8SJ5442 and 8SJ7988) have been previously documented within the South Ponte Vedra and Vilano Beach reaches; however, both of these sites were assessed as isolated finds that were washed onto the beach after storm events (USACE 2017). However, no materials were identified in either area during the USACE 2010 shoreline survey and none have been reported to LAMP or to the St. Johns County. The St. Augustine Inlet area has been surveyed intensively for cultural resources by the USACE for prior St. Augustine Beach renourishment and maintenance dredging projects. Two shipwreck sites have been documented and several, potentially significant remote sensing targets have been identified within these areas.

The City of St. Augustine zoning map indicates that just west of the project reaches, north and south of the Bridge of Lions is zoned HP-2 to HP-5 under City's Historic Preservation code along the Spanish St, on the west upland side of the boundary expansion area are numerous historic structures. Their presence is noted in this EA as a part of existing conditions.

3.5 Socioeconomics

3.5.1 Recreational Resources

Recreational resources and opportunities are plentiful within the Reserve. Ecotourism and recreational uses within and adjacent to the Reserve including boating, picnicking, swimming, sport fishing, cast netting, hunting, camping, hiking, biking, horseback riding, canoeing, kayaking and nature study. Wildlife viewing, especially birds, is excellent. Fishing, hunting, and nature observation resources are outstanding within the Reserve. Magnificent vistas and photographic opportunities exist across expansive salt marshes and miles of undeveloped beaches. Several public access areas are provided to the public, including eleven boat ramps, four picnic areas, twelve parking lots, eight trail heads and three designated camping areas. Fort Matanzas National Monument and Princess Place Preserve are preserved for historical significance and offer additional recreational value. Sport fishing for estuarine species includes drum, menhaden, spotted sea trout, weakfish, spot and flounder. Oceanic sport fishing species include blue fish, sharks, wahoo, barracuda, mackerel, mahi mahi, cobia, snapper and grouper. Limited recreational oyster and hard clam harvesting throughout the estuary occurs as well. The natural resources of the GTMNERR are also valued commercially through aquaculture (oyster and clam leases), ecotourism, fishing charters, tackle shops and other marine trade businesses. A visitor survey conducted by Reserve staff in 2006, suggests that fishing is the most frequent use of the surveyed areas (GTMNERR, 2009).

3.5.2 Navigation

The proposed boundary expansion area will include the St. Augustine Inlet which is an improved tidal inlet connecting the San Sebastian River and the ICW Federal navigation channel to the Atlantic Ocean. Originally a natural inlet located south of its current location, the inlet was relocated in 1940 as part of the St. Augustine Harbor Navigation Project in response to public interests. The authorized 16-foot inlet entrance channel is maintained at the best natural alignment, while the geographically fixed ICW channel is maintained at 12 feet deep (USACE 2017).

3.5.3 Noise

Noise is defined as unwanted sound and in the context of protecting public health and welfare, implies potential effect on the human and natural environment. The Northern boundary expansion area is located near both urban and rural areas, in and around the City of St. Augustine. St. Johns County passed its most recent revised noise ordinance on October 4, 2011. Noise levels within the expansion area are highest in the urban areas, in the vicinity of the St. Augustine Inlet, and near the St. Augustine Airport. Noise levels typically decrease as one moves further from these urbanized areas into the more rural areas of the Reserve.

Marsh View Preserve is located in a relatively rural, secluded section of the GTMNERR. Noise levels within this portion of the reserve are typically minimal.

Chapter 4 ENVIRONMENTAL CONSEQUENCES

This chapter examines the environmental consequences for the two alternatives addressed in this EA. The potential impacts would be applicable to the affected environment described in Chapter 4.

The criteria used to determine whether an effect (impact) of a proposed action is or is not “significant” are based on Council on Environmental Quality (CEQ) Guidance and NOAA standards and practice, including the “Policy and Procedures for Compliance with the National Environmental Policy Act and Related Authorities: Companion Manual for NOAA Administrative Order 216-6A” (NOAA, January 31, 2017). The term “effects”

(which is synonymous with “impacts” in the Council on Environmental Quality [CEQ] regulations [40 CFR 1508.8]) includes ecological, aesthetic, historic, cultural, economic, social, or public health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that have both beneficial and adverse effects, even if on balance the agency believes that the effect would be beneficial. An agency action may also have no impact on a particular resource or human use.

4.1 Alternative 1- No Action

Under No Action Alternative, the GTMNERR management boundary would remain the same as delineated in the GTMNERR Final EIS approved on February 3, 1999 and the GTMNERR Management Plan, May 2009-April 2014. As described in Chapter 1, under Section 315 of CZMA, National Estuarine Research Reserve System empowers NOAA to designate different areas into their System for long-term research; and use as a base for estuarine education and interpretation programs. The System also provides a framework through which management approaches, research results, and techniques for estuarine education and interpretation can be shared with other programs. Under the No Action Alternative, the integrated resource management framework of NERRS would not be extended in the expansion areas.

All NERRS in the System receive federal support through the OCM. OCM plays four primary roles in the NERRS operations. First, it disburses and oversees expenditures of federal funds for research, education, land acquisition, operations and development of individual reserves. Second, OCM coordinates and provides guidance in the development of policy for the Reserve system. Third, the OCM promotes the System and undertakes certain projects that benefit the entire System. Finally, OCM participates in the periodic evaluation of Reserve’s operations for compliance with the federal requirements and with the individual Reserve’s federally-approved management plan. Under the No Action Alternative, NOAA OCM would not be able to extend its comprehensive natural resource protection to the expansion areas, which possess similar biogeographical and ecological characteristics as of the GTMNERR. Federal funds through OCM/state cooperative agreement would not be used in the scientific research, environmental monitoring, environmental education and outreach, habitat restoration and other natural resource management efforts of the expansion areas. The original biological, cultural, and economic need to protect the natural resources of the St. Augustine submerged lands and Marsh Preserve Tract would continue. As explained above, these boundary expansion areas will remain devoid of the multistep environmental stewardship programs that are extended by the NOAA OCM; which might result in the ecological degradation of these expansion areas in the long term.

4.2 Alternative 2- Preferred Alternative

The Preferred Alternative would acquire 3,346.44 acres to expand the GTMNERR to a total of 73,413.53 acres. The land NOAA is proposing to add to the existing boundary would further the Reserve’s mission and goals. The City of St. Augustine Inlet/ Submerged lands would connect the north and south properties of the Reserve. As noted in Chapter 1, MOA dated June 6, 2017 between the FDEP and City of St. Augustine determines that the proposed City owned submerged lands are included in the Reserve’s boundaries to participate in environmental stewardship programs extended by the Reserve. The proposed St. Augustine submerged lands are incorporated as Reserve’s buffer area; however continue to remain under the ownership of City of St. Augustine (MOA 2017). In addition, the Preferred Alternative proposes to include Marsh View Preserve parcel into GTMNERR’s boundary. This parcel is located adjacent to the southern portion of the GTMNERR and

demonstrates similar high quality marsh criterion. The southern component of the GTMNERR is associated with the Matanzas River estuary, extending from Moultrie Creek to south of Pellicer Creek.

The expansion of the boundary would provide a wider range of protection and enhance opportunities for research, monitoring and education for the Reserve. This expansion would provide a mechanism for more coordination and integrated ecosystem management that would help the Reserve attain its mission of conserving natural biodiversity and cultural resources.

The Preferred Alternative has little to no potential to have a significant effect on the human environment. Many of the education programs offered at the GTMNERR's Marineland office and the Environmental Education Center would be extended to include the boundary expansion area. In addition, implementation of the future education and outreach programs is expected to support the boundary expansion and to improve stewardship toward the reserve, which could lead to beneficial impacts on the overall quality of the natural and human environment associated with the Reserve. In addition, including the Marsh View Preserve tract and the state-owned submerged lands would conserve them in perpetuity as part of the Reserve, which provides further potential for positive ecological effects on these areas. With the Preferred Alternative, the Reserve would be able to maintain its marine and terrestrial habitats in the GTMNERR boundary expansion areas as one ecological unit. This would help the Reserve in the maintenance and protection of the habitats that are functionally important to one or more managed species in its existing GTMNERR area and in the boundary expansion areas.

4.2.1 Physical Resources

The expansion of the GTMNERR site is not expected to have significant impact or effect on any physical resource. The expansion of the GTMNERR boundary will presumably have positive effects associated with expansion to include more protected land. With the inclusion of St. Augustine inlet within Reserve's boundaries, a slight increase in the number of vessels might be noted. However, change in corresponding increase in exhaust from these vessels will remain insignificant. Direct and long-term minor impacts to air quality could result from any increase in vessel and automobile traffic related to Reserve activities. However, with the extension of conservation in the expansion parcels, no overall measurable change in the air quality is expected.

The Reserve has fully implemented the NERR system-wide monitoring program (SWMP) for measuring water quality, nutrients, and meteorological data. The principal mission of this monitoring program is to develop quantitative measurements of short-term variability and long-term changes in the integrity and biodiversity of the estuarine ecosystems for the purposes of contributing to effective coastal zone management. The monitoring program currently measures pH, conductivity, salinity, temperature, dissolved oxygen, turbidity, water level and atmospheric conditions (GTMNERR Management Plan 2009). Therefore, incorporation of additional parcels in the GTMNERR will result in the extension of monitoring efforts. The implementation of Reserve's policy of research and monitoring of abiotic variables (water, soil and air quality) would provide both direct and indirect, long-term, localized minor benefits to physical resources in the expansion areas. These benefits would be both localized and extending beyond the proposed boundaries.

In addition, Reserve's staff members work with local communities and regional groups to address coastal resource management issues, such as non-point source pollution. Through integrated research and education programs that are promoted by the Reserve designation of the expansion parcels, overall positive impact on the physical resources is expected.

4.2.2 Biological Resources – Wetlands and Coastal Barrier Resources

This section discusses environmental consequences of the proposed boundary expansion on its wetlands, supporting biotic community and miles of undeveloped beach, that make GTMNERR one of the most significant natural resources in northeast Florida. One of the primary goals of GTMNERR is to enhance and restore, where required, the varied and complex ecosystems of the Reserve. To fulfill its mission, the Reserve engages into several research and monitoring activities of its wetland and its biotic communities. The Reserve emphasizes educational linkages and particularly the use of research and monitoring information in guiding adaptive management decisions. One of the Reserve's partners is the St. Johns River Water Management District (SJRWMD), which has recently collaborated with the GTMNERR in the development of a guide for the GIS based photointerpretation and coding of coastal wetland communities associated with the GTMNERR. In addition, there are some wetland areas within the GTMNERR that are managed in partnership with the FWC as Strategic Habitat Conservation Areas (e.g. the Guana River Wildlife Management Area, Twelve Mile Swamp and Snowden Bay drainage basins).

The exotic plant communities of wetland areas (e.g. sicklepod, Japanese privet and shrub verbena) within the Reserve are managed through persistent action. Signs of all exotic plants are routinely monitored by the Reserve's staff so that any dramatic increase in existing populations or arrivals of new species can be dealt with swiftly. In addition, under the SWMP program, the Reserve implements monitoring of biotic variables including the organisms and habitats. The first aspects of SWMP program incorporates monitoring and quantification of vegetation (e.g., marsh vegetation, submerged aquatic vegetation) patterns and their change over space and time. Other aspects that are incorporated include monitoring infaunal benthic, nekton and plankton communities (GTMNERR Management Plan 2009).

Under the Preferred Alternative, the research, monitoring and interagency management efforts would be extended to the area surrounding the St. Augustine Inlet and Marsh Preserve. Therefore, the addition of the St. Augustine area and Marsh View Preserve within the Reserve's boundary would increase protection for both the upland, aquatic and wetland species, with the increased opportunities for research and monitoring. . The GTMNERR accomplishes resource management by physically conducting management activities on the resources for which it has direct management responsibility, and by influencing the activities of others within and adjacent to its managed areas and within its watershed. Therefore, the inclusion of expansion parcels will broaden the scope of educational and scientific goals of the GTMNERR; and induce a positive impact on the wetlands and its supporting communities in the region.

The boundary expansion would include two Coastal Barrier Resources System (CBRS) units and one Otherwise Protected Area under the Coastal Barrier Resources Act (CBRA). See Chapter 3.3.6 for additional information on the CBRS units. Since a significant amount of shoreline within the CBRS unit is composed of undeveloped, privately owned parcels, Federal expenditures for any development would be restricted by the CBRA. However, since NOAA is not proposing to encourage any development, there will be no change in the existing condition of these CBRS units.

4.2.3 Wildlife and Marine Resources

Current Reserve's policy encourages restrictions on anchoring or otherwise mooring; discharging or depositing materials or other matter; alteration of the seabed; possessing various marine resources; injuring or taking or attempting to injure or take Reserve's resources; and feeding fish. As a result, expanded Reserve areas could experience reduced fishing pressure and impacts on vulnerable fish species and bottom habitats, benefiting critical nursery and feeding sites for fish juveniles and adults and for live bottom. The expansion of GTMNERR is not expected to have any significant impact on any existing wildlife and marine resource. Recently, the

Reserve was used to conduct research on the American Alligator (*Alligator mississippiensis*). The Reserve is also conducting further assessment to determine if prescribed fire or other compatible management techniques might restore more suitable habitat conditions for the endangered Anastasia Island beach mouse species in the Reserve.

Boundary expansion would lead to additional habitat for reptiles and amphibians within the Reserve and could lead to additional reptile and amphibian research and monitoring opportunities. No impacts to birds are anticipated as a result of the boundary expansion. Birdwatching is popular within the GTMNERR and the expansion would lead to additional areas for the public to enjoy birding, along with additional opportunities to conduct research and monitoring of the avian species found within the Reserve. Furthermore, the boundary expansion would lead to additional opportunities for invertebrate research, including adding additional areas that could be utilized for research and monitoring of crustacean, mollusk, and invertebrate plankton species within the Reserve. Reserve staff is already engaged in several projects aimed at oyster mapping and monitoring programs around the state, enhancing communication among practitioners, identifying data gaps, and initiating pilot-scale mapping and monitoring studies. If added to the boundary, the proposed parcels would also be potential areas for expanding this work.

4.2.4 Protected Species

Sea turtles and marine mammals are protected by the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA), which prohibits their take. Since its designation as a NERR in 1999, the resource management program has focused on the listed species monitoring and protection. GTM Research Reserve stewardship staff has assumed responsibility as primary permit holder for Marine Turtle Permit #140, in cooperation with the FWC. Under authority of this permit, the Reserve staff has lead responsibility for daily monitoring of 1 state index nesting beach covering 5.2 miles of Atlantic beach. The permit authorizes specific GTM Research Reserve staff and volunteers to conduct daily activities related to nest monitoring, stranding and salvage incidents of sea turtles on these beaches (GTMNERR Management Plan 2009).

With the Preferred Alternative, GTMNERR would be able to expand its role to facilitate and conduct research and monitoring, stewardship and education strategies designed to enhance ability to monitor the condition of protected species and to conserve their habitats. The proposed boundary expansion would result in extension of research and monitoring of the protected species in the expansion parcels, which may result in direct short-term and long-term population level benefits for the protected species. The Reserve designation of additional parcel areas would have an overall positive effect on the protected species under ESA and MMPA. With NOAA's future funding, if the need arises, appropriate ESA and MMPA consultations will be completed at that time.

4.2.5 Cultural and Historic Resources

The expansion of the GTMNERR is not expected to have an impact on any cultural or historic resources. Currently, the Reserve protects and manages its 61 existing cultural and historic resource sites. Should any cultural or historic resources be discovered within the proposed boundary expansion area in the future, the comprehensive management approach afforded by NOAA would provide important protection and research capacities allowing for their appropriate conservation and documentation in accordance with the National Historic Preservation Act. The Reserve designation of these additional areas would have no effect on the cultural and historic resources protected under National Historic Preservation Act (NHPA). With NOAA's future funding, if the need arises, appropriate Section 106 consultation would be completed at that time.

4.2.6 Socioeconomics Resources

The expansion of the GTMNERR is not expected to have any significant impact on any socioeconomic resources. Extending Reserve's management into the proposed expansion areas would enhance opportunities for research, education, tourism and recreation (e.g., recreational fishing and diving), yielding direct, long-term, localized benefits to marine area use, recreation, and socioeconomics. Increased visitation to the Reserve for recreation or tourism could result in positive long-term regional economic impacts due to increased visitor spending in coastal communities from which the Reserve is accessed. The Reserve already provides public education programs, and the Preferred Alternative would provide additional or enhanced opportunities to extend these programs in the expansion parcels. The expansion of the boundary would not result or impose additional regulations or restrictions for the community to participate in recreational activities. Recreational anglers may realize a minor benefit from Reserve expansion in areas both in and outside of the proposed expansion areas, because of increased production resulting from reduced fishing pressure or habitat protections inside the proposed boundaries. Due to the inclusion of St. Augustine Inlet within the boundary expansion, the Reserve might experience more ship and vessel traffic. However, there would be no change in the overall ship and navigation scenario of the area due to the proposed action.

4.3 Cumulative Effects Analysis and Conclusion

Potential cumulative effects are assessed to determine the incremental consequences of an action when added to other past, present, and reasonably foreseeable future actions (40 C.F.R 1508.7). The direct effects of an individual action may be negligible but may contribute to a measurable environmental impact when considered cumulatively with indirect effects and with other past/and or reasonably foreseeable future projects. Cumulative impacts may result from individually minor but collectively significant actions taking place over a period of time.

Other past, present, and reasonably foreseeable commercial activities in the proposed boundary expansion that potentially affect the resources by the proposed action are primarily driven by two major activities: economic development and military operations. GTMNERR is in proximity to Jacksonville which is a major military deep-water port. Military operations do not directly affect the Reserve to any material degree. The primary effect of military operations is indirect: the military contribution to the overall population and to population growth. Thus, the effect of military operations is subsumed under the more general discussion of economic development activities. The major activities contributing to economic development pressure that could potentially affect the GTMNERR are residential population growth and tourism. Inclusion of St. Augustine submerged lands and Marsh Preserve tract within the existing GTMNERR boundary could increase a small number of tourists. However, due to an insignificant quantifiable change, it is expected that it does not materially change the level of population growth or tourism of the area cumulatively.

4.3.1 Economic Development: Population Growth

Residential population growth has been strong in the five coastal northeast Florida counties, from north to south: Nassau, Duval, St. Johns (where the Reserve is located), Flagler, and Volusia (Florida OEDR, 2018; Florida Demographic Estimating Conference, 2017). Steady growth has resulted in a doubling of the population since 1980 (Figure 4.1 and Table 4.2).

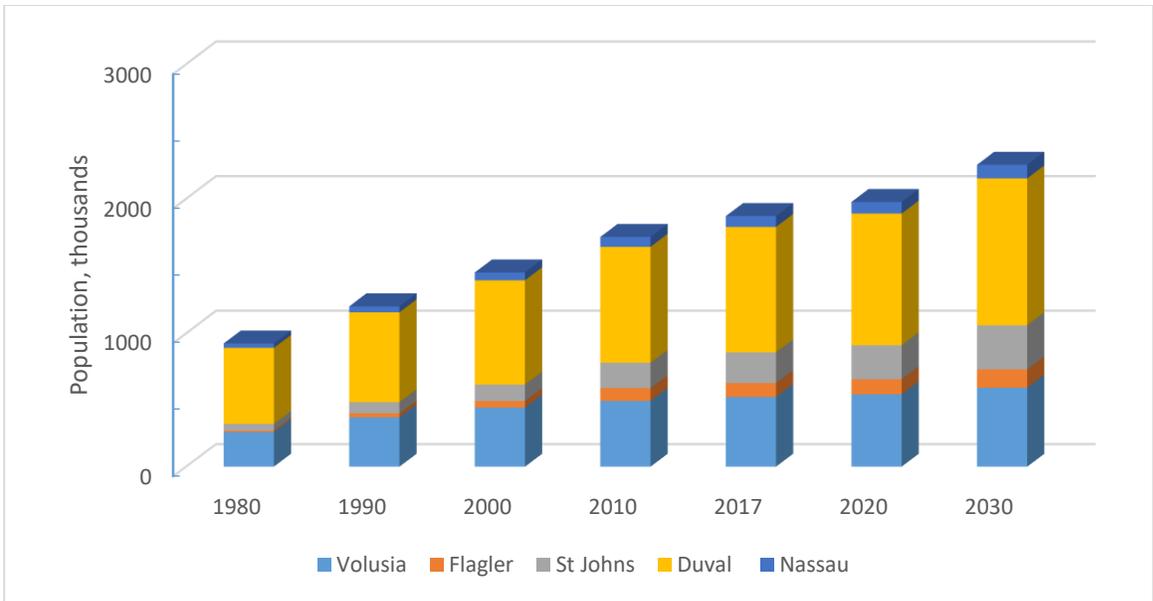


Figure 4.1: Past and Projected Populations, 1980-2030, in Northeast Florida Coastal Counties

Table 4.2: Population Growth NE Florida Coastal Counties, 1980-2030

	Population, thousands						
	1980	1990	2000	2010	2017	2020	2030
Volusia	259	371	443	494	523	543	593
Flagler	11	29	50	96	105	114	138
St Johns	51	84	123	190	230	255	330
Duval	571	673	779	864	934	979	1,091
Nassau	33	44	58	73	80	86	101
Total	925	1,201	1,453	1,717	1,872	1,977	2,253

The past and projected population growth trends based on 2017 data show a simple linear regression model of growth in population in a decennial timeline among the five counties (Figure 4.2). Individually and in aggregate, population growth for the counties is remarkably linear, with near perfect correlation coefficients (r^2 ranged from 0.986 and 0.994). Population data of 2017 was used to project population growth by county until the year 2040 (Florida OEDR 2018)

Another remarkable observation is that these graphs show the financial crisis of 2008 had no discernible effect on the rate of population growth in these five Florida coastal counties.

Although the overall population trend for these Florida coastal counties uniformly shows population growth, the relative contributions among these counties to the total regional population has changed over time. The proportion of the regional population represented by the two most populous counties decreases from 1980 to 2030 while the relative proportion of the less populous counties increases (Figure 4.3).

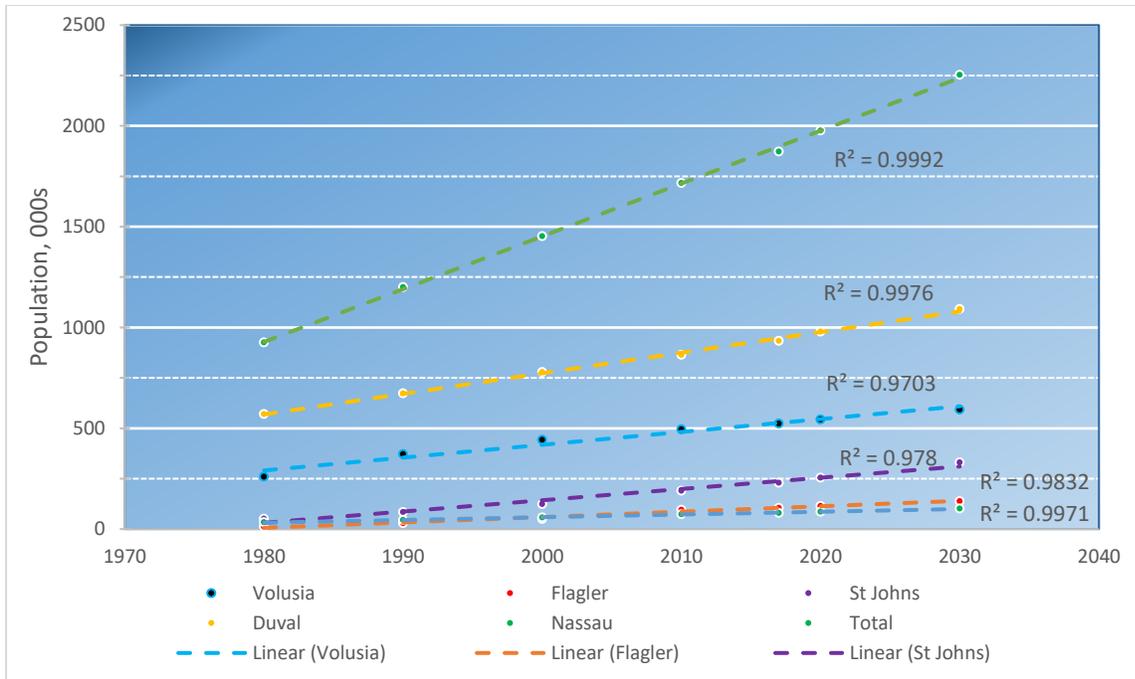


Figure 4.2: Population Growth, NE Florida Coastal Counties, 1980-2030

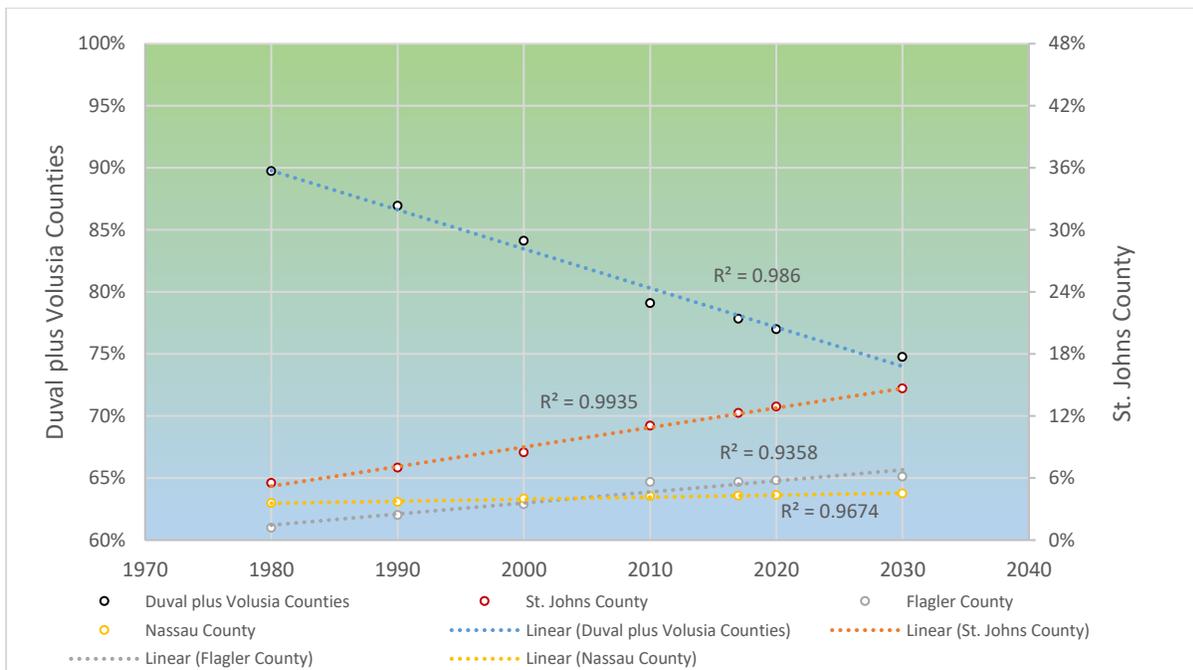


Figure 4.3: Percentage Contributions of Duval and Volusia Counties and St. Johns, Flagler, and Nassau Counties to the NE Florida Coastal Counties Past and Projected Population

Based on “Total County Population: April 1, 1970-2045” data released in 2017, the relative proportion of the five-county population for the two most populous counties, Duval and Volusia Counties, represented 90% of the total aggregate five-county population in 1980. That contribution decreased to 79% in 2010 and is projected to decrease to <75% by 2030. The St. Johns County (where the Reserve is located) contribution to

the total area population has continuously increased. In 1980, the county represented 5.5% of the aggregate five-county population; 11.1% by 2010; and increase by 2.7-fold over its 1980 level to 14.6% by 2030. Similarly, Flagler County represented 1.2% of the aggregate five-county population in 1980; 5.6% in 2010; and increase by 5.2-fold over its 1980 level to 6.1% by 2030. Likewise, Nassau County represented 3.6% of the aggregate five-county population in 1980; 4.3% in 2010; and increase by 1.3-fold over its 1980 level to 4.5% by 2030 (Florida Projected Population 2017).

4.3.2 Economic Development: Tourism and Coastal Economy

On the following page, Figure 5.4 presents the wages, GDP, and employment data for the five northeast Florida coastal counties. Figures 5.5 presents the average wages for tourism and total ocean-based economy data (total ocean-based economy comprising marine construction, living resources, offshore minerals extraction, ship and boat building, tourism and recreation, and marine transportation). Data provided by NOAA (Personal communication, S. Robinson 2018a)

Again, a striking observation about the tourism economy in these five NE Florida coastal counties is their resilience in the face of the financial crisis of 2008. While the smallest of these county economies (Flagler and Nassau) showed an upward spike in tourism total and average wages and GDP in 2008, followed by a slight depression over 2009-2010, the remaining counties showed a slight or no decline in total and average wages and GDP through the financial crisis and recovery.

The total contribution of tourism is substantial in these counties, in aggregate representing \$1.25-1.5 billion in business. The average wages in the tourism sector generally run below the total average wages. However, the range of tourism-related average wages varies considerable, from lower but very comparable (Nassau and Volusia Counties) to nearly half the average wages of the total ocean economy (Duval County).

According to the data provided by NOAA, the overall trend in tourism and ocean-sector economies for the five NE Florida Coastal Counties is one of modest annual increases. Annual growth from 2005 through 2015 is approximately 1.6% for Nassau County; 1.8% for both Duval and Volusia Counties, 2.4% for St. Johns County, and 3.8% for Flagler County. The aggregate annual growth in the tourism and ocean economy business sectors for the five NE Florida coastal counties from 2005 through 2015 was approximately 1.6%, from approximately \$1.2 to \$1.5 billion annually (Personal Communication, S. Robinson 2018a).

Data for the broader coastal economy business sectors (trade, transportation, and utilities; construction; education and health services; financial activities; information; leisure and hospitality; manufacturing; natural resources and mining; professional and business services; and public administration) show similar growth trends. Annual growth in the coastal economy business sectors from 2005 through 2015 was approximately 1.3% for Flagler County; 1.9% for Volusia County; 2.7% for Duval County; 3.4% for Nassau County; and 5.7% for Flagler County. The aggregate annual growth in the coastal economy business sectors for the five NE Florida coastal counties was approximately 2.7%, from approximately \$66 billion to \$84 billion annually (Personal Communication, S. Robinson 2018a).

The conclusion from the above population and economic data is that the five northeast Florida coastal counties have enjoyed a modest steady growth over nearly 40 years and are expected to continue to grow at this same modest rate through 2030.

The proposed action represents an insignificant impact on the overall ocean business sector-based economy and far less on the much larger coastal business sector-based economy. Therefore, the impact of the proposed action on economic development in the five NE Florida coastal counties is expected to be negligible with respect the cumulative impacts of past, present, and reasonably foreseeable activities.



Figure 4.4: Average Wages, GDP, and Employment for the Five Northeast Florida Coastal Counties

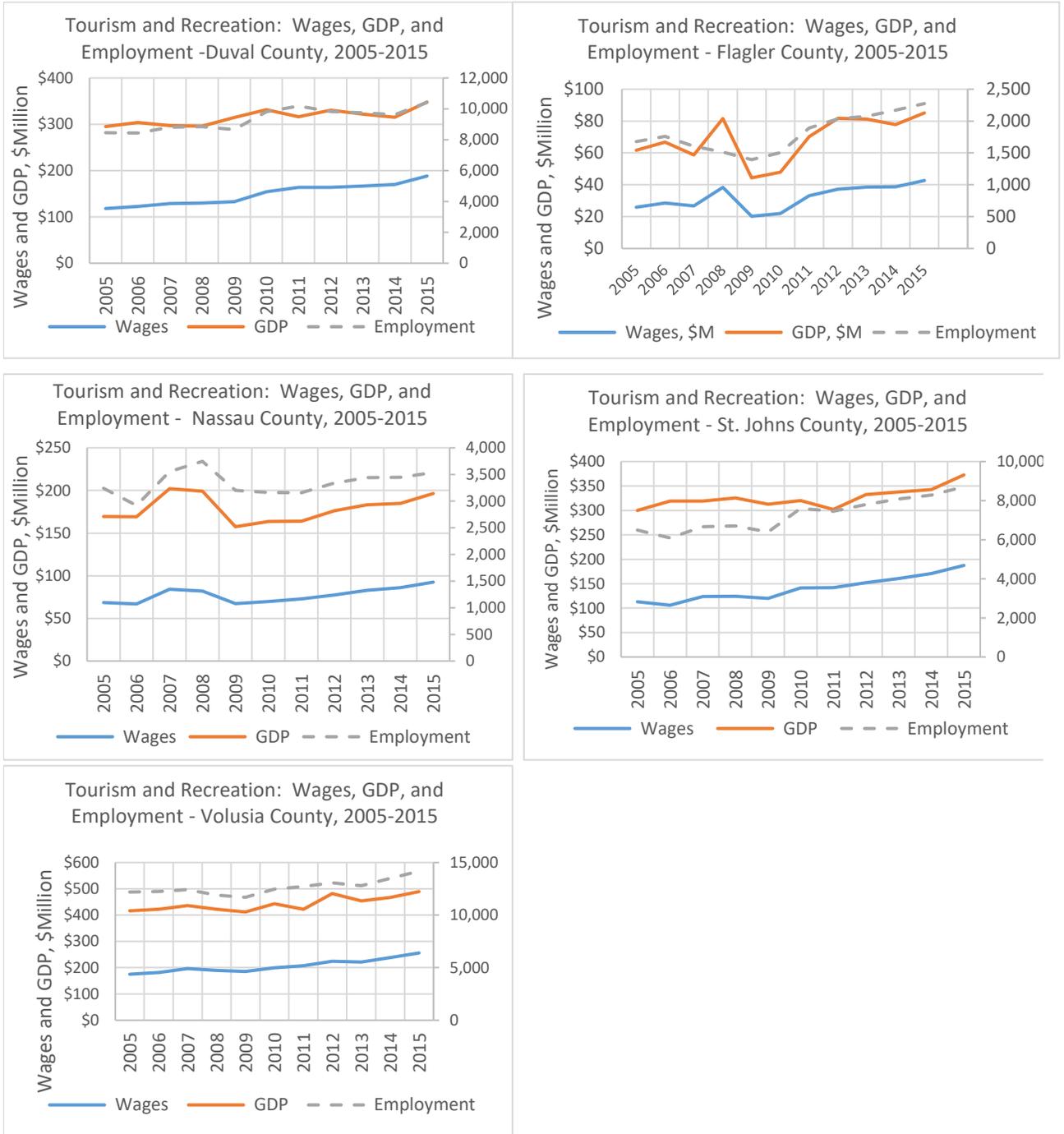


Figure 4.5: Average Wages for Tourism and Total Ocean-Based Economy for the Five Northeast Florida Coastal Counties

4.3.3 Military Use

Military bases in Florida are home to over 57,000 active duty military personnel and 36,000 military reserves. Active duty personnel are located at 22 military bases and installations statewide (Table 5-3; HCDMag, 2018; CoBases, 2018; Military Installations, 2018).

Table 4.3: Military Installations in Florida

Air Force	
Eglin AFB	Valparaiso, FL
Hurlburt Field	Mary Esther, FL
MacDill AFB	Tampa, FL
Patrick AFB	Brevard, FL
Tyndall AFB	Panama City, FL
Army	
Camp Blanding	Starke, FL
Coast Guard	
United States Coast Guard Air Station Clearwater	Clearwater, FL
United States Coast Guard 7th District	Miami, FL
USCG Integrated Support Command Miami	Miami Beach, FL
USCG HITRON Command	Jacksonville, FL
Marine Corps	
Blount Island Command	Jacksonville, FL
Navy	
AUTEC Complex	West Palm Beach, FL
Naval Air Station Jacksonville	Jacksonville, FL
Naval Air Station Key West	Key West, FL
Naval Air Station Pensacola	Pensacola, FL
Naval Air Station Whiting Field	Milton, FL
Naval Air Warfare Center	Orlando, FL
Jacksonville Naval Hospital	Jacksonville, FL
Naval Hospital Pensacola	Pensacola, FL
Naval Station Mayport	Duval, FL
Naval Support Activity Panama City	Panama City, FL
Corry Station Naval Technical Training Center	Pensacola, FL

Sources: HCDMag, 2018; CoBases, 2018; Military Installations, 2018

Five major installations are located in the coastal counties within approximately 60 miles of the location of the proposed action, with many others nearby. These include: Naval Air Station, Jacksonville; Naval Station Mayport, Duval; Jacksonville Naval Hospital, Jacksonville; Coast Guard Helicopter Interdiction Tactical Squadron, Jacksonville; and the Blount Island Command, Marine Corps, Jacksonville. Facilities supporting the reserves and National Guard also are found within northeast Florida as well as ancillary, auxiliary, or other support installations.

Military operations themselves have little to no impact on the proposed action. The potential impact from military use is from the contributions of active duty personnel, their dependents, and associated Federal and

contract support personnel to population growth and consequent development pressure. The contributions of the dependents and non-active duty support personnel may be substantial. For example, at NAS Jacksonville, there are 4.25 dependents and no active duty personnel for each active duty personnel: 10,200 active personnel; 34,000 dependents; 6,000 Federal employees; 2,500 contractors; and 900 non-appropriated fund (NAF) employees (Military Installations, 2018).

These non-active duty personnel and dependents do not represent a 1:1 contribution to the population-driven development pressure compared to the resident, civil population. For example, base housing reduces the demand for housing; the PX reduces the demand for grocery stores and gasoline stations; base power generation reduces the demand for energy. But as shown in the example above, there can be a near 1:1 correspondence between the number of active duty personnel and the number of Federal, contractor, and NAF employees. All of these personnel add some contribution to the development pressure in the region, even if not on a 1:1 basis compared to the nonmilitary population.

Predicting the future of Defense Department activity is burdened by a number of factors that are hard to foresee. However, a safe assumption is that there would not be large swings in Defense Department budgets (i.e., $\pm 10\%$ or more), recognizing that an event comparable to 9/11 always is possible and can produce significant changes in the military impact on local and regional communities.

However, the five northeast Florida coastal counties all have shown consistent stability in population growth rates from 1980 through 2017. These county-level data include the various contributions of active military personnel, non-active military personnel, and military dependents to the population growth rates in these counties. Therefore, using historical and projected growth in the general population adequately accommodates the contribution of the military to the development pressure in these communities. As determined above for general population and for tourism, ocean- and coastal-based economies, the contribution of the proposed action when combined with reasonably foreseeable military use activities would have a negligible cumulative impact on the area of interest.

4.3.4 St. Johns County Habitat Conservation Plan

NOAA is proposing an action that is wholly contained within the boundaries of St. Johns and Flagler Counties. The St. Johns County has had an active Habitat Conservation Plan since 2003, "A Plan for the Protection of Sea Turtles and the Anastasia Island Beach Mouse on the Beaches of St. Johns County, Florida", (St. Johns County Planning Division 2003). The Plan requires county permits for a range of public activities, including Incidental Take Permits, Coastal Construction Permits, Beach Use Permits, Special Use Permits (Commercial Fishing, Horseback Riding, 4x4 Driving, special events), as well as light management and beach pavilion reservations. The Plan covers the area where the proposed action would occur. Therefore, any activities subject to the Plan would need to comply with the requirements of the Plan.

4.3.5 Projected Activity of the Guana Tolomato Matanzas National Estuarine Research Reserve

The work of the Reserve is supported by the dedication of the volunteers that support its mission. Figure 4.6. The chart shows the number of volunteer hours contributed in fiscal years 2011 through 2017 in the form of stacked bar graphs and the number of volunteers as the line graph, based on data provided by NOAA (personal communication, S. Robinson 2018b). The volunteer hour's data include the five types of volunteer hours described in the legend to the chart. The chart shows no clear trend. The number of volunteers shows much more variability than their hour contributions to the Reserve, ranging from approximately 100 to 300+ volunteers. The number of volunteer hours appears more consistent, with only 2012 falling above the range of

10,020 to 11,500 hours. The data support the conclusion that the activity level at the Reserve would remain within a tight range of 11,000 per year and would not be substantially increasing in the near future. The proposed action would not add any incremental impact to the existing cumulative impacts of past, present, and reasonably foreseeable activities.

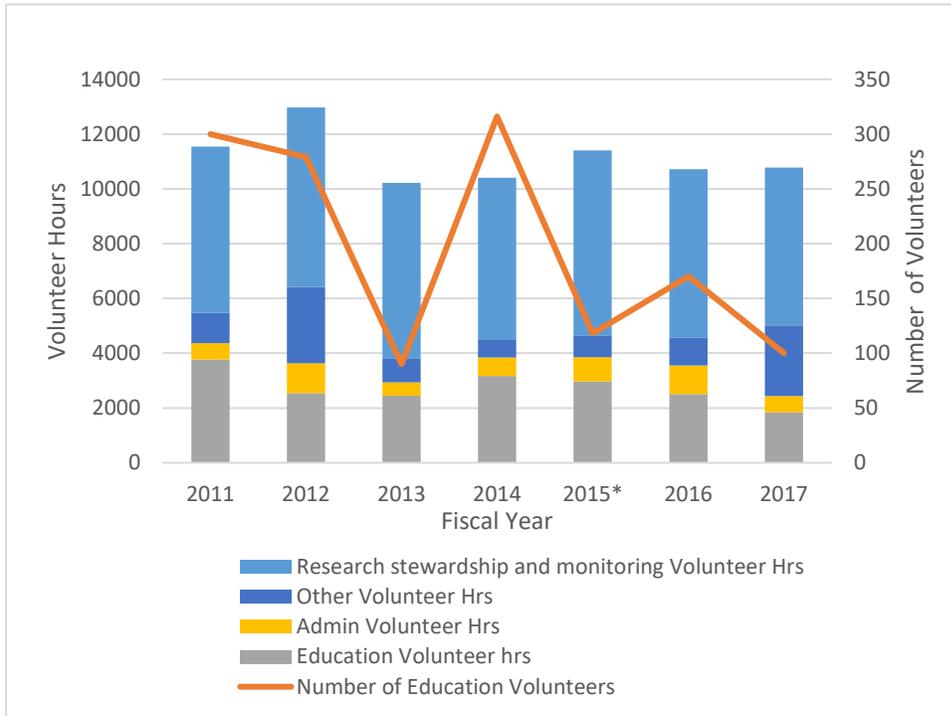


Figure 4.6: Number of Volunteers and Volunteer Hours at GTMNERR, 2011-2017

4.3.6 Conclusion

After a thorough evaluation of the Preferred Alternative and Alternative 1 (No Action Alternative), as presented in this EA, OCM concludes that the Preferred Alternative would not have significant environmental effects on the environment. The preferred alternative would result in adding the proposed parcels to the boundary, adding 3,346.44 acres to the GTMNERR for a total of 73,413.53 acres. The additional land added into the existing boundaries would further the GTMNERR mission and goals. If no action were taken, there would be no change to the current boundary for GTMNERR. The boundary would remain the same as approved in the GTMNERR February 1999 EIS and the GTMNERR Management Plan dated May 2009-April 2014.

Chapter 5 COMPLIANCE WITH OTHER LAWS

This section will be completed in final EA.

Chapter 6 REFERENCES

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