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# Final Endangered Species Act Section 4(b)(2) Report

## Impacts Analysis for Critical Habitat Designation for the Endangered U.S. Distinct Population Segment of Smalltooth Sawfish (*Pristis pectinata*)

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Photo Source: Mote Marine Laboratory

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# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>V</b>
<b>ACRONYMS .....</b>	<b>VI</b>
<b>1 INTRODUCTION.....</b>	<b>1</b>
1.1 Purpose and Structure of Report.....	1
1.2 Summary of Preliminary Endangered Species Act Section 3 Determinations .....	1
1.3 Section 4(b)(2) Requirements.....	3
1.3.1 The Statutory Language and Consideration of Potential Impacts of Designation .....	3
1.3.2 Key Legal Interpretations .....	4
1.4 Other Laws, Executive Orders, and Policies Applicable to Economic Impact Analysis .....	5
1.5 Description of the Mangrove and Shallow Euryhaline Habitats .....	6
1.5.1 Mangrove Ecosystems .....	6
1.5.2 Shallow Euryhaline Habitats.....	8
<b>2 RELEVANT BASELINE INFORMATION .....</b>	<b>10</b>
2.1 Economic Baseline .....	10
2.1.1 Unit 1: Charlotte Harbor Estuary Unit.....	10
2.1.2 Unit 2: Ten Thousand Islands/Everglades Unit .....	14
2.2 Existing Laws and Regulations that May Protect the Critical Habitat Features.....	20
2.2.1 Federal Laws.....	21
2.2.2 State and Local Laws.....	24
2.2.3 Protected Areas .....	27
2.3 Baseline Benefits and Values of the Critical Habitat .....	30
<b>3 ECONOMIC IMPACTS .....</b>	<b>31</b>
3.1 Economic Impact Analysis.....	31
3.2 Section 7 Impacts .....	33
3.2.1 Overview of Section 7 Process .....	33
3.2.2 Activities That May Trigger Consultations .....	34
3.2.3 Review of Future Management and Development Plans.....	37
3.2.4 Projected Type and Number of Future Consultations.....	38
3.3 Potential Project Modifications .....	38
3.4 Estimated Section 7 Costs .....	43
3.4.1 Administrative Costs.....	44
3.4.2 Project Modification Costs .....	45
<b>4 NATIONAL SECURITY IMPACTS .....</b>	<b>45</b>
<b>5 OTHER RELEVANT IMPACTS .....</b>	<b>46</b>
5.1 Education, Awareness, and Other General Benefits of the Protected Habitat That May Result from the Designation.....	46
5.2 Conservation Benefits.....	47
5.2.1 Benefits of the Designation to the Smalltooth Sawfish .....	47
5.2.2 Benefits of Preventing Loss of Mangroves and Shallow Euryhaline Habitats .....	47
5.3 Impact on Natural Resource Agencies with Existing Management Plans.....	52
<b>6 SYNTHESIS: IMPACTS OF INCLUDING THE IDENTIFIED AREAS IN THE CRITICAL HABITAT DESIGNATION FOR SMALLTOOTH SAWFISH .....</b>	<b>54</b>
6.1 Impacts in Unit 1: Charlotte Harbor Estuary Unit.....	55
6.1.1 Economic Impacts.....	55
6.1.2 National Security Impacts.....	55

6.1.3 Other Relevant Impacts .....	56
6.2 Impacts in Unit 2: Ten Thousand Islands/Everglades Unit .....	56
6.2.1 Economic Impacts.....	56
6.2.2 National Security Impacts.....	57
6.2.3 Other Relevant Impacts .....	57
<b>7 REFERENCES.....</b>	<b>58</b>

**APPENDICES**

Appendix A	Boundaries of the Areas Final for Critical Habitat Designation
Appendix B	Final Regulatory Flexibility Analysis for the Final Designation of Critical Habitat for Smalltooth Sawfish

## LIST OF FIGURES

Figure 1: Location Map of Charlotte County.....	10
Figure 2: Location Map of Lee County .....	12
Figure 3: Location Map of Collier County .....	14
Figure 4: Location Map of Monroe County.....	16
Figure 5: Location Map of Miami-Dade County .....	19
Figure 6: Protected Areas Included in the Critical Habitat Designation.....	28
Figure 7: Recreational Trips in Florida.....	52

## LIST OF TABLES

Table 1: Loss of Mangrove Coverage in Critical Habitat Counties (1987–2000) .....	7
Table 2: Employment Profile by Industry Sector in Charlotte County (2005) .....	11
Table 3: Commercial Landings of Mangrove-Dependent Species, Charlotte County (2005) .....	12
Table 4: Employment by Industry Subsector in Lee County (2005) .....	13
Table 5: Commercial Landings of Mangrove-Dependent Species, Lee County (2005) .....	14
Table 6: Employment Profile by Industry Sector in Collier County (2005) .....	15
Table 7: Commercial Landings of Florida Mangrove-Dependent Species, Collier County (2005) .....	16
Table 8: Employment Profile by Industry Sector in Monroe County (2005) .....	17
Table 9: Commercial Landings of Mangrove-Dependent Species, Monroe County (2005) .....	18
Table 10: Employment Profile by Industry Sector in Miami-Dade County (2005) .....	19
Table 11: Commercial Landings of Mangrove-Dependent Species, Miami-Dade County (2005) .....	20
Table 12: Examples of Mangrove Ecosystem Services, Functional Scale, Benefits, and Valuation Methodologies .....	30
Table 13: Projected Future Actions Requiring Consultation in Unit 1 – Charlotte Harbor Estuary .....	39
Table 14: Projected Future Actions Requiring Consultation in Unit 2 – Ten Thousand Islands/Everglades .....	40
Table 15: Potential Project Modifications for each Category of Activity .....	41
Table 16: Estimated Administrative Costs of Section 7 Consultation (Per Effort) .....	44
Table 17: Potential Project Modification Costs .....	45
Table 18: Florida Mangrove Amphibian and Reptile Species .....	48
Table 19: Florida Mangrove Mammal Species .....	48
Table 20: Florida Mangrove Bird Species .....	49
Table 21: Florida Mangroves Fish Species .....	50
Table 22: Major Resource Management Areas that Overlap with the Final Critical Habitat Designation for Smalltooth Sawfish .....	53

## EXECUTIVE SUMMARY

This report identifies and analyzes the impacts that may result from the critical habitat designation for the U.S. distinct population segment (DPS) of smalltooth sawfish (*Pristis pectinata*). Section 4(b)(2) of the Endangered Species Act (ESA) requires that the Secretary of the Department of the Interior (DOI) or the Department of Commerce designate critical habitat for listed species based on the best scientific data available, after taking into consideration the economic, national security, and other relevant impacts of specifying any particular area as critical habitat. The National Marine Fisheries Service (NMFS) has determined that the physical and biological features essential to the conservation of the smalltooth sawfish found within the specific areas for designation (which constitute nursery areas for sawfish) consist of red mangroves and shallow euryhaline habitats characterized by water depths between the mean high water (MHW) line and 3 feet (0.9 meter) measured at mean lower low water (MLLW). These features provide nursery area functions to sawfish, such as predator protection and abundant food resources, which will allow juvenile sawfish to recruit into the adult population. The two areas containing the essential features are comprised of a total of 840,472 acres (340,127 hectares) on the southwest coast of Florida. The first area is the Charlotte Harbor Estuary Unit and the second area is the Ten Thousand Islands/Everglades (TTI/E) Unit.

Economic impacts result through implementation of Section 7 of the ESA, which requires Federal agencies to ensure that any action they fund, authorize, or carry out will not result in the destruction or adverse modification of critical habitat. The two final critical habitat units are both projected to have limited total future Section 7 impacts, but the units will have different types of impacts. In the Charlotte Harbor Estuary Unit, the majority of the 77 projected future Section 7 consultations associated with the final critical habitat for the smalltooth sawfish are likely to address activities permitted by the U.S. Army Corps of Engineers (USACE), for projects such as private dock, pier, and boat ramp construction in wetlands and navigable waterways, including dredging and disposal. The TTI/E Unit is projected to have only eight consultations over the first 10-year period of implementing the designation, for which the USACE is expected to be the primary action agency. Although this unit largely overlaps the Everglades National Park, due to limitations on habitat altering activities in the park, one consultation with DOI over the next 10 years is projected as a result of this designation. NMFS predicts increases in future administrative costs of consultation for each unit associated with the final designation. In addition, the types of modifications that might be required for future categories of activities to avoid destroying or adversely modifying critical habitat are identified. While costs for the various types of modifications are estimated where possible, specific information on the location and size of future consultations requiring modifications for the critical habitat features is not available.

NMFS contacted the Department of Defense (DOD) concerning potential national security impacts of the final designation. Responses indicate that based on the location of the critical habitat, consultations with respect to activities on DOD facilities or training are unlikely as a result of the final critical habitat designation. Therefore, no national security impacts are anticipated.

Three broad categories of other relevant impacts were considered: educational and awareness benefits, conservation benefits, and impacts on natural resources agencies. The designation may expand the awareness raised by the listing of the smalltooth sawfish, therefore encouraging people to alter their activities to protect the smalltooth sawfish and increasing the attractiveness of conducting recreational activities within the boundaries of the critical habitat. Implementing project modifications would provide conservation benefits by avoiding destruction or adverse modification of the critical habitat features, which would reduce the loss of the ecosystem and economic benefits that the mangrove and shallow water habitats provide to the sawfish as well as to society. Minimal impacts on Federal agencies responsible for managing designated natural resource protection areas covered by the final designation are projected to result from the final designation; as stated above, only one consultation is projected for park management activities in the Everglades National Park over the next 10 years.

# ACRONYMS

CERP	Comprehensive Everglades Restoration Project
CFR	Code of Federal Regulations
COLREGS	1972 International Regulations for Preventing Collisions at Sea
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DOD	Department of Defense
DOI	Department of the Interior
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERP	Environmental Resource Permit
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute
F.A.C.	Florida Administrative Code
FAO	Food and Agriculture Organization of the United Nations
FDEP	Florida Department of Environmental Protection
FDNR	Florida Department of Natural Resources (now FDEP)
FHA	Federal Highway Administration
FR	Federal Register
HDD	Horizontal Directional Drilling
ICW	Intercoastal Waterway
IEc	Industrial Economics, Incorporated
INRMP	Integrated Natural Resources Management Plan
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAICS	North American Industry Classification System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service

OCRM	Office of Ocean and Coastal Resource Management
OMB	Office of Management and Budget
PCTS	Public Consultation Tracking System
RFA	Regulatory Flexibility Act
RHA	Rivers and Harbors Act
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
SIC	Standard Industrial Classification
SR	State Road
TMDL	Total Maximum Daily Load
TTI/E	Ten Thousand Islands/Everglades
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USCG	U.S. Coast Guard

# 1 INTRODUCTION

This report contains the National Marine Fisheries Service (NMFS), Southeast Region's analysis of impacts of designating critical habitat under Section 4 of the Endangered Species Act (ESA) for the U.S. distinct population segment (DPS) of smalltooth sawfish (*Pristis pectinata*), which was listed as endangered under the ESA on April 1, 2003 (Volume 68 of the Federal Register 15674 [68 FR 15674]). It describes the applicable laws, court rulings, Executive Orders (EOs), and policies, as well as methods used and processes followed for the recommended designation.

## 1.1 Purpose and Structure of Report

This report documents NMFS' compliance with Section 4(b)(2) of the ESA regarding the impacts of designating critical habitat for the U.S. DPS of smalltooth sawfish. Specifically, Section 4(b)(2) requires consideration of the economic impact, impact on national security, and any other relevant impact, of specifying a particular area as critical habitat. Section 4(b)(2) also provides for discretion in excluding particular areas from a designation, but only if the benefits of excluding that area outweigh the benefits of including them in the designation, and exclusion would not result in the extinction of the species.

The remainder of the report is structured as follows. *Section 1.2* describes the preliminary determination of environmental features and specific areas for the smalltooth sawfish that meet the definition of critical habitat in Section 3 of the ESA, and which form the basis for identifying impacts that may result from the designation. *Sections 1.3* and *1.4* summarize Section 4(b)(2)'s requirements, as informed by previous designations and key court rulings, and the requirements of other laws, EOs, and policies that are applicable to evaluating the impacts of Federal regulatory actions. *Section 1.5* describes the mangrove, and shallow euryhaline habitats that would be included in the critical habitat designation. *Section 2* describes the regulatory and socioeconomic baselines applicable to the impact analysis prepared in support of this designation. *Sections 3, 4,* and *5* consider the economic, national security, and other relevant impacts of the final critical habitat designation. *Section 6* synthesizes the impacts resulting from the final critical habitat designation.

## 1.2 Summary of Preliminary Endangered Species Act Section 3 Determinations

Section 3(5)(A) of the ESA defines critical habitat as:

*(i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of Section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species. (Title 16 U.S. Code [U.S.C.] §1532(5)(A))*

The application of this definition for smalltooth sawfish is described in detail in the final rule to designate critical habitat for the species, which is incorporated by reference and summarized herein.

Smalltooth sawfish historically ranged from Texas to New York in the United States. The best available scientific information identifies the geographical area occupied by the smalltooth sawfish, at the time of listing (68 FR 15674, April 1, 2003), as peninsular Florida. The "geographical area occupied" in the definition of critical habitat is interpreted as the range of the species at the time of listing. The range was delineated from the data provided from encounter databases (Mote Marine Laboratory, 2004; Poulakis and Seitz, 2004) and existing literature.

Within the species' occupied range, critical habitat is defined as specific areas containing physical and biological features essential to the species' conservation, and which may require special management

considerations or protection. Conservation is defined in the ESA as meaning “to use, and the use of, all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary” (16 U.S.C. §1532(3)). Features essential to a species’ conservation are those features without which the process of conservation would fail, and the species would not achieve recovery for purposes of the ESA. Although features forming the basis of a critical habitat designation must be essential to the species’ conservation, the features do not have to be the sole factor required to bring about recovery.

Based upon the best scientific data available, a key habitat-based conservation objective for this species is facilitating juvenile recruitment into the adult population by protecting nursery areas. Two specific areas were identified from available information on the density, site fidelity, and recurrent use of areas by juvenile sawfish that indicate the location of nursery areas for the species. NMFS identified two physical and biological features within these areas that are essential to the conservation of the species because they provide nursery area functions (73 FR 225, November 20, 2008):

1. red mangroves
2. shallow euryhaline habitats characterized by water depths between the mean high water (MHW) line and 3 feet (0.9 meter) measured at mean lower low water (MLLW)

For the purposes of the final rule, euryhaline is defined as wide ranging salinities. Euryhalinity is associated with the regime of freshwater fluctuation of salinity in tidally influenced areas. As described in the FR notice proposing to designate critical habitat for the sawfish, no other specific areas or environmental features were identified as appropriate or necessary to define critical habitat for the smalltooth sawfish.

Unit 1 of the final critical habitat is located in the vicinity of Charlotte Harbor Estuary and Unit 2 is located in the vicinity of Ten Thousand Islands/Everglades (TTI/E). These areas are located within Charlotte, Lee, Collier, Monroe, and Miami-Dade Counties, FL. Refer to Appendix A for details on the boundaries of the final areas.

The essential physical and biological features of red mangroves and shallow euryhaline habitats may require special management considerations or protection. Along the southeastern United States, including within the final critical habitat, these features are experiencing significant impacts from human activities, such as agricultural and urban development, commercial development, dredge and fill activities, boating, and freshwater runoff. The impacts from these activities, combined with those from natural factors (i.e., major storm events), significantly affect the features essential for the conservation of the sawfish, and could impair their ability to provide nursery area services to sawfish.

No areas outside the geographical area occupied by the species at the time of listing are included in the designation. At the present time, no areas outside of the occupied range have been identified as being essential to the conservation of the smalltooth sawfish. Identifying areas outside this range would require speculation about possible expansion of the species beyond their historic range. Moreover, beyond juvenile use of nursery areas, NMFS has not identified any habitats, areas, or environmental features that are used by the sawfish for other biological functions or behaviors. Thus, no areas outside the geographical area occupied by the species have been identified as essential for its conservation (Title 50 Code of Federal Regulations [CFR] §424.12(e)).

Finally, Section 4(a)(3)(B) prohibits designating as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense (DOD), or designated for its use, that are subject to an integrated natural resources management plan (INRMP), even if it is determined that such plans provide a benefit to the smalltooth sawfish (16 U.S.C. §1533(a)(3)(B)). At the time of the final rule, no areas within the designated areas are covered by relevant INRMPs.

### 1.3 Section 4(b)(2) Requirements

This section describes the statutory requirements of determining the impacts of designating areas as critical habitat. The interpretation of the statute is based on previous designations and key court opinions discussed in the sections that follow.

#### 1.3.1 The Statutory Language and Consideration of Potential Impacts of Designation

Section 4(b)(2) of the ESA states:

*The Secretary shall designate critical habitat, and make revisions thereto, under subsection (a)(3) of this section on the basis of the best scientific data available and after taking into consideration the economic impact, impact on national security, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned.* (16 U.S.C. §1533(b)(2))

Impacts may result from a critical habitat designation primarily through Section 7 of the ESA (16 U.S.C. 1536). Section 7(a)(2) requires each Federal agency to consult with NMFS (or the U.S. Fish and Wildlife Service [USFWS], as applicable) to ensure that any action they authorized, funded, or carried out by such agency will not likely destroy or adversely modify the designated critical habitat of listed species. Federal agencies are required to enter into consultation whenever a proposed action “may affect” listed species or designated critical habitat. If a proposed Federal action will likely destroy or adversely modify critical habitat, NMFS may recommend that the Federal agency or the project permittee or grantee implement a reasonable and prudent alternative (RPA) to the proposed action that would avoid destruction or adverse modification of critical habitat. Thus, impacts that may result from Section 7 consultations include the administrative costs of performing the consultation, costs of modifications to the proposed action in order to implement an RPA, and secondary costs to local or regional economies that result from the project modification. In addition, because critical habitat is by definition “essential to the conservation” of the species, conservation benefits to the listed species would be expected to result when the consultation process avoids destruction or adverse modification of its critical habitat, or avoids lesser adverse effects to critical habitat that may not rise to the level of adverse modification. Adverse impacts to other components of the ecosystem may similarly be avoided through consultation and implementation of RPAs. Designation and protection of critical habitat could result in project modifications that avoid adverse impacts to critical habitat and other components of the ecosystem may result in continued provision of benefits to user groups and economic sectors that utilize these habitats or ecosystem components.

Commenters on previous critical habitat designations have suggested that secondary costs to regional economies can also result from project modifications prescribed through Section 7 consultations. For example, some have been concerned that proposing critical habitat in areas of residential development would lead to reduced revenues and employment in construction-related firms, potential lost tax revenue associated with decreased residential development, and even impairment of regional growth (Elliott D. Pollack and Company, 1999). In other designations, commenters have expressed concerns that critical habitat designation may require alteration in shipping channel dredging projects or commercial fishing activities to such an extent that it would result in regional economic impacts (Industrial Economics, Incorporated [IEC], 2003). The project modifications for the categories of activities projected to require Section 7 consultations due to this final critical habitat designation are not expected to result in impacts at the scale of regional economies. The essential features are located along the shoreline and the designated areas are not located in close proximity to major shipping channels. No commercial fishing activities that

may require modification to avoid destroying or adversely modifying the essential features were identified. Even project modifications recommended for large U.S. Army Corps of Engineers (USACE) permitted projects, like cable or pipeline installation, are not expected to result in secondary costs to regional economies. The potential project modifications for predicted future consultations may require project relocation, horizontal directional drilling (HDD), restrictions on road/utility corridors, use of alternative shoreline stabilization methods, limitations on dock widths and size, limitations/restrictions on modifying freshwater flow, and/or sediment and turbidity control measures, and/or conditions monitoring. These requirements are not expected to have large-scale economic impacts. Thus, secondary costs to regional economies are not likely to result from the final designation, and these impacts are not discussed further in this report.

Aside from the protections provided through Section 7, the ESA imposes no requirements or limitations on any entities or individuals as a result of critical habitat designation. Benefits to the smalltooth sawfish and its critical habitat may nonetheless result from a designation if State or local governments voluntarily enact protective legislation or regulations to complement the ESA protections. Similarly, a designation may raise public awareness and sensitivity to the status of listed species and the importance of designated critical habitat areas for conservation. As a result, individuals or other entities may voluntarily modify their activities to avoid harm to the species or habitat, contribute to conservation efforts, or seek to view the species in the wild. These benefits are further explored in *Section 5.1* of this report.

### 1.3.2 Key Legal Interpretations

The ESA does not specify methods for identifying and considering the impacts of critical habitat designation, and previous designations have used a variety of approaches based on the relevant circumstances of the species and habitat involved. As described below, the legislative history of the ESA informs these analyses, and several important court opinions have evaluated the legal sufficiency of these analyses, and clarified a number of important aspects of these statutory provisions. Section 4(b)(2) consists of two steps: an initial mandatory requirement that the agency consider certain impacts of critical habitat designation, and a discretionary step wherein the agency, informed by those considerations, may propose excluding particular areas from the designation. The ESA's legislative history explains the broad latitude afforded to NMFS in its consideration of impacts:

*Economics and any other relevant impact shall be considered by the Secretary in setting the limits of critical habitat for such a species. The Secretary is not required to give economics or any other "relevant impact" predominant consideration in his specification of critical habitat...The consideration and weight given to any particular impact is completely within the Secretary's discretion.* (H.R. Rep. No. 95-1625, at 16-17 (1978), 1978 U.S.C.C.A.N. 9453, 9466-67)<sup>1</sup>

NMFS may then exclude particular areas that otherwise meet the definition of critical habitat from a designation, on a determination that the benefits of exclusion outweigh the benefits of including the area(s), and exclusion will not result in the species' extinction. This step is entirely discretionary, and does not require exclusion in any circumstances.

One court recently held that an agency's decision not to exercise its discretion to exclude areas is not subject to judicial review (*Home Builders Association of No. Calif. et al., v. U.S. Fish and Wildlife Service*, 2006 U.S. Dist. LEXIS 80255 at 45-46 (E.D. Cal., Nov. 1, 2006)). The court based this conclusion on the broad latitude provided to the agency in consideration of impacts described above, the discretionary nature of the exclusion provision, and the fact that the statute provides substantive standards only for the review of actual exclusions, i.e., the Secretary must determine that the benefits of exclusion

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<sup>1</sup> The provisions requiring consideration of impacts were originally discussed as applicable only to critical habitat designations for invertebrate species. However, Section 4(b)(2), as enacted, is not limited to invertebrates, and NMFS and FWS have applied the provision to designations for vertebrate and invertebrate species.

outweigh the benefits of inclusion for particular areas. In contrast, the statute includes no substantive standards for a court to review a decision not to exclude areas from a designation.

Regarding consideration of economic impacts in the *Home Builders* case, the court noted that the term “impacts” is not specific and can be both positive and negative (*Id.* at 54, citing *Butte Envtl. Council v. Norton*, slip op., 04-0096, at 12 (N.D. Cal. Oct. 28, 2004)); this logic applies equally to national security impacts and other relevant impacts.

#### **1.4 Other Laws, Executive Orders, and Policies Applicable to Economic Impact Analysis**

The consideration of impacts from a critical habitat designation is subject to other laws, EOs, and policies beyond the ESA. For example, the Regulatory Flexibility Act (RFA, 5 U.S.C. 601 *et seq.*) establishes a regulatory philosophy that agencies shall endeavor, consistent with the objectives of a proposed rule and applicable statutes, to fit regulatory requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. The RFA does not contain decision criteria per se; rather, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of a proposed action to ensure that the agency considers alternatives that minimize expected significant adverse impacts of the rule on a substantial number of small entities, while meeting the goals and objectives of the proposed action. A Final Regulatory Flexibility Analysis (FRFA) was conducted for the final critical habitat designation (Appendix B).

EO 12866, Regulatory Planning and Review, provides guidance to Federal agencies on the development and analysis of regulatory actions. The overarching regulatory philosophy established by EO 12866 is:

*Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages, distributive impacts, and equity), unless a statute requires another regulatory approach.*

The EO includes a list of twelve principles for regulatory program planning and development of individual proposed rules that agencies should adhere to, to the extent permitted by law and where applicable. These principles include identification of market failures or other problems intended to be addressed by the regulation, and whether existing regulations or laws have created or contributed to the problem. If applicable, agencies are directed to identify non-regulatory alternatives to the problem. Where regulations are necessary or required by law, agencies must design regulations in the most cost-effective manner available to achieve the regulatory objective and impose the least burden on society. All costs and benefits of proposed regulations must be assessed. If feasible, agencies should specify performance objectives rather than behavior or compliance requirements. Agencies are directed to seek the views of appropriate State, local, and Tribal officials if such would be significantly or uniquely affected by a proposed rule. Regulations must not be inconsistent, incompatible, or duplicative with other Federal regulations, and must be simply drafted and easy to understand.

Office of Management and Budget (OMB) guidance to Federal agencies on implementing EO 12866 states that good regulatory analyses include three basic elements: (1) a statement of the need for the

action, (2) an examination of alternative approaches, and (3) an evaluation of benefits and costs of the final action and the main alternatives (OMB Circular A-4, Sept. 17, 2003). Further, OMB Circular A-4 states that proper evaluation of the benefits and costs of regulations requires:

- Explaining how the actions required by the rule are linked to the expected benefits
- Identifying an appropriate baseline
- Identifying the expected undesirable side effects and ancillary benefits of the final rule

These regulatory principles were integrated into the development of the final rule to the extent consistent with the mandatory duty to designate critical habitat, as defined in the ESA.

## **1.5 Description of the Mangrove and Shallow Euryhaline Habitats**

While recovery strategies outlined in the species recovery plan (NMFS 2009) include minimizing human interaction with the species and the injury and mortality associated with human interaction, a second objective that is addressed by this critical habitat designation is the protection of smalltooth sawfish juvenile nursery area habitats (NMFS, 2006). Red mangroves and shallow euryhaline habitats were identified as the essential features in the two designated areas, which function as nursery areas for juvenile smalltooth sawfish. The habitat structure provided by the mangrove root system and the shallow water depths offers refuge from predation and provides food for early life stages. This section describes the mangrove ecosystem in southern Florida, including estimated mangrove coverage remaining and the type and characteristics of mangroves and mangrove ecosystems, as well as shallow euryhaline habitats.

### **1.5.1 Mangrove Ecosystems**

#### **Estimates of Mangrove Cover**

Anecdotal evidence suggests that mangrove loss in certain locations around Florida has been significant over the last 50 years, especially in estuarine systems, such as Tampa and Sarasota Bays and the Marco Island area in Lee County. However, few specific studies have tallied the losses of mangrove wetlands in Florida over time. Ueland (2005) notes that while there have been a number of previous estimates of mangrove cover in Florida, none of these estimates was specifically developed to track long term changes in mangrove coverage and there were differences in the methodology. Two estimates conducted in 1982, one by the Florida Marine Research Institute and the other by the Florida Fish and Wildlife Conservation Commission, differed in their estimate of Florida's mangrove coverage by 199,385 acres (80,688 hectares) (Ueland, 2005).

In 2007, the Food and Agriculture Organization of the United Nations (FAO) published a paper that documents mangrove loss worldwide during the period from 1980 to 2005 (FAO, 2007). The FAO states that the most recent reliable estimate of mangrove coverage for the United States, which is based on a survey of mangrove experts, is 488,398 acres (197,648 hectares). Of the mangroves that occur in the United State, approximately 96 percent occur in Florida (Mendelssohn and McKee, 2000) and of the mangroves that occur in Florida, approximately 90 percent occur in south Florida within Collier, Lee, Miami-Dade, and Monroe counties (Odum and McIvor, 1990).

The FAO reports that, between 1980 and 1990, the United States (excluding U.S. Territories in the Caribbean) lost 86,486 acres (35,000 hectares) of mangroves, and between 1990 and 2005 lost another 111,000 acres (44,920 hectares) of mangroves, for a total loss of approximately 197,000 acres (79,723 hectares) over a 25-year period (2007). Given that Florida has 96 percent of the total U.S. mangrove acreage, Florida may have lost as many as 189,000 acres (76,486 hectares) of mangroves over this period depending on the actual loss of mangroves in other States.

Ueland (2005) employed Principal Components Analysis and band ratios coupled with a Bayesian classification scheme to study aerial photography to isolate and map mangrove dominated ecosystems in 14 south Florida counties. Using this methodology, Ueland compared coverage of mangroves in south

Florida from 1987 to 2000. He estimated that 563,388 acres (227,995 hectares) of mangroves existed in the 14-county area in 1987 and by 2000 there were 512,842 acres (207,540 hectares) remaining, which is a 9 percent (50,546 acre or 20,455 hectares) decrease in mangrove coverage for the 13-year period.

Of the five counties that contain final smalltooth sawfish critical habitat, Monroe County lost the most mangroves in the 13-year timeframe, approximately 37,031 acres (14,986 hectares or 12.2 percent), while Charlotte County gained 1,229 acres (497 hectares or 5.9 percent) of mangroves (Table 1) (Ueland, 2005). Overall, the five-county area lost 40,452 acres (16,370 hectares or 7.8 percent) of mangroves over a 13-year period.

**Table 1: Loss of Mangrove Coverage in Critical Habitat Counties (1987–2000)**

COUNTY	1987 ESTIMATE (acres)*	2000 ESTIMATE (acres)*	% CHANGE
Charlotte	20,810	22,039	5.9
Lee	44,537	44,235	-0.7
Collier	84,973	82,251	-3.2
Miami-Dade	68,019	66,393	-2.4
Monroe	303,549	266,518	-12.2
<b>Totals</b>	521,888	481,436	-7.8

\*Source: Ueland, 2005

The greatest area of mangrove loss, in Monroe County, is in an area that falls within the borders of the Everglades National Park. Because this area is uninhabited, the cause of the large loss is not specifically known; however, some have hypothesized that drought has caused hypersaline conditions in this area that have led to the death of mangroves (Ueland, 2005). Mangrove loss in counties that are more urbanized than Monroe can generally be attributable to urbanization of coastal areas.

### **Mangrove Ecosystems**

Mangroves can grow in a wide range of soil types, including heavy consolidated clays, unconsolidated silts, calcareous and mineral sands, coral rubble, and organic peats. Mangrove trees are resilient to high salinity levels, with some being found in areas with salinities close to 35 parts per thousand. The ideal temperature for mangroves is 20 degrees Celsius (°C) where fluctuations do not exceed 10°C. Mangroves cannot tolerate temperatures below freezing; the ideal average minimal temperature is no lower than 15°C.

Florida has four mangrove species: red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*), which is classified as a mangrove or mangrove associate. The red mangrove's prop root system offers support and stability by supplying air to underlying roots, and traps mud and silt to increase the deposition of sediment around them. Their tolerance for high salinities allows this species to establish closer to open waters. Red mangrove bark is characterized by a high concentration of tannins. In Florida, red mangroves grow to a height of about 20 feet (6.1 meters) (Institute of Food and Agricultural Sciences, 2007).

The black and white mangroves are restricted to high intertidal zones generally protected from high wave energy. Both species have numerous pencil-like breathing tubes, called pneumatophores, which grow vertically from the mud and provide air to the underground and underwater roots. Black mangroves grow closer to the shore than white mangroves, where they are reached only by high tides. White mangroves generally grow more landward and are located in the southern regions of the State (Law and Army, 2007).

The distribution of the mangrove species along the coastal areas depends on the hydrology and topography. There are three major types of mangrove forests (Cintron et al., 1985):

1. **Fringe mangroves:** Fringe mangroves are characterized by their growth in protected areas and along canals, rivers, and lagoons. Red mangroves usually dominate. The shoreline tides generally cause an accumulation of organic debris in the dense prop root systems (Grasso, 1998).
2. **Riverine mangroves:** Riverine mangroves are often found several miles inland along coastal rivers and creeks. While the water table may be just below the surface, riverine mangroves can tolerate periods of dryness. They are subject to the effects of freshwater runoff from adjacent land areas, as well as water, sediments, and nutrients from the adjacent river (Grasso, 1998).
3. **Basin Mangroves:** Basin mangroves are found in areas isolated from tides, including inland depressions, basins, and drainage depressions. The water in these basins is often stagnant and may remain flooded for extended periods, which contributes to high soil salinity. Black mangroves often dominate (Grasso, 1998).

Mangroves do not need the presence of salt water to grow; however, their ability to tolerate widely varying levels of salinity allows them to establish several miles inland on tidally influenced freshwater rivers and in areas where high salinity levels limits the growth of many types of salt intolerant plants. In tidally influenced riverine systems, mangroves are able to out-compete freshwater vascular plants that do not have tolerance for salinity fluctuations. In basin or fringe conditions, mangroves are able to out-compete other halophytes because of efficient salt exclusion and excretion mechanisms. Given their wide tolerance for salinities, mangroves are an especially important habitat for many euryhaline organisms, like the smalltooth sawfish.

The root systems of Florida mangroves are thought to exclude salt through a reverse osmosis process. Water is drawn into the root through a membrane system by negative pressure in the xylem that is created by transpiration at the leaves (Scholander et al., 1965; Scholander 1968). This process excludes salt at the root membrane and allows mostly fresh water into the mangroves vascular system.

In Florida, red mangroves are limited by soil salinities above 60 to 65 parts per thousand (Cintron et al., 1978). Mangroves can be negatively affected by changes in salinity regimes. In riverine systems, excess discharges of freshwater may allow freshwater vegetation to out-compete mangroves. In basin or fringing mangrove communities, the exclusion of freshwater inputs or the restriction of saltwater flushing may lead to the buildup of lethal soil salinities.

Naturally occurring salt barrens are often found interspersed in mangrove ecosystems. Salt barrens are characterized by little or no vegetation and are fringed by high salt marsh vegetation and mangroves. These areas are generally located above high tide and are irregularly flushed with salt water. A combination of low seasonal rainfall, high temperatures, and high evaporation rates creates high soil salinities that cause mangrove death (Odum and McIvor, 1990). Mangroves growing directly adjacent to these areas tend to be stunted or have a “dwarf” growth form. Dwarf mangroves are also found in areas where tidal flushing has been unnaturally restricted and high evaporation rates have led to high soil salinities.

Mangroves are important sources of detrital nutrients to coastal waters. Detrital productivity varies by mangrove species and environmental factors, such as soil, fauna, the volume of water flow, and the ebb and flow of tidal fluctuations. The exchange of materials within the mangrove-estuarine ecosystem is controlled by tides and runoff. Leaf litter provides an important source of organic matter and nutrients that flow from the mangroves to estuarine waters. Increases in hydrologic energy result in increases in litter productivity, decomposition, and export (Grasso, 1999).

### 1.5.2 Shallow Euryhaline Habitats

In addition to mangroves, shallow euryhaline habitats in Florida have a valuable niche in the overall coastal ecosystem. These areas provide necessary refuge and foraging habitat for juvenile smalltooth sawfish and the seagrass, hardbottom, and soft-bottom communities found in these areas provide

additional necessary ecosystem functions for the smalltooth sawfish and a wide variety of other saltwater organisms.

Inshore and nearshore seagrass beds are some of the most productive marine communities found in the world's oceans. These areas provide a nursery and feeding areas for many commercially important species found in Florida's waters. Macroalgae, epibenthic, and infaunal organisms live within seagrass communities and provide a food source for grazers and predators, such as drums (*Sciaenidae*), sea bass (*Serranidae*), grunts (*Pomadasyidae*), and snappers (*Lutjanidae*) that utilize seagrass communities (Livingston, 1990). In addition, invertebrates such as queen conch (*Strombus gigas*), pink shrimp (*Penaeus duorarum*), and spiny lobster (*Panulirus argus*) inhabit seagrass beds along with small crustaceans that live on epiphytes or in the sediments (Livingston, 1990).

Vermetid reefs are hardbottom structures found in intertidal areas seaward of the Ten Thousand Islands areas in Southwest Florida. These rare structures are constructed by worm-like gastropod mollusks and are generally anchored on old oyster bars. These reefs provide habitat for stone crab (*Menippe mercenaria*) and fish that utilize the reefs during high tides (Jaap and Hallack, 1990).

Soft-bottom habitats are comprised of sand, shell, and mud and are found throughout coastal areas of Florida. They are highly productive communities that are populated by benthic and epibenthic organisms and many types of fish. Benthic organisms that inhabit these areas, such as polychaete worms, amphipods, and insect larvae, are important parts of the food chain that fuel populations of higher organisms that live in the adjoining water column (Livingston, 1990).

Soft-bottom habitats are critical for commercially important invertebrates including shrimp and crabs. Pink shrimp utilize seagrass beds as nurseries but as adults utilize sand, shell, and mud bottoms. Additionally, crabs, such as the stone crab and blue crab (*Callinectes sapidus*) spend part of their life cycles utilizing nearshore soft-bottom habitats (Livingston, 1990).

In general, shallow tidally influenced habitats are important during various life stages for almost all commercially important species that are harvested off the Gulf Coast of Florida. These areas remain highly productive because shallow depths allow sunlight to penetrate to the bottom, which in turn fuels algal, microfloral, and seagrass growth. These are some of the basic building blocks of the estuarine and nearshore food chain. These areas also serve as secondary refuge and resting areas for juvenile fish.

Much of Florida's coastal area can be characterized as euryhaline waters which is ecologically more than a transition zone between marine and freshwater habitats. Euryhaline waters are typically characterized by high biological productivity and high species diversity including the smalltooth sawfish, spiny lobster, and manatee. The inland euryhaline waters on the west coast of Florida are dominated by low energy waves from the Gulf of Mexico and distinctive salinity gradients that are a function of the amount of freshwater run-off present in a particular area. These systems are found in southwest and northwest Florida and often form lagoons behind barrier islands. The southern portion of euryhaline waters is dominated by mangrove habitats that slowly turns into marshlands moving northward up the coastline (Livingston, 1990).

Euryhaline waters provide an essential functional role within water ecosystems. They provide the bridge between the freshwater sections of drainage basins to the ocean which requires balancing complex physical, chemical, and biological interactions. One of the most important characteristics of euryhaline waters is the high level of microbes and other nutrients generated in the habitat, making it ideal nursery grounds (Livingston, 1990).

The salinity gradient affects important species interactions such as predator-prey relations and competition. If the salinity is highly variable (i.e., seasonal effects), then the area will be dominated by opportunistic species that are highly adaptable and accustomed to abrupt changes in their environment. Under such conditions predator-prey relations and competition have less of an effect on community population and distribution typically resulting in low species diversity. As the salinity gradient increases

and becomes more stable, population distributions are more even. Species diversity increases, dominance decreases, with predator-prey relations and competition having a greater effect in community dynamics (Livingston, 1990).

## 2 RELEVANT BASELINE INFORMATION

As discussed in *Section 1.3*, the impacts of final critical habitat designation must be evaluated in terms of the benefits and costs of the action measured against a relevant baseline. The baseline is the best assessment of the way the study area currently looks and will look in the future in the absence of the final designation. For this final critical habitat designation, the following sections characterize: 1) the relevant economic baseline, 2) existing laws and regulations that may protect the final critical habitat features, and 3) baseline benefits and values provided by the essential features that form the basis for the final designation.

### 2.1 Economic Baseline

This subsection summarizes key economic information for the counties in which activities may be affected by the final designation. Units 1 and 2 in the designated critical habitat comprise geographic regions in parts of five counties: Charlotte County, Lee County, Collier County, Monroe County, and Miami-Dade County. Understanding the current types and levels of economic activity in these counties provides context for evaluating the importance of impacts resulting from the final designation. The most current economic data available by county for the specific areas are presented.

#### 2.1.1 Unit 1: Charlotte Harbor Estuary Unit

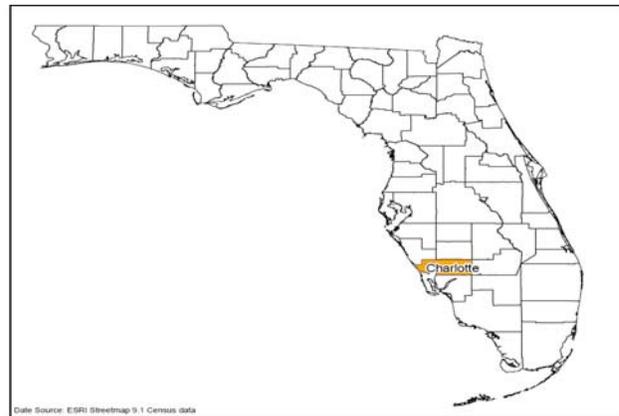
Unit 1 comprises portions of Charlotte and Lee Counties.

##### Charlotte County

Charlotte County is located along the southwestern portion of Florida's Gulf Coast (Figure 1). According to the U.S. Census Bureau, the county has a total area of 859 square miles (2,225 square kilometers). Nearly 81 percent (694 square miles or 1,797 square kilometers) of the total area is land and the remaining 19 percent (166 square miles or 430 square kilometers) is water. Major cities in the County include Punta Gorda, Charlotte Harbor, Englewood, Rotonda, and Solana.

Based on U.S. Census Bureau estimates, the total population of the county increased from 141,267 in July 2000 to 158,438 persons in April 2006; an increase of 16,811 persons (12.1 percent) over the 6-year period. In 2006, the total number of occupied housing units was reported to be 71,026, an increase of 11 percent over 2000 levels. The homeowner vacancy rate in 2000 was reported to be nearly 20 percent within the county.

Median household income in 2005 was reported to be \$39,031, and 10 percent of the county population lived below the poverty level, in comparison to the statewide median household income of \$42,433 and poverty rate of 13 percent.



Source: ESRI Streetmaps 9.1 Census Database

Figure 1: Location Map of Charlotte County

The southwestern seaboard of the Florida coast has historically been home to many popular tourist destinations. Some of these include the Everglades National Park, Cypress National Preserve, and the

“Paradise Coast.” In general, the tourism sector, which has been a popular revenue generating industry sector within the local economy, is supported by activities in other sectors such as retail trade, construction, and real estate.

As presented in Table 2, the retail trade and the health care and social assistance sectors were the two largest employment sectors in the county in 2005. Other major employment sectors in the county include construction and the accommodation and food services sector.

**Table 2: Employment Profile by Industry Sector in Charlotte County (2005)**

NAICS Code <sup>a</sup>	Industry Code Description	Non-Employer Establishments <sup>b</sup>	Non-Employer Receipts (\$1,000) <sup>c</sup>	Employer Establishments <sup>d</sup>	Number of Employees	Annual Payroll (\$1,000) <sup>e</sup>
11	Agriculture, Forestry, Fishing and Hunting	181	7,289	1	0–19	*
21	Mining	D	D	3	20–99	*
22	Utilities	17	637	8	64	2,546
23	Construction	1,633	151,315	709	4,316	149,872
31	Manufacturing	116	13,634	72	652	24,737
42	Wholesale Trade	190	12,876	119	615	22,903
44	Retail Trade	937	61,916	580	8,611	187,792
48	Transportation and Warehousing	430	23,336	73	286	9,081
51	Information	116	2,885	50	646	27,770
52	Finance and Insurance	384	24,314	238	1,456	63,614
53	Real Estate and Rental and Leasing	2,337	141,358	365	1,002	30,698
54	Professional, Scientific, and Tech. Serv.	1,253	51,705	354	1,888	81,838
56	Admin, Support, Waste Mgt, Remediation Services	912	30,892	254	1,621	35,859
61	Educational Services	126	1,521	23	166	3,676
62	Health Care and Social Assistance	582	32,818	455	7,951	289,394
71	Arts, Entertainment and Recreation	402	10,833	46	547	8,726
72	Accommodation and Food Services	140	19,909	225	4,011	49,593
81	Other Services (Except Public Adm.)	1,638	58,645	348	1,796	33,801
99	Unclassified Establishments	*	*	10	20-99	*
<b>TOTAL</b>		<b>22,790</b>	<b>1,291,841</b>	<b>3,938</b>	<b>35,792</b>	<b>1,028,591</b>

\* Zero in 2005 County Business Patterns

<sup>a</sup> The U.S., Canada, and Mexico developed the North American Industry Classification System (NAICS) as the new industry classification system, which replaces the U.S. Standard Industrial Classification (SIC) system to provide comparable statistics across the three countries.

<sup>b</sup> A “non-employer firm” is defined as one that has no paid employees, has annual business receipts of \$1,000 or more (\$1 or more in the construction industries), and is subject to Federal income taxes. Most non-employers are self-employed individuals operating very small unincorporated businesses, which may or may not be the owner’s principal source of income.

<sup>c</sup> “Receipts” (net of taxes) are defined as the revenue for goods produced, distributed, or services provided, including revenue earned from premiums, commissions and fees, rents, interest, dividends, and royalties. Receipts exclude all revenue collected for local, State, and Federal taxes.

<sup>d</sup> “Employer establishments” consist of full- and part-time employees, including salaried officers and executives of corporations, who were on the payroll in the pay period including March 12. Included are employees on sick leave, holidays, and vacations; not included are proprietors and partners of unincorporated businesses.

<sup>e</sup> "Total annual payroll" includes all forms of compensation, such as salaries, wages, commissions, bonuses, vacation allowances, sick-leave pay, and the value of payments in-kind (e.g., free meals and lodgings) paid during the year to all employees.

D Withheld to avoid disclosing data for individual businesses; data are included in broader industry totals.

Source: U.S Census Bureau, 2005 County Business Patterns

Commercial and recreational fishing is a component of the economy in Charlotte County related to the ecosystem services provided by the resources in the designated area. In 2005, commercial fishermen in Charlotte County landed a total of 51,946 pounds of fish that inhabit mangroves during their life cycle (Table 3). The estimated dockside value of the catch was \$24,064.

**Table 3: Commercial Landings of Mangrove-Dependent Species, Charlotte County (2005)**

Group/(Species)	Pounds	Value (\$)
Jacks ( <i>Caranx species</i> )	37,090	21,944
Spotted Seatrout ( <i>Cynoscion nebulosus</i> )	252	450
Atlantic Sheepshead ( <i>Archosargus probatocephalus</i> )	14,242	986
Gray Mangrove Snapper ( <i>Lutjanus griseus</i> )	362	684
<b>Total</b>	<b>51,946</b>	<b>24,064</b>

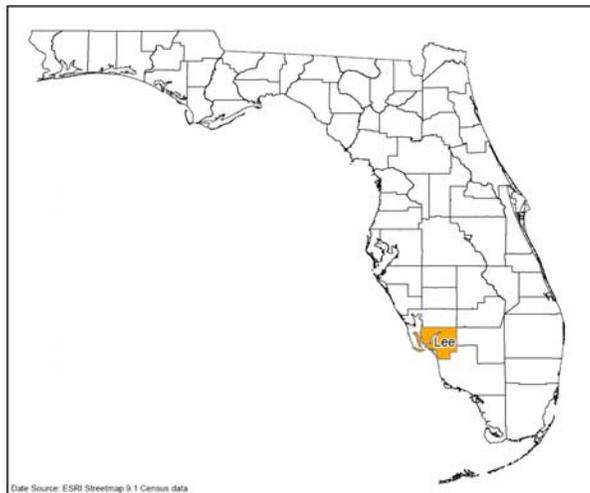
Source: NMFS Southeast Regional Office Logbook Data

### **Lee County**

Lee County is located to the south of Charlotte County along the southwestern portion of Florida's Gulf Coast (Figure 2). Lee County has a total area of 1,212 square miles (3,139 square kilometers) of which 66 percent (804 square miles or 2,082 square kilometers) is land and 34 percent (408 square miles or 1,057 square kilometers) is water (U.S. Census Bureau). Major cities in the county include Cape Coral and Fort Myers.

As reported by the 2000 U.S. Census, the total population in the county was 440,888 persons. The population estimate for 2006 was 571,344; an increase of 29.5 percent over the 6-year period. In 2000, the total number of housing units in the county was reported to be 188,599 units; that number increased to 248,128 units in 2006. Median household income reported in 2005 was \$46,053, and 10 percent of the county population lived below the poverty level, in comparison to the statewide median household income of \$42,433 and poverty rate of 13 percent. The homeowner vacancy rate in the county in 2000 was reported to be 23 percent of the total available housing stock.

As presented in Table 4, the retail trade and construction sectors were the two largest employment sectors in the county in 2005. Other major employment sectors in the county include the accommodation and food services and health care and social assistance sectors.



Source: ESRI Streetmaps 9.1 Census Database

**Figure 2: Location Map of Lee County**

**Table 4: Employment by Industry Subsector in Lee County (2005)**

NAICS Code	Industry Code Description	Non-Employer Establishments	Non-Employer Receipts (\$1,000)	Employer Establishments	Number of Employees	Annual Payroll (\$1,000)
11	Agriculture, Forestry, Fishing and Hunting	543	29,608	19	97	3,274
21	Mining	267	15,343	9	273	12,241
22	Utilities	42	1,833	26	847	53,885
23	Construction	5,925	479,388	2,589	27,697	1,082,658
31	Manufacturing	412	24,637	407	7,190	284,978
42	Wholesale Trade	752	65,428	666	5,915	262,490
44	Retail Trade	3,300	194,052	2,336	34,047	850,441
48	Transportation and Warehousing	2,780	152,236	370	3,447	106,708
51	Information	458	2,885	221	3,985	184,638
52	Finance and Insurance	1,995	137,972	1,019	6,745	344,057
53	Real Estate and Rental and Leasing	9,989	732,581	1,498	6,265	237,077
54	Professional, Scientific, and Tech. Serv.	5,395	272,891	1,710	9,404	435,253
56	Admin, Support, Waste Mgt, Remediation Services	3,746	115,723	1,152	14,845	545,934
61	Educational Services	626	11,252	102	1,459	51,023
62	Health Care and Social Assistance	2,191	93,589	1,282	24,406	939,521
71	Arts, Entertainment and Recreation	1,668	55,298	259	4,790	98,941
72	Accommodation and Food Services	610	115,174	1,004	21,661	313,259
81	Other Services (Except Public Adm.)	7,068	263,405	1,403	8,451	196,744
99	Unclassified Establishments	*	*	18	29	620
<b>TOTAL</b>		<b>47,767</b>	<b>2,780,974</b>	<b>16,090</b>	<b>181,553</b>	<b>6,003,742</b>

\* Zero in 2005 County Business Patterns

Source: U.S Census Bureau, 2005 County Business Patterns

The composition of the construction industry by subsector indicates that a majority of the employer establishments (68 percent) and non-employer firms (80 percent) are “Specialty Trade Contractors.” “Construction of Buildings” was the second largest construction industry subsector, followed by “Heavy and Civil Engineering Construction” and “Other Heavy and Civil Engineering Construction” (NAICS Code 2379). The “Other Heavy and Civil Engineering Construction” subsector includes marine construction projects such as breakwater, dock, pier, jetty, seawall and harbor construction, and dredging.

Commercial and recreational fishing is a component of the economy in Lee County related to the ecosystem services provided by the resources in the final designated area. In 2005, commercial fishermen in Lee County landed a total of 92 million pounds of fish that inhabit mangroves during their life cycle. The estimated dockside value of the catch was \$83,886 (Table 5). In addition, aquaculture activities (e.g., clam production) are conducted within the coastal areas of the county.

**Table 5: Commercial Landings of Mangrove-Dependent Species, Lee County (2005)**

Group/(Species)	Pounds	Value (\$)
Jacks ( <i>Caranx species</i> )	39,269	21,583
Grunts ( <i>Haemulon species</i> )	323	273
Spotted Seatrout ( <i>Cynoscion nebulosus</i> )	12,168	24,249
Atlantic Sheepshead ( <i>Archosargus probatocephala</i> )	33,010	21,771
Gray Mangrove Snapper ( <i>Lutjanus griseus</i> )	7,336	16,010
<b>Total</b>	<b>92,106</b>	<b>83,886</b>

Source: NMFS Southeast Regional Office Logbook Data

## 2.1.2 Unit 2: Ten Thousand Islands/Everglades Unit

Unit 2 comprises portions of Collier, Monroe, and Miami-Dade Counties.

### Collier County

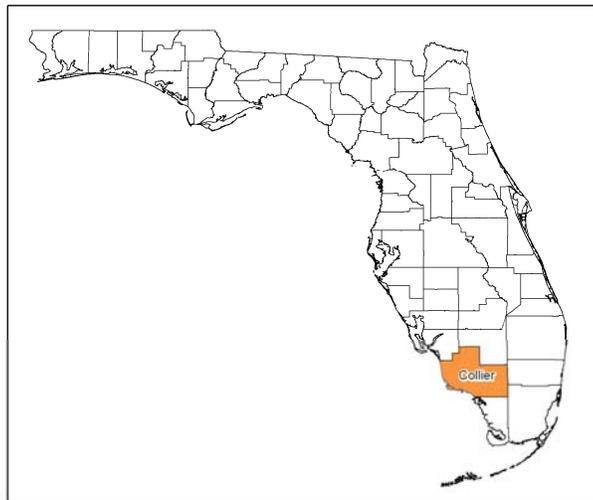
Collier County is located at the southern end of Florida's Gulf Coast (Figure 3). According to the U.S. Census Bureau, the county has a total area of 2,305 square miles (5,970 square kilometers). Nearly 88 percent (2,025 square miles or 5,245 square kilometers) of the area is covered by land and the remaining 12 percent (280 square miles or 725 square kilometers) is water. Major cities in the county include Everglades City, Marco Island, and Naples.

Collier County is the sixth most populous county in the State. Based on U.S. Census Bureau estimates, the total population of the county increased from 251,154 persons in July 2000 to 314,649 persons in April 2006, representing an increase of 25.3

percent over the 6-year period. An increase in population has led to a corresponding increase in the number of housing units within the county. In 2006, the total number of occupied housing units was reported to be 120,963: a 17.5 percent increase over 2000 levels. The homeowner vacancy rate in 2000 was reported to be 4.8 percent.

Median household income in 2005 was reported to be \$52,179, and 9.6 percent of the county population lived below the poverty level, in comparison to the statewide median household income of \$42,433 and poverty rate of 13 percent.

As presented in Table 6, the retail trade and the accommodation and food services sectors were the two largest employment sectors in the county in 2005. Other major employment sectors in the county include the construction and the health care and social assistance sectors.



Source: ESRI Streetmaps 9.1 Census Database

**Figure 3: Location Map of Collier County**

**Table 6: Employment Profile by Industry Sector in Collier County (2005)**

NAICS Code	Industry Code Description	Non-Employer Establishments	Non-Employer Receipts (\$1,000)	Employer Establishments	Number of Employees	Annual Payroll (\$1,000)
11	Agriculture, Forestry, Fishing, and Hunting	629	28,215	15	2,365	47,919
21	Mining	245	16,739	7	20–99	0
22	Utilities	23	1,779	11	100–249	0
23	Construction	3,085	281,655	1,560	16,455	686,260
31	Manufacturing	274	19,640	237	2,732	106,258
42	Wholesale Trade	452	51,267	393	2,998	128,410
44	Retail Trade	1,675	116,580	1,492	20,544	544,697
48	Transportation and Warehousing	1,506	92,456	229	1,662	55,158
51	Information	324	10,406	118	1,515	65,724
52	Finance and Insurance	1,386	156,412	644	4,266	308,332
53	Real Estate and Rental and Leasing	6,536	554,148	1,064	3,376	156,732
54	Professional, Scientific, and Technical Services	4,049	272,424	1,253	5,138	282,038
55	Management of Companies and Enterprises	0	0	26	418	42,148
56	Admin, Support, Waste Management, Remediation Services	2,170	87,122	765	6,536	171,405
61	Educational Services	408	7,178	76	1,651	81,882
62	Health Care and Social Assistance	1,351	71,590	816	13,406	557,880
71	Arts, Entertainment, and Recreation	1,134	38,102	176	5,972	180,783
72	Accommodation and Food Services	344	49,297	677	16,638	279,205
81	Other Services (Except Public Administration)	3,973	152,269	917	5,620	129,945
99	Unclassified Establishments	0	0	28	57	1,115
<b>TOTAL</b>		<b>29,564</b>	<b>2,007,279</b>	<b>10,504</b>	<b>111,524</b>	<b>3,825,911</b>

\* Zero in 2005 County Business Patterns

Source: U.S Census Bureau, 2005 County Business Patterns

The retail trade and accommodation and food services sectors are considered components of the tourism sector. Popularly known as the “Paradise Coast,” Collier County is home to several tourist destinations and includes attractions for all age groups year round. Based on information reported by the County Tourism Department, more than 1.4 million persons visited the county in 2005. The visitors spent over \$713 million in the county, resulting in total economic impacts (direct and indirect) of over \$1.06 billion (Collier County, 2007). Tourist revenues have resulted in an estimated tax savings of \$518 per resident and financial benefits to the county of nearly \$60 million in sales tax revenue (Tourism Development Council, 2007).

Commercial and recreational fishing is a component of the economy in Collier County related to the ecosystem services provided by the resources in the final designated area. In 2005, there were 191 non-employer firms with annual receipts of \$7.5 million in the fishing industry subsector (NAICS 1141), which represent nearly 1 percent of all non-employer firms and 0.4 percent of annual receipts for all non-employer firms in the county. In addition, aquaculture activities (e.g., clam production) are conducted within the coastal areas of the county. As presented in Table 7, in 2005 commercial fishermen in Collier County landed a total of 4,826 pounds of fish that inhabit mangroves during their life cycle. The estimated dockside value of the catch was \$4,154.

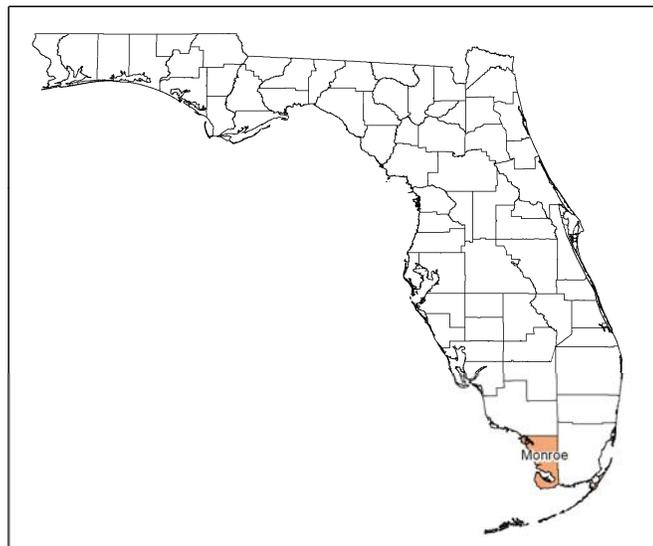
**Table 7: Commercial Landings of Florida Mangrove-Dependent Species, Collier County (2005)**

Group (Species)	Pounds	Value (\$)
Jacks ( <i>Caranx</i> spp.)	3,243	2,031
Grunts ( <i>Haemulon</i> spp.)	-	-
Spotted seatrout ( <i>Cynoscion nebulosus</i> )	-	-
Atlantic sheepshead ( <i>Archosargus probatocephalus</i> )	810	454
Gray mangrove snapper ( <i>Lutjanus griseus</i> )	773	1,669
Schoolmaster snapper ( <i>Lutjanus apodus</i> )	-	-
<b>Total</b>	<b>4,826</b>	<b>4,154</b>

Source: NMFS Southeast Regional Office Logbook Data

### Monroe County

Monroe County is the southernmost county in Florida and the United States (Figure 4). It has a total area of 3,737 square miles (9,679 square kilometers), with approximately 27 percent land and the remaining 73 percent water (U.S. Census Bureau). The county includes the Florida Keys and portions of Big Cypress National Preserve and Everglades National Park. The Florida Keys are a series of islands that extend over 220 miles in length and make up the third largest barrier reef ecosystem in the world, and the only one of its kind in the country. The State of Florida has designated the Florida Keys as an Area of Critical State Concern to protect the area's ecological richness, cultural significance, and environmentally sensitive nature (Florida Statute 1986; Florida Administrative Code [F.A.C.] §28-29, 1975). The county has only one highway, U.S. Highway 1. Commercial activities and residential development are mostly concentrated along that route. Among the county's cities are Key West, Key Largo, Big Pine Key, Marathon, and Plantation Key.



Source: ESRI Streetmaps 9.1 Census Database

**Figure 4: Location Map of Monroe County**

More than 99.9 percent of the county's population lives on the Florida Keys. According to U.S. Census Bureau estimates, the population of the county decreased from 79,589 in 2000 to 74,737 in July 2006; a

decrease of nearly 6.5 percent over the 6-year period. During that period, there was a natural increase in population of 195 (4,642 births less 4,447 deaths) coupled with a net out-migration of 4,668 persons leaving the county (2,612 net international migration less 7,280 net internal out-migration). The number of housing units increased from 51,617 in 2000 to 52,911 in 2005, an increase of 2.5 percent. Median household income in 2005 was \$49,040 and 9.8 percent of the county population lived below the poverty level, in comparison to the statewide median household income of \$42,433 and poverty rate of 13 percent.

As presented in Table 8, the accommodation and food services and the retail trade sectors were the two largest employment sectors in the county in 2005. Other major employment sectors in the county include the health care and social assistance and the construction sectors.

**Table 8: Employment Profile by Industry Sector in Monroe County (2005)**

NAICS Code	Industry Code Description	Non-Employer Establishments	Non-Employer Receipts (\$1,000)	Employer Establishments	Number of Employees	Annual Payroll (\$1,000)
11	Agriculture, Forestry, Fishing, and Hunting	992	34,476	16	20–99	*
21	Mining	5	160	1	0–19	*
22	Utilities	9	1,254	2	100–249	*
23	Construction	1,177	82,123	359	1,693	55,733
31	Manufacturing	107	5,337	80	338	9,652
42	Wholesale Trade	136	15,495	112	480	18,964
44	Retail Trade	601	44,847	723	6,422	145,298
48	Transportation and Warehousing	393	19,220	141	942	25,076
51	Information	91	3,781	53	504	21,220
52	Finance and Insurance	301	28,942	152	953	38,252
53	Real Estate and Rental and Leasing	1,766	154,010	355	1,031	30,557
54	Professional, Scientific, and Technical Services	1,219	68,691	334	1,320	51,592
55	Management of Companies and Enterprises	0	0	6	91	5,136
56	Admin, Support, Waste Mgt, and Remediation Services	895	33,503	192	796	21,627
61	Educational Services	104	2,520	33	222	6,860
62	Health Care and Social Assistance	421	21,970	214	2,373	97,625
71	Arts, Entertainment, and Recreation	866	41,944	135	1,103	24,086
72	Accommodation and Food Services	255	41,226	523	10,852	210,466
81	Other Services (Except Public Adm.)	1,362	43,583	308	1,331	29,204
99	Unclassified Establishments	0	0	7	0–19	*
<b>TOTAL</b>		<b>10,700</b>	<b>643,082</b>	<b>3,746</b>	<b>30,631</b>	<b>791,348</b>

\* Zero in 2005 County Business Patterns

Source: 2005 County Business Patterns, U.S. Census Bureau

The retail trade and the accommodation and food services sectors are principle components of tourism, and tourism is the major industry of Monroe County. Tourism, directly and indirectly, contributed \$2.2 billion to Monroe County's economy in 2005 (Bennett, 2006). Tourism directly and indirectly created 23,616 jobs, or 54 percent of Monroe County's employment in the same year.

The Monroe County Tourist Development Council estimates more than 3.49 million people visited the county in 2003, and 3.2 million visited the Florida Keys in 2006. Of visitors surveyed from March 2005 through February 2006, 80 percent were in the Florida Keys for recreation or vacation purposes. Of those surveyed, about 84 percent reported beach activities, 75 percent reported viewing wildlife, 57 percent reported diving and snorkeling, and 30 percent reported fishing as activities they participated in during their visit (Monroe County Tourist Development Council, 2007).

The Port of Key West is a small port; it serves cruise ships with itineraries in the Eastern and Western Caribbean and the Bahamas. The Key West Chamber of Commerce estimates 888,183 cruise passenger arrivals in the Port of Key West in 2006, up from 656,866 in 2000 (Key West Chamber of Commerce). In 2006, imports with a value of \$36,283 and exports with a value of \$11.7 million transited through the Port of Key West. There are two commercial airports in the Florida Keys: Key West International Airport and Florida Keys Marathon Airport. Key West International Airport had 276,154 person arrivals in 2006, up from 275,386 in 2000, and remains the Keys' primary airport for commercial activity.

Commercial and recreational fishing is a component of the economy in Monroe County related to the ecosystem services provided by the resources in the final designated area. In 2005, commercial fishermen in Monroe County landed a total of 159,883 pounds of fish that inhabit mangroves during their life cycle with a dockside value of \$233,261 (Table 9). In addition, aquaculture activities (e.g., clam production) are conducted within the coastal areas of the county. In 2002, the charter fishing and party fishing boats industry subsector (NAICS 4872102) included 42 business establishments, with total annual revenue of about \$5.5 million and 73 employees (U.S. Census Bureau). That same year the excursion and sightseeing boats industry subsector (NAICS 4872101) included 23 business establishments, with total annual revenue of \$17.3 million and 224 employees.

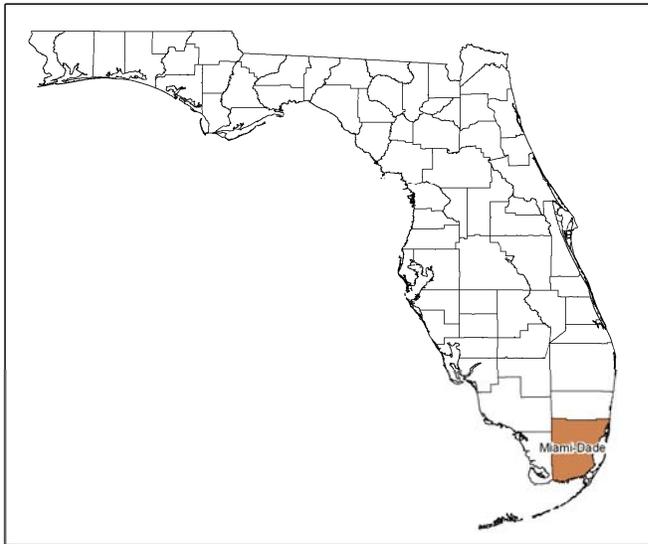
**Table 9: Commercial Landings of Mangrove-Dependent Species, Monroe County (2005)**

Group (Species)	Pounds	Value (\$)
Jacks ( <i>Caranx</i> spp.)	40,179	26,754
Grunts ( <i>Haemulon</i> spp.)	937	759
Spotted seatrout ( <i>Cynoscion nebulosus</i> )	13	22
Atlantic sheepshead ( <i>Archosargus probatocephalus</i> )	138	166
Gray mangrove snapper ( <i>Lutjanus griseus</i> )	118,613	205,556
Schoolmaster snapper ( <i>Lutjanus apodus</i> )	3	4
<b>Total</b>	<b>159,883</b>	<b>233,261</b>

Source: NMFS Southeast Regional Office Logbook Data

### **Miami-Dade County**

Miami-Dade County (Figure 5) has a total area of 2,431 square miles (6,297 square kilometers), with approximately 80 percent lands and the remaining 20 percent water (U.S. Census Bureau). Most of the area of water is Biscayne Bay, and another significant portion is the adjacent waters of the Atlantic Ocean. Among the county's major cities are Miami, Miami Beach, Coral Gables, and Key Biscayne.



Source: ESRI Streetmaps 9.1 Census Database

**Figure 5: Location Map of Miami-Dade County**

Miami-Dade County is the most populous county in Florida and the eighth most populous county in the Nation. According to U.S. Census Bureau estimates, the population of the county grew 6.6 percent from 2,253,362 persons in 2000 to 2,402,208 persons in 2006, an addition of nearly 148,846 persons during the 6-year period. The number of housing units also increased from 852,414 in 2000 to 928,715 in 2005, which represents an increase of about 9 percent. The median household income in 2005 was \$37,418 and 18 percent of the county population lived below the poverty level, in comparison to the statewide median household income of \$42,433 and poverty rate of 13 percent.

As presented in Table 10, the retail trade and the health care and social assistance sectors were the two largest employment sectors in the county in 2005. Other major employment sectors in the county include retail trade and construction sectors.

**Table 10: Employment Profile by Industry Sector in Miami-Dade County (2005)**

NAICS Code	Industry Code Description	Non-Employer Establishments	Non-Employer Receipts (\$1,000)	Employer Establishments	Number of Employees	Annual Payroll (\$1,000)
11	Agriculture, Forestry, Fishing and Hunting	1,015	38,961	35	500–999	*
21	Mining	38	2,187	29	1,073	62,003
22	Utilities	274	3,944	29	2,500–4,999	*
23	Construction	30,690	1,165,256	4,618	38,417	1,482,470
31	Manufacturing	3,669	212,073	2,378	46,621	1,561,117
42	Wholesale Trade	7,658	814,973	8,514	67,342	2,884,026
44	Retail Trade	16,420	765,506	10,335	118,182	2,870,980
48	Transportation and Warehousing	23,596	1,000,767	2,725	51,193	1,936,735
51	Information	3,457	152,330	1,444	21,956	1,283,285
52	Finance and Insurance	9,005	561,580	4,728	47,057	2,889,919
53	Real Estate and Rental and Leasing	33,897	2,666,341	4,950	23,462	1,055,582
54	Professional, Scientific, and Tech. Serv.	31,153	1,381,648	11,047	60,355	3,488,485
55	Management of Companies and Enterprises	*	*	291	17,005	1,311,656
56	Admin, Support, Waste Mgt, Remediation Services	29,597	550,415	3,489	76,326	2,301,355
61	Educational Services	3,719	63,432	727	28,162	1,019,920
62	Health Care and Social Assistance	26,415	905,533	7,715	114,198	4,439,517

NAICS Code	Industry Code Description	Non-Employer Establishments	Non-Employer Receipts (\$1,000)	Employer Establishments	Number of Employees	Annual Payroll (\$1,000)
71	Arts, Entertainment and Recreation	8,962	280,307	971	12,553	378,867
72	Accommodation and Food Services	3,906	208,302	4,188	89,680	1,506,700
81	Other Services (Except Public Adm.)	62,985	1,270,636	5,895	38,989	884,694
99	Unclassified Establishments	*	*	158	100–249	*
<b>TOTAL</b>		<b>296,456</b>	<b>12,044,191</b>	<b>74,266</b>	<b>858,080</b>	<b>31,357,311</b>

\* Zero in 2005 County Business Patterns

Source: 2005 County Business Patterns, U.S. Census Bureau

Commercial and recreational fishing is a component of the economy in Miami-Dade County related to the ecosystem services provided by the resources in the final designated area. In 2005, commercial fishermen in Miami-Dade County landed a total of 39,517 pounds of fish that inhabit mangroves during their life cycle, with a dockside value of \$57,747 (see Table 11). In addition, aquaculture activities (e.g., clam production) are conducted within the coastal areas of the county. In 2005, the fishing industry subsector (NAICS Code 1141) included 405 non-employer firms with annual receipts of \$13 million, which represented 0.14 percent of all non-employer firms and 0.11 percent of annual receipts for all non-employer firms in the county (2005 County Business Patterns, U.S. Census Bureau).

**Table 11: Commercial Landings of Mangrove-Dependent Species, Miami-Dade County (2005)**

Group/(Species)	Pounds	Value (\$)
Jacks ( <i>Caranx</i> spp.)	26,390	30,813
Grunts ( <i>Haemulon</i> spp.)	13	13
Atlantic sheepshead ( <i>Archosargus probatocephalus</i> )	10	20
Gray mangrove snapper ( <i>Lutjanus griseus</i> )	13,103	26,899
Schoolmaster snapper ( <i>Lutjanus apodus</i> )	1	2
<b>Total</b>	<b>39,517</b>	<b>57,747</b>

Source: NMFS Southeast Regional Office Logbook Data

## 2.2 Existing Laws and Regulations that May Protect the Critical Habitat Features

The physical and biological features that form the basis of the final critical habitat designation are red mangroves and shallow euryhaline habitats characterized by water depths between the Mean High Water (MHW) line and 3 feet (0.9 meter) measured at MLLW. Several Federal laws provide some level of direct protection from adverse human impacts to the essential features: the ESA, Essential Fish Habitat (EFH) provisions of the Magnuson Stevens Fishery Conservation and Management Act, Section 404 of the Clean Water Act (CWA), Section 10 of the Rivers and Harbors Act (RHA), and the National Park Service Organic Act. State and local laws also directly and indirectly provide protections to mangroves and their habitats. In addition, protected areas, such as Federal and State parks, provide additional protection within their borders. These laws and regulations were evaluated to determine the existing level of protection offered to the essential features. Existing legal requirements are evaluated to assist in determining the incremental impact of critical habitat designation; the more overlap between the requirements of existing laws and the protections provided to the essential features, the less the incremental cost of the designation.

The essential features that form the basis for the final critical habitat designation are red mangroves, and shallow euryhaline habitats characterized by water depths between the MHW line and 3 feet (0.9 meter) measured at MLLW. Human activities could adversely affect these features and their ability to support conservation of the listed smalltooth sawfish by causing:

- Loss of foraging opportunities
- Loss of protection from predation
- Loss of euryhaline conditions

These effects may result from a change in water depth associated with dredging or filling, the removal of red mangroves, and modification of euryhaline waters by a change in the salinity regime to a non-euryhaline condition.

Because the critical habitat provisions of the ESA focus on species recovery, critical habitat designation and the resulting avoidance of destruction or adverse modification will function to protect the essential features to increase the abundance of the smalltooth sawfish. This will provide protection beyond other laws described below, which focus on the protection of the sawfish itself or on the protection of mangroves and coastal ecosystems generally.

### **2.2.1 Federal Laws**

#### **Endangered Species Act 16 U.S.C. 1531 et seq.)**

Currently, mangrove habitats that support smalltooth sawfish receive some level of protection through the Section 7 consultation process for the listed smalltooth sawfish. Under the Section 7 consultation process, habitat impacts are evaluated to determine if the proposed impacts may result in harm or take of the species by “impairing essential behavioral patterns,” such as feeding or sheltering (50 CFR §222.102). In the absence of a critical habitat designation, habitat impacts that constitute take could only be addressed through Section 7 if the impacts would jeopardize the continued existence of the U.S. DPS of smalltooth sawfish, by appreciably reducing their likelihood of both survival and recovery (50 CFR §402.02). Lesser impacts to habitat that constitute incidental take of the species could be minimized through reasonable and prudent measures (RPMs) identified in biological opinions. In contrast, habitat features identified through the critical habitat designation are protected from destruction or adverse modification through the Section 7 consultation, based on the effects on the habitat’s ability to conserve the listed species and not on impacts to both the survival and recovery of the species itself.

Currently, critical habitats for other listed species under NMFS’ jurisdiction do not overlap with the final critical habitat for the smalltooth sawfish. Additionally, no other listed species under NMFS’ jurisdiction heavily utilize or rely on the mangrove ecosystem or shallow tidally influenced euryhaline water. However, critical habitat for the American crocodile, a species under USFWS jurisdiction, does overlap the final critical habitat for the smalltooth sawfish within the boundaries of the Everglades National Park from U.S. Highway 1 west to Cape Sable. The American Crocodile utilizes mangrove swamps and tidal creeks for nesting and foraging habitat, therefore the critical habitat designation for the American crocodile does provide protection for the smalltooth sawfish habitat within the overlapping areas. The American Crocodile critical habitat designation, however, is based on geographic considerations and does not specific physical or biological features. Because crocodiles have a preference for mangrove swamps and brackish waters, the smalltooth sawfish essential features have some protection where they overlap crocodile critical habitat.

Because the critical habitat provisions of the ESA focus on the species recovery, the critical habitat designation and the resulting avoidance of destruction or adverse modification will function to protect the essential features to increase the abundance of smalltooth sawfish. This will provide protection beyond the other laws described below, which focus generally on natural resource or coastal wetlands protection.

**Magnuson-Stevens Fishery Management and Conservation Act (Magnuson-Stevens Act): Essential Fish Habitat 16 U.S.C. 1801 et seq.)**

Fishery management plans developed under the Magnuson-Stevens Act are required to describe and identify EFH for covered fisheries, and are required to provide for the protection of the habitat by minimizing, to the extent practical, the adverse effects on the habitat caused by fishing (16 U.S.C. §1853(a)(7)). The Magnuson-Stevens Act defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity” (16 U.S.C. §1802(10)). The areas of critical habitat for smalltooth sawfish fall under the jurisdiction of the Gulf of Mexico Fishery Management Council (Council). NMFS has designated mangrove and estuarine habitats as EFH, as recommended by the Council. Both essential features are critical components of areas designated as EFH and receive a basic level of protection under the Magnuson-Stevens Act to the extent that the act requires minimization of impact to EFH resources.

The Magnuson-Stevens Act requires all Federal agencies to consult with NMFS regarding actions they undertake or authorize that may adversely affect EFH. NMFS will recommend measures to protect or conserve EFH, and Federal agencies must respond in writing on measures proposed to avoid or offset impacts to EFH; or explain its reasons for proposing to proceed inconsistently with NMFS’ recommendations (16 U.S.C. §1855 (b)). Although the individual essential features are not specifically addressed in the Magnuson-Stevens Act, it does offer some level of protection is provided by NMFS’ ability to comment and request project changes to protect EFH.

**Clean Water Act – 33 U.S.C. 1251 et seq.**

The CWA establishes a comprehensive Federal framework for improving and maintaining surface water quality by regulating discharges of pollutants into the waters of the United States, including the territorial sea. The CWA includes several provisions that provide protection to both essential features.

Section 303 of the Act requires States and tribes to develop and adopt water quality standards that meet the broad goals of the CWA for individual water bodies. The U.S. Environmental Protection Agency (EPA) must approve State or tribal water quality standards, or promulgate substitute standards. Water quality standards protect designated uses of water bodies, such as drinking water supply, recreational use, or aquatic life. Water quality criteria may also be established, which are pollutant-specific limits, or descriptions of conditions of a water body, necessary to achieve or maintain designated uses. EPA publishes recommended water quality criteria for specific designated uses; States and tribes must adopt corresponding criteria that are at least as protective as EPA’s recommendations. States and tribes are required to monitor and report on the conditions of their water bodies. Those water bodies not meeting established water quality standards due to pollutants are termed “impaired waters.”

Sediments, including clean sediments, and nutrients are considered “pollutants” under the CWA, and according to EPA are the most common causes of impaired waters. States are required to develop strategies to meet established water quality standards for their impaired waters by, among other things, developing Total Maximum Daily Loads (TMDLs) for pollutants that EPA must approve or substitute. Florida has identified recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife in marine waters as the designated use of Florida Keys waters. Florida Keys waters are listed as an impaired water body due, in part, to excessive nutrients. EPA has developed a comprehensive framework to address nutrient water quality standards and has published guidance for States and tribes for development of nutrient TMDLs, and Ecoregional Nutrient Criteria to help address eutrophication.

Section 404 of the CWA regulates the discharge of dredged and fill material into U.S. waters, which include mangrove and nearshore euryhaline habitats inhabited by juvenile smalltooth sawfish. Specific guidelines for issuance for permits under Section 404 were developed jointly by EPA and USACE and are known as the 404(b)(1) Guidelines. These guidelines, codified at 40 CFR Part 230, include specific parameters that must be met for the USACE to issue a permit for the discharge of dredged or fill material

into U.S. waters. In addition, the guidelines require that all practicable alternatives be considered that would avoid and minimize adverse impacts to aquatic resources, in particular wetlands, from discharge of dredge or fill materials into waters of the United States. The guidelines and associated regulations allow for compensatory mitigation of impacts that cannot be avoided. In April 2008, the USACE and EPA published final amendments to regulations governing compensatory mitigation that are applicable to permits issued by the USACE under both the CWA and the RHA (73 Fed. Reg. 19594, April 10, 2008). In part, the regulations issue new performance standards for permittee-responsible mitigation, mitigation banks, and in-lieu fee mitigation programs. The agencies intend for the rule to retain a flexible preference for in-kind mitigation, but replaces the onsite preference with a hierarchy that prefers use of mitigation bank credits. The materials also state that the new rule's allowed consideration of watershed-scale factors in selection of mitigation sites may increase the incidence of off-site and out-of-kind mitigation.

More significantly, 40 CFR 230.10(b) provides that no discharge of dredged or fill material shall be permitted if the activity will jeopardize the continued existence of a species listed as threatened or endangered under the ESA or result in the likelihood of destruction or adverse modification of designated critical habitat identified under the ESA.

National Pollutant Discharge Elimination System (NPDES) permits issued under Section 402 of the CWA are required for all discharges to surface waters of the United States from point sources such as industrial facilities or municipal wastewater plants. NPDES permits contain numeric limits on specific pollutants and are an integral part of States' strategies to achieving water quality standards for water bodies. EPA authorizes States to implement NPDES permitting programs based on specific criteria. EPA retains oversight of State permitting activities, including the ability to object to issuance of particular permits and issuance of substitute permits. EPA acts as the NPDES permitting authority for point sources in States that do not have approved programs. Florida has a fully-approved NPDES permitting program.

The CWA does not establish direct Federal regulatory authority over nonpoint sources of pollution, though nonpoint source discharges are the most significant sources of pollution overall in the United States. Nonpoint sources can include atmospheric deposition of pollutants into water bodies, and commonly includes sediments and nutrients. Under Section 319 of the Act, EPA can provide Federal grants to States with EPA-approved nonpoint source pollution management programs.

Finally, Section 401 of the Act requires that Federal agencies issuing permits or licenses under certain provisions of the Act obtain State certification that the activity will not cause or contribute to violation of the relevant State water quality standards for the water body at issue. Section 401 applies to NPDES permits issued by EPA and to Section 404 permits issued by the USACE.

#### **Rivers and Harbors Act – Section 10 (33 U.S.C. 401 *et. seq.*)**

Section 10 of the RHA (33 CFR 322) gives the USACE authority to issue permits for activities occurring in navigable waters of the United States. Activities may include the construction of dams, over-water structures, channels, and docks; dredging; and/or aquaculture-related activities. The Act provides some protection against physical destruction of natural resources; however, individual essential features for smalltooth sawfish critical habitat are not specifically protected. Limited protection is afforded under this Act to the essential features because as part of a public interest test, the USACE must consider the adverse impacts to listed species and their critical habitats.

#### **Coastal Zone Management Act (16 U.S.C. 1451 *et seq.*)**

The Coastal Zone Management Act (CZMA) (15 CFR 923) encourages coastal States to develop comprehensive programs to manage and balance competing uses of coastal resources. The Act emphasizes State participation in decision making regarding coastal zone issues and provides monetary incentives for States to develop coastal zone management programs.

States, such as Florida, that have developed federally approved coastal management programs perform Federal consistency reviews on Federal actions that may impact coastal resources. On the Federal level, the National Oceanic and Atmospheric Administration's (NOAA's) Office of Ocean and Coastal Resource Management (OCRM) is responsible for coordination of the CZMA with the State partner programs.

Federal license or permit activities and/or Federal funding assistance activities that may affect coastal resources must be consistent with State coastal management programs. Red Mangroves, shallow waters within 500 meters of the shoreline, and euryhaline waters are protected by Florida's coastal zone management plan. Moreover, consistent with the provisions of Section 307(c)(3) of the CZMA, the USACE may not issue any permits or authorizations under Section 404 of the CWA (33 U.S.C. §1344), or Section 10 of the RHA (33 U.S.C. §403) that do not have a State CZMA consistency determination. Impacts to resources, including the essential features, receive a review under the CZMA; however, they are approved if the impacts meet permit issuance guidelines of State permitting agencies.

### **National Park Service Organic Act (16 U.S.C. 1 *et seq.*)**

Passed in 1916, the National Park Service Organic Act created the National Park Service (NPS) and charged the Service with the creation of national parks and monuments and "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Act also gave the Secretary of the Interior the ability to make rules and regulations for the protection, use, and management of National Park lands. Since a large area of smalltooth critical habitat occurs within the Everglades National Park, protection to individual essential features may be afforded through the NPS' mission to conserve the scenery, natural objects, and wildlife "by such means as will leave them unimpaired for the enjoyment of future generations."

## **2.2.2 State and Local Laws**

### **STATE**

#### **Environmental Resource Permit Program**

The Environmental Resource Permit (ERP) program (Part IV, Chapter 373 Florida Statutes) regulates dredge and fill activities in the State's wetlands. The ERP program is intended to ensure that construction activities do not degrade water quality, cause flooding, cause a net functional loss of wetland values or functions, or degrade habitat for aquatic or wetland dependent wildlife, such as the smalltooth sawfish. Structures or activities in wetlands or other surface waters requiring an ERP that may affect smalltooth sawfish habitat include: dock facilities, seawalls, boat ramps, and dredging and filling for residential or commercial development. Within Charlotte County the ERP applications are processed by either the Florida Department of Environmental Protection (FDEP) or the Southwest Florida Water Management District. The ERP application is a joint permit application with the USACE for convenience of permit applicants. The FDEP forwards a copy of the application to the USACE upon receipt; however, the USACE issues a separate permit from the FDEP except in the case of the State Programmatic General Permit program.

ERP rule criteria require that, "design modifications to reduce or eliminate adverse impacts must be explored." In addition ERP rules require that, "an applicant must provide reasonable assurance that a regulated activity will not impact the values of wetlands, other surface waters and other water related resources, so as to cause adverse impacts to the habitat of fish, wildlife and listed species." Proposed projects are also subject to a public interest test which requires that projects be evaluated as to, "Whether the regulated activity will adversely affect the conservation of fish and wildlife, including endangered or threatened species, or their habitats." Because State ERP rules do not specifically protect individual essential features, impacts to these habitats are allowable under the ERP program if State rules for conditions of issuance are met and a project "does not cause a net adverse impact on wetland functions

and other surface water functions which is not offset by mitigation.” However, through the project review process, impacts to resources which may include the essential features can be reduced, minimized, or eliminated to the extent practicable as allowed by the ERP rules.

### **The Florida Aquatic Preserve Act**

Pursuant to Chapter 18–21.001 of the F.A.C., Aquatic Preserves “shall be managed primarily for the maintenance of essentially natural conditions, the propagation of fish and wildlife, and public recreation.” Additionally, the rule provides that Aquatic Preserves “were established for the purpose of being preserved in an essentially natural or existing condition so that their aesthetic, biological and scientific values may endure for the enjoyment of future generations.” The Florida Aquatic Preserve Act gives extended protection to wetland resources in designated Aquatic Preserves, which include seven areas in Monroe, Collier, Charlotte, and Lee Counties. Rules have been established in aquatic preserves to limit sizes of docking facilities to reduce impacts on mangroves and submerged aquatic vegetation. Agencies issuing ERP permits are allowed to apply an added public interest test in these areas that may provide additional protection to the essential features. Projects proposed in aquatic preserves must be “clearly in the public interest” as opposed to “not contrary to the public interest” in non-aquatic preserve areas.

### **Sovereign Submerged Lands Management Rule**

The Sovereign Submerged Lands Management rule (Chapter 253, Florida Statutes) states that authorization is required from the Board of Trustees of the Internal Improvement Trust Fund (Board) for any activities in, on, or over State-owned, sovereign submerged lands. Sovereign submerged lands are defined as “those lands waterward of the ordinary or mean high water line, beneath navigable fresh water or beneath tidally-influenced waters, to which the State of Florida acquired title on March 3, 1845, by virtue of statehood, and which have not been heretofore conveyed or alienated.” The FDEP and the water management districts have been delegated by the Board (Governor and Cabinet) to manage the use of sovereign submerged lands for the good of the public, to maintain traditional uses such as navigation and fishing, to provide maximum protection of all sovereign submerged lands, and to ensure that all private uses of sovereign submerged lands will generate revenue as just compensation for that privilege. The types of authorizations required for the use of sovereign submerged lands are provided in Chapter 18–21 of the F.A.C. and depend on the complexity of the project, the size of the requested easement, the potential impacts to sovereign submerged lands, and the potential for preempting the use of those sovereign submerged lands from the public.

Any activity proposed in, on, or over sovereign submerged lands, including those lands with smalltooth sawfish habitat, requires review and approval from FDEP or the proper water management district. The rule provides a basic level of protection for resources that occur on sovereign submerged lands, which may include the essential features, if impacts to resources are found to be inconsistent with the public interest. For approval the proposed activity must be consistent with the Sovereign Submerged Lands Management rule and not be contrary to the public interest. If the proposed activity is within an Aquatic Preserve, the project must be clearly in the public interest. In addition, project modifications may be required to avoid or minimize impacts, and mitigation will be required for unavoidable impacts to aquatic and emergent resources.

### **Mangrove Trimming and Preservation Act**

The Mangrove Trimming and Preservation Act (Act) (403.9321–403.9333, Florida Statutes) was established in 1996 to protect and preserve Florida’s three species of mangroves, which provide habitat for the smalltooth sawfish, from unregulated removal, defoliation, and destruction. This Act allows riparian homeowners to trim and/or alter shoreline mangrove fringes for a view and reasonable ingress and egress to adjacent waters. However, no mangroves located on uninhabited islands are allowed to be trimmed under this Act. In addition, this Act does not authorize any dredge and fill activities within wetlands and other surface waters. The main purpose of this act is to protect mangroves from trimming

that may lead to the death of mangroves or from trimming that may render mangroves ecologically non-functional. This Act does not provide protection to shallow euryhaline waters.

The primary forms of authorization established in this act include Trimming and Alteration Permits and General Permits to be issued by the FDEP. The form of authorization required is determined by the amount and location of the proposed trimming. A General Permit is required for riparian homeowners when the proposed trimming is conducted by a professional mangrove trimmer as defined in 403.9329 of the Florida Statutes; the trimming is within mangrove fringes that are less than 500 feet (152.4 meters) wide from the edge of open water to the shoreline; the trimming will affect no more than 65 percent of the mangroves along the shoreline; the trimming will not reduce the height of any mangrove below 6 feet (1.8 meters); and no chemicals or herbicides will be used to complete the trimming. A General Permit is also available for the limited trimming of mangroves within existing navigation channels to provide clearance for watercraft. To qualify for this General Permit, the proposed trimming must be completed by a professional mangrove trimmer or the riparian homeowner requesting the trimming, or be conducted on sovereign submerged lands; remove only branches and foliage waterward of the mangrove prop roots; and not involve the use of chemicals or herbicides. Once mangroves are trimmed using a General Permit, they may be maintained at the authorized height in perpetuity. General Permits do not require mitigation for the authorized actions.

If a proposed trimming activity does not meet the requirements for a General Permit, a Trimming and Alteration Permit will be required. When a Trimming and Alteration permit is needed, modifications to the project may be required to avoid or minimize mangrove impacts. After the proposed mangrove impacts have been minimized to the greatest extent practicable, mitigation is required to offset the loss of mangrove function and value to wetland-dependent wildlife species, including the smalltooth sawfish. In addition, the proposed mangrove trimming must not be contrary to the public interest. If the proposed activity is in a water body classified as Outstanding Florida Waters, the proposed trimming must be clearly in the public interest.

### **Local Laws**

In addition to Federal and State rules, local jurisdictions in the study area have rules that protect the essential features. The existing rules and regulations for the five counties in the study area were reviewed to determine the level of protection offered to the essential features.

Section 14-455 of the Lee County Land Development Code provides that provides that “No person, or any agent or representative thereof, directly or indirectly, shall alter any mangrove tree located in the unincorporated areas of the county, without first obtaining a permit, where applicable, from the State department of environmental protection in accordance with the requirements of chapter 17-321, Florida Administrative Code.” Additionally, the law requires residents to comply with State mangrove laws or face county sanctions. Additionally, Section 26-77 of the Land Development Code further prohibits the removal of mangroves for the construction of shoreline protection structures and limits mangrove removal during dock construction. Lee County permit requirements for mangrove removal supplement Federal and State requirements. Lee County does not have rules or ordinances that protect shallow waters or euryhaline waters and defers to State and Federal agencies for regulation.

In Monroe County, filling of mangroves and near shore shallow water habitats is prohibited except in the case of construction of shoreline stabilization structures. In addition, new dredging is prohibited except for boat ramp construction and maintenance of existing navigational channels. However, because the designated critical habitat lies entirely within the boundaries of Everglades National Park, Monroe County laws and regulations are outside the jurisdiction of the county.

In Miami-Dade County, any impacts to mangroves or shallow near shore waters require a county permit. Proposed impacts are evaluated through a biological assessment performed by county staff; and mitigation is required for unavoidable impacts. However, because the designated critical habitat lies

entirely within the boundaries of Everglades National Park, Miami-Dade County laws and regulations are outside the jurisdiction of the county.

Neither Charlotte County nor Collier County has regulatory protection for mangroves or adjacent shallow tidal waters.

### **2.2.3 Protected Areas**

The final areas for critical habitat designation include a total of 15 national and State parks. Activities within these facilities are regulated by Federal and State laws that serve as an added layer of protection for the elements of the critical habitat. These rules and regulations help preserve and protect the diverse and rich natural ecosystems prevalent within these parklands. These jurisdictions are shown in Figure 6 and described below.

#### **Everglades National Park**

Managed by the U.S. Department of the Interior's (DOI's) NPS, the Everglades National Park was originally established in 1947. Established as a national park for the benefit of the people, the purpose of the park is to serve as a "permanent wilderness preserving essential primitive conditions including the natural abundance, diversity, behavior, and ecological integrity of its flora and fauna" (NPS, 2001). The park qualifies as a world heritage site and supports the largest mangrove ecosystem in the western hemisphere. Designated to protect the area's unique biology, the park measured approximately 460,000 acres (186,155 hectares) when it was first established. The park now comprises approximately 1,500,000 acres (607,028 hectares). Considered an integral part of the South Florida ecosystem, the park contains mangroves, pinelands, wetlands, coastal islands, and coral reefs (NPS, 2001; USACE, 2000).

#### **Collier Seminole State Park**

The Collier Seminole State Park, currently operated by the FDEP, is designated for public outdoor use and conservation. The goals of the facility can be broadly categorized: 1) to maintain the natural and cultural resources prevalent in the area and 2) to "continue to provide quality resource based outdoor recreational and interpretive programs and facilities at the state park" (FDEP, 2004). Although there are no legislative or executive directives that govern the use of the park, certain uses that might affect the natural ecosystems, such as water resource development projects, water supply projects, stormwater management projects, and sustainable agriculture and forestry are discouraged within the boundaries of the property.

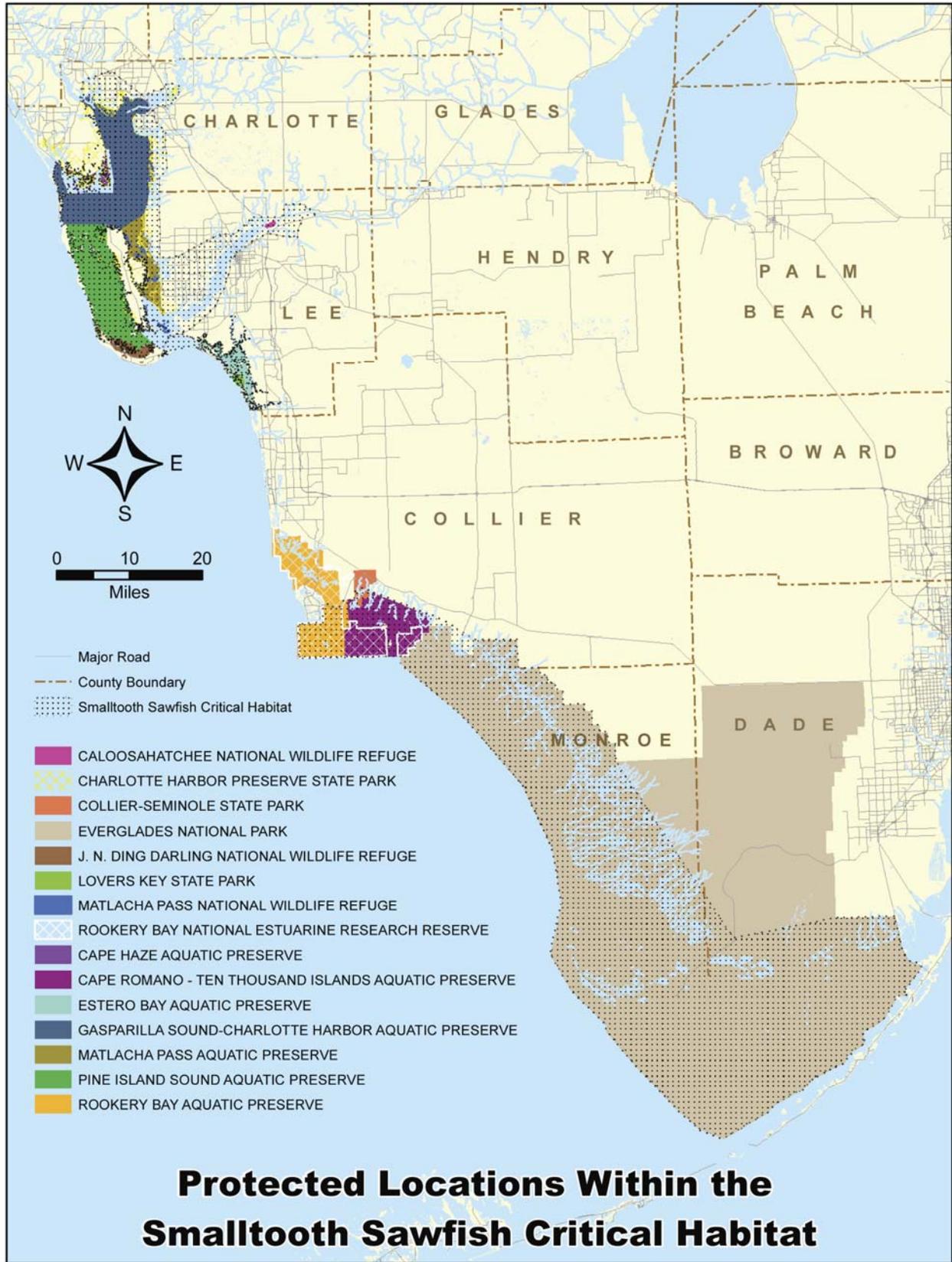


Figure 6: Protected Areas Included in the Critical Habitat Designation

### **Rookery Bay National Estuarine Reserve and Rookery Bay Aquatic Preserve**

The Rookery Bay National Estuarine Reserve was originally designated in 1978 and expanded in 2000 to include the rest of the Rookery Bay Aquatic Preserve and Cape Romano-Ten Thousand Islands Aquatic Preserve. Nearly 110,000 acres (44,515 hectares) of mangrove forests, seagrass beds, saltwater marshes, and other coastal and upland habitats that form the critical habitat for the smalltooth sawfish are contained within the boundaries of the Preserve. The mission of the National Estuarine Research Reserve Program is the establishment and management of national estuarine research reserves to permit and provide opportunities for research and education on a host of coastal management issues and protection of coastal resources (FDEP, 2000). Activities within the Rookery Bay National Estuarine Reserve and the Cape Romano-Ten Thousand Islands Aquatic Preserve are governed by regulations stipulated in the National Estuarine Research Reserve Program Regulations (15 CFR 921). Designation of a National Estuarine Research Reserve is a Federal activity, and in cases where the activities of the preserve affect the State's coastal zone, the activities of the Reserve must be in accordance with the approved coastal management program as provided by Section 1456(c) (1) of the CZMA of 1972, as amended, 16 U.S.C 1451 et seq., Chapters 18-20 and 18-21, F.A.C. One of the goals towards preserving the habitat is to "limit the trimming and/or removal of saltmarsh vegetation and other shoreline vegetation within aquatic preserves, except for legally authorized projects" (Florida Department of Natural Resources [FDNR], 1988).

### **Estero Bay Aquatic Preserve**

Located within Lee County, the Estero Bay Aquatic Preserve encompasses a total surface water area of 15 square miles. Mangrove trees are the most dominant vegetation in the estuarine complex. Designated and maintained as a wilderness preserve, activities within the Preserve are governed by the Florida Aquatic Preserve Act, 1975 (FDNR, 1983a). As previously mentioned, the Act prohibits the trimming and removal of mangroves except when necessitated for the execution of legally authorized projects.

### **J.N. "Ding" Darling National Wildlife Refuge**

Established in December 1945, the J.N. "Ding" Darling National Wildlife Refuge is located entirely within Lee County. Considered an integral portion of the greater Everglades region, the refuge was created to maintain the natural habitat of Sanibel Island and to protect the threatened and endangered species that live within its boundaries. The refuge is managed by the USFWS and contains over 6,400 acres (2,590 hectares) of mangrove forest, submerged seagrass beds, cordgrass marshes, and West Indian hardwood hammocks. About 2,800 acres (1,133 hectares) of the refuge is designated by Congress as a Wilderness Area (USFWS, 2008a). Although the goals of the refuge are to safeguard and enhance the existing habitat, no specific regulations were identified that protect the mangroves prevalent in the area.

### **Charlotte Harbor Aquatic Preserve System**

The Charlotte Harbor Aquatic Preserve System consists of five preserves: Pine Island Sound Aquatic Preserve; Charlotte Harbor Preserve; Gasparilla Sound-Charlotte Harbor; Matlacha Pass Aquatic Preserve; and Cape Haze Aquatic Preserve. The Charlotte Harbor Aquatic Preserves Management Plan serves as a policy document directing activities within the park (FDNR, 1983b). These areas are designated and managed as wilderness preserves with an overall mission to maintain the existing wilderness condition. As indicated in the management plan, activities within the Preserve are governed by the Florida Aquatic Preserve Act, 1975, which specifically offers protection to the designated critical habitat by prohibiting the "trimming and/or removal of mangroves and other natural shoreline vegetation within the aquatic preserves, except when necessitated by the pursuit of legally authorized projects."

### **Caloosahatchee National Wildlife Refuge**

The Caloosahatchee National Wildlife Refuge administered as part of the J.N. "Ding" Darling National Wildlife Refuge Complex was established in 1920 and measures approximately 40 acres (16 hectares).

Consisting of several mangrove islands, the refuge area is covered by a variety of fresh and brackish water vegetation. Although one of the objectives of the refuge is “to protect and provide the suitable habitat for endangered and threatened species including the West Indian manatee, wood stork, eastern indigo snake, American crocodile, and bald eagle,” no specific regulations were identified that offer a layer of protection for the mangroves present on-site (USFWS, 2008b).

### **Lovers Key Recreation Area**

Located between Fort Myers Beach and Bonita Beach in Lee County, Lovers Key Recreation Area was originally accessible only by boat. Today, it is connected by road and its waters contain West Indian manatees, bottlenose dolphins, roseate spoonbills, marsh rabbits, and bald eagles. The State park is popular for activities such as swimming, picnicking, and sunbathing. Consisting of four barrier islands, the park totals nearly 1,600 acres (647 hectares) and is designated a protected area and included as part of long-term conservation project. The State of Florida is in the process of restoring the islands with native plant communities and conserving the natural ecosystem. No specific rules or regulations were identified that explicitly protect the mangrove species present on the parks properties.

## **2.3 Baseline Benefits and Values of the Critical Habitat**

The baseline benefits and values of the essential features are important given the focus of critical habitat designation on the avoidance of destruction or adverse modification of the habitat to promote recovery of the endangered smalltooth sawfish. The prohibition on the destruction or adverse modification of mangroves and shallow euryhaline habitats can have direct and indirect benefits to human society. These benefits derive from the services provided by the ecosystem, and the current benefits provided by these features are appropriately considered as part of the baseline. These services are normally classified as public goods and not fully captured in commercial markets, but they can be a valuable resource for local communities and adjacent ecosystems.

The value of mangrove ecosystems has been assessed in other studies based on its capacity to provide nursery grounds to aquatic species, raw material for consumption and construction, shoreline protection, and water treatment, among other things. Depending on the type of function, mangrove ecological functions can have an impact on a local, regional, and/or global scale. Table 12 presents information on ecosystem services, scales, benefits, and typical valuation methods.

**Table 12: Examples of Mangrove Ecosystem Services, Functional Scale, Benefits, and Valuation Methodologies**

<b>Ecosystem Service</b>	<b>Scale</b>	<b>Benefits</b>	<b>Valuation Methodology</b>
Atmospheric Gas Regulation	Global	CO <sub>2</sub> /O <sub>2</sub> balance	CO <sub>2</sub> international prices
Disturbance Regulation	Local	Storm/hurricane protection	Reduced damage value or preventive costs
Water Regulation	Regional	Flood damage reduction	Replacement costs
Erosion Control	Local	Prevention of soil loss from wind, runoff, and other processes	Preventive expenditures
Waste Treatment (and Nutrient Cycling)	Regional	Recovery and breakdown of excess or xenic nutrients and compounds	Replacement costs
Refuge from Predators	Regional	Nursery and habitat for migrant species	Market price of the species
Raw Materials (Forest Resources)	Regional	Timber, charcoal, and tannins	Market price household production
Recreation	Local	Sport fishing, eco-tourism, boating, and other outdoor activities	Travel costs contingent valuation

No current published research on the quantitative economic value of Florida's mangroves is available at this time. Milon (2002) estimated the total economic value of human uses of the Indian River Lagoon, Florida in 1995 as being between \$717.4 and \$730.9 million. In that study the author considered the following ecosystem use categories: recreational and commercial fishing, shell fishing, swimming, boating, nature observation, water sports, hunting, and riverfront residential land. Other literature focusing at least in part on Florida's mangrove forests discusses qualitative benefits only. The Florida Marine Research Institute notes the important role mangrove habitat plays in the health of both the recreational and commercial fishing industries (2008). The Institute emphasizes that both industries will significantly decline if healthy mangrove forests are not present to provide necessary and suitable fish nurseries. As with other mangrove reports, this study also discusses the important storm protection function offered to the Florida coast by mangroves; however, this protection is not quantified. However, most mangrove valuation case studies focus on developing countries where the communities' subsistence is strongly related to the ecosystem. As expected, the range of values varies considerably according to the location, benefit valued, and methodology used.

Because current literature is not available for the Southern Florida region, this analysis does not estimate a monetary value for the mangroves but discusses the benefits qualitatively. See *Section 5.2* for a more detailed discussion of potential benefits of conservation of mangroves that may result from this final designation.

### 3 ECONOMIC IMPACTS

The following section identifies economic impacts that may result from the final critical habitat designation. As discussed above, economic impacts result through the implementation of Section 7 of the ESA, in consultations with Federal agencies to ensure that their proposed actions are not likely to destroy or adversely modify designated critical habitats, as well as any project modifications resulting from these consultations.

The analysis of impacts below begins with a comprehensive approach to the first, mandatory step of Section 4(b)(2), by identifying and considering economic (*Section 3*), national security (*Section 4*), and other relevant impacts (*Section 5*) that may result from including each of the final units in the critical habitat designation. Both positive and negative impacts are identified (these terms are used interchangeably with benefits and costs, respectively). Impacts are evaluated in quantitative terms where feasible, but qualitative appraisals are used where they are more appropriate to particular impacts.

The ESA does not define what "particular areas" means in the context of Section 4(b)(2), or the relationship of particular areas to "specific areas" that meet the statute's definition of critical habitat. Because NMFS found no biological basis to subdivide the two critical habitat units into smaller units, these "specific areas" are treated as "particular areas" for the initial consideration of impacts of designation.

The following is a brief overview of important court rulings and other important guidance regarding methods for economic impact analyses.

#### 3.1 Economic Impact Analysis

##### Co-Extensive and Incremental (Baseline) Methods

Several courts have reviewed analyses of economic impacts of critical habitat designations, and most of these cases have addressed whether the traditional economic methodology of baseline or incremental impacts analysis may be used. In *New Mexico Cattle Growers Assoc. et al. v. USFWS*, 248 F.3d 1277 (10th Cir. 2001), the court ruled that given USFWS' underlying assumption that critical habitat did not add any protection beyond what listing of the species already provided, the baseline economic impacts analysis was not consistent with the ESA. The court required USFWS to analyze the total economic

impacts of critical habitat designation, even if those impacts are attributable co-extensively to other causes, such as listing of the species (*Id.* at 1285). In *Cape Hatteras Access Preservation Alliance et al. v. U.S. Dept. of the Interior*, 344 F. Supp. 2d 108 (D.D.C. 2004), the district court agreed with previous courts and found that the basis of USFWS' belief that impacts of critical habitat designation were wholly co-extensive with impacts of listing was based on conflating the regulatory definitions of "destruction or adverse modification" and "to jeopardize" a listed species (*Id.* at 128-29). However, given the distinction between adverse modification of critical habitat and jeopardy, the *Cape Hatteras* court disagreed with the Tenth Circuit and ruled that the baseline approach is a reasonable method for assessing the actual costs of a particular critical habitat designation (*Id.* at 130). In *Center for Biological Diversity v. Bureau of Land Management*, 422 F. Supp. 2d 1155, 1153 (N.D. Cal. 2006), the court reviewed the *Cape Hatteras* and *New Mexico Cattle Growers* cases and ruled that co-extensive costs could not be the basis for excluding areas from a designation.

NMFS has followed the Tenth Circuit's "total costs" approach, including identification of co-extensive costs and benefits, in circumstances where data have not allowed making a credible distinction between the impacts of consultations that would result from critical habitat designation, in addition or compared to the impacts that would result from species listing alone. (See e.g., Proposed Rule Designating Critical Habitat for Southern Resident Killer Whales, 71 FR 34571 at 34577, June 15, 2006). At least one court has ruled that continued use of the total impacts approach and inclusion of co-extensive impacts can be appropriate so long as the impacts of designating critical habitat are not presumed to be wholly co-extensive with the impacts of listing the species (*Home Builders Association of Northern California et al. v. USFWS*, 2007 U.S. Dist. LEXIS 5208 [E.D. Cal. Jan. 24, 2007]). This opinion indicates that a valid total impacts analysis, one that meaningfully analyzes impacts above and beyond listing, must at minimum give proper consideration to the recovery benefits resulting from a critical habitat designation (*Id.* at 19-21).

### **Additional Guidance**

Other cases and Federal government guidance are relevant to the analysis of economic impacts resulting from critical habitat designations. For example, as discussed more fully above, the Statement of Regulatory Philosophy and Principles in EO 12866, Regulatory Planning and Review, states in part:

*In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider.*

OMB Circular A-4 (2003) provides additional explanation:

*Benefit-cost analysis is a primary tool used for regulatory analysis. Where all benefits and costs can be quantified and expressed in monetary units, benefit-cost analysis provides decision makers with a clear indication of the most efficient alternative, that is, the alternative that generates the largest net benefits to society...*

*It will not always be possible to express in monetary units all of the important benefits and costs. When it is not, the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate. In such cases, you should exercise professional judgment in determining how important the non-quantified benefits or costs may be in the context of the overall analysis.*

*A complete regulatory analysis includes a discussion of non-quantified as well as quantified benefits and costs.... When there are important non-monetary values at stake,*

*you should also identify them in your analysis so policymakers can compare them with the monetary benefits and costs.*

Cases reviewing critical habitat impacts analyses have applied principles similar to those of the OMB guidance, for example: all important costs and benefits should be included in an impacts analysis (e.g., *Center for Biological Diversity v. Bureau of Land Management*, 422 F. Supp. 2d 1155, 1153 [N.D. Cal. 2006], in which the court found that USFWS' impacts analysis was unbalanced in ignoring available data in the record regarding the economic benefits of designation) and important impacts that can only be evaluated if non-monetary metrics can be included in the analysis (e.g., *Home Builders Association of Northern California*, 2006 U.S. Dist. LEXIS 80255 [E.D. Cal., Nov. 1, 2006], which found that the USFWS properly determined that monetizing the benefits of designation was infeasible, and that benefits were best expressed in biological terms).

### **3.2 Section 7 Impacts**

Designating an area as critical habitat requires Federal agencies to consult with NMFS on proposed actions that may affect designated critical habitat, and modify their actions as necessary to avoid destroying or adversely modifying critical habitat. As discussed above, consultations may result in economic impacts on Federal agencies and proponents of proposed actions. These impacts and costs may not constitute incremental impacts of critical habitat designation if a proposed project would trigger consultation/project modification due to its effects on listed species. If a consultation is required due to the expected effects of a proposed action on both the listed species and on the designated critical habitat, and the same project modification would address both types of adverse effects, the impacts would be co-extensive.

#### **3.2.1 Overview of Section 7 Process**

Section 7(a)(2) of the ESA requires Federal agencies (action agencies) to consult with NMFS whenever activities they fund, authorize, or carry out may affect a listed species or critical habitat. In some cases, consultations will only involve NMFS and another Federal agency, such as the USACE. Often, consultations will include a third party involved in projects with a Federal nexus, such as private applicants conducting activities that require a Federal permit, or public or private entities receiving Federal funding.

During a consultation, NMFS, the action agency, and, if applicable, the private permittee or grantee communicate in an effort to minimize potential adverse effects on the species and/or critical habitat. The duration and complexity of these interactions depends on the number of variables, including the species at issue, the activity of concern, the potential effects to the species and critical habitat associated with the proposed activity, and the parties involved. *Informal consultation* is designed to identify and avoid potential adverse impacts at an early stage in the planning process. If, during informal consultation, the Federal agency determines, with the written concurrence of NMFS, that the action is not likely to adversely affect listed species or critical habitat, the consultation process is terminated, and no further action is necessary (50 CFR §402.13). By contrast, a *formal consultation* is required if the action agency determines that the proposed action may adversely affect a listed species or critical habitat in ways that cannot be resolved through informal consultation. Regardless of the type of consultation or proposed project, Section 7 consultations can require substantial administrative effort on the part of all participants. The administrative costs of these efforts are an important component of the impacts assessment.

The Section 7 consultation process may result in modifications to a proposed project. Projects may be modified in response to conservation measures suggested by NMFS during the informal consultation process in order to avoid adverse impacts on a species or its designated critical habitat (harm avoidance), thereby removing the need for formal consultation. Alternatively, formal consultations may involve modifications that are agreed upon by the action agency and the applicant, and included in the project descriptions as harm avoidance measures, or the modifications may be included in NMFS' biological

opinion on the proposed action as RPMs to reduce the impact of take of the species. NMFS' consultation regulations specify that RPMs, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, and timing of the action, and may only involve minor changes (50 CFR §402.14(i)(2)).

In some cases, NMFS may determine that a project is likely to jeopardize the continued existence of the species or destroy or adversely modify its designated critical habitat. In these cases, NMFS will include RPAs to the proposed project that must avoid jeopardy or destruction or adverse modification. By definition, RPAs must be consistent with the intended purpose of the action and capable of being implemented consistent with the action agency's legal authority and jurisdiction, and be economically and technologically feasible (50 CFR §402.02). Project modifications have the potential to represent some direct cost to the action agency or the applicant.

### **Consultation Impacts for the Smalltooth Sawfish and the Physical and Biological Features of Final Critical Habitat**

Precisely estimating future Section 7 impacts can be difficult in part due to the rarity of the smalltooth sawfish, the distribution of the essential features, the uncertain scope and location of projected future Federal actions, and the uncertain nature of potential project modifications that could be required to avoid adverse effects to the smalltooth sawfish or the essential features. Therefore, pre-consultation surveys may be necessary to determine the amount of essential features within a proposed project area and the potential use of project areas by the sawfish, to assist in determining whether consultation is required and whether potential project modifications may be necessary.

As discussed below, all broad categories of future actions projected to occur in the final critical habitat areas have the potential to adversely affect one or both of the essential features of the final critical habitat, and the smalltooth sawfish, if present in the footprint of the action area. NMFS database indicates that all past consultations based on potential for adverse effects to the sawfish were concluded informally (no biological opinion), with no requirement for project modifications to avoid impacts to the fish, due to the mobility and perceived lack of specific habitat use by the species. However, recent section 7 consultations have determined that it may not be appropriate to conclude that juvenile sawfish forced to vacate nursery habitat due to project activities will not be harmed by these effects, given juveniles' specific habitat requirements and high site fidelity. In some recent consultations, limitations on removal of red mangroves and shallow habitat areas were implemented to avoid take of juvenile sawfish using project areas. Because such projects are directly impacting features that have been identified as critical habitat and may be indirectly affecting the listed species, it is possible that critical habitat considerations will be the more important factor in shaping future consultations. Thus, to be conservative in estimating the potential incremental impacts of this final designation, NMFS assumes that though all future consultations may be triggered by both the fish and its critical habitat, any project modifications would be required due to the designation and the requirement to avoid destroying or adversely modifying the critical habitat. The maximum potential incremental administrative costs of consultation of this designation are estimated as the additional costs associated with a formal consultation in comparison to the costs of consultations that would have been concluded informally based on effects to the fish alone.

In addition, to be conservative in estimating impacts, NMFS assumes project modifications would always be required to address adverse effects on the essential features predicted from the expected future agency actions triggering consultation.

### **3.2.2 Activities That May Trigger Consultations**

A query of NMFS' Public Consultation Tracking System (PCTS) was conducted to identify past activities that required ESA Section 7 consultations that, if proposed in the future, would trigger consultation because they "may affect" either both the smalltooth sawfish and its final critical habitat, or solely the critical habitat. This technique has been used consistently in evaluating the Section 7 impacts of critical

habitat designations to produce a reasonable estimation of future Federal actions that may require consultation. The PCTS database contains information dating from 1997, providing a consultation history spanning 10 years.

Consultation data for the smalltooth sawfish began when it was listed in 2003, and available information indicates that the number of consultations increased as Federal agencies recognize those projects that might affect the species and thus require consultation. Based on outreach efforts to Federal agencies about the need to consult for the sawfish, NMFS data from 2005 to the present seems to best represent the level of project activity in the two areas included in the final designation from which to estimate the number of future actions that may trigger consultation. Thus, NMFS extrapolated the number of consultations that occurred over a 3-year period between 2005 and the present that required consultation due to the presence of the sawfish into the number of future consultations. Similar to previous designations, predictions of impacts were limited to a 10-year time horizon due to the difficulty in estimating activities and costs beyond that timeframe. There may be a growth or decline in a particular type of action, so the past PCTS activity may overestimate or underestimate the number of future actions undergoing consultation and the aggregate impacts. Therefore, NMFS asked the USACE district office that issues permits in the areas covered by the final designation to evaluate the projections, because the USACE was the Federal action agency for the vast majority of past consultations involving sawfish in these areas. The USACE suggested that the estimates may be low and provided total numbers of permits they issued over the past 10 years in the two Florida counties that contain final Unit 1 of the critical habitat. However, the USACE data do not indicate the type of activity involved, whether ESA Section 7 consultation was required or requested, or whether the projects were located within the final critical habitat or elsewhere in Charlotte and Lee counties. Thus, the NMFS database of actual consultations requested by the USACE for the last 3 years, limited to the actual boundaries of the final critical habitat units, is the best available information for estimating future numbers of projects that may require consultation.

The first step of the analysis described above provided us with a list of Federal activities that would trigger future consultations, and the number of projects within each category that may occur over the next 10 years, based on the consultation history, in each of the two final critical habitat units.

Actual past consultations in these two areas were reviewed next to determine the relative proportion of projects that included actual effects on one or both of the essential features, for instance dredging projects that would have changed water depth or dock construction projects that would have removed mangroves. NMFS projects the same proportions of future projects would affect the critical habitat features. Thus, for example, Table 13 demonstrates that 180 future consultations may affect the sawfish in Unit 1, but only 77 future consultations may affect both the sawfish and one or both of the critical habitat essential features. Not every future category of actions, nor every future project within a category, is projected to affect both essential features.

The following sections describe those categories of future activities that are projected to trigger future consultations because they may affect one or both of the critical habitat essential features, and how they may impact the features.

### ***U.S. Army Corps of Engineers***

The USACE is responsible for carrying out and permitting the majority of actions with the potential to affect the areas in which the smalltooth sawfish and its final critical habitat occur. The USACE is projected to be the action agency for all 84 future consultations in the areas covered by the final critical habitat designation. The USACE regulates activities in navigable waterways of the United States under Section 404 of the CWA and Section 10 of the RHA. Project types that have been permitted by the USACE are listed below.

### **Construction/Repairs – docks, piers, boat ramps, shoreline stabilization, cables**

Generally, the USACE permits any construction in waters of the United States. This category can include single-family home docks, large vessel mooring locations, and private marinas. Piles driven into the substrate support framework and decking. Shoreline vegetation, including mangroves, may be removed to allow construction of docks and associated structures such as walkways, and completed structures may inhibit recolonization of vegetation due to shading. Similarly, shoreline stabilization projects such as construction of seawalls may involve removal of vegetation including mangroves. Dredging may be involved for some dock, marina, boat ramp, or stabilization projects. Sub-aqueous utility cables may involve mangrove removal, dredging, or directional drilling.

### **Dredging and Disposal (filling)**

Dredging is the removal of material from the bottom of water bodies, and is most commonly done to create, deepen, widen, or maintain navigation channels, anchorages, or berthing areas, or aquaculture-related activities. Dredging may also involve the disposal of dredged material into a marine environment.

Dredging has the potential to damage the final critical habitat in several ways. First, dredging is most often used to deepen water bodies. Since the essential features include habitat areas with water depths no greater than 3 feet (0.9 meter) MLLW, deepening waters within the critical habitat may render these areas unsuitable to sawfish as protection from larger predators. Additionally, if marine sediments from a dredging project were dumped into the shallow water areas of the critical habitat accessing these habitat areas would be difficult for the juvenile smalltooth sawfish because of the decreased water depth.

Dredging through red mangrove habitat would lead to the direct destruction of this essential feature. Additionally, disposal of dredged material on mangroves would lead to their death as mangroves are sensitive to the placement of fill material around their bases and roots.

### **Filling**

Filling of wetlands can take many forms, from the placement of fill to construct single family homes, multi-residential buildings, or large subdivisions, to the construction of docks and shoreline stabilization structures. Filling projects can also be part of the construction of roads, pipelines, electric lines, or bridges, dams, or water control structures in, on, under, or over wetlands or waterways.

These types of activities have direct and indirect impacts on the critical habitat. Direct impacts include filling of the mangrove and shallow water habitats for the construction of homes or roads, which results in destruction and loss of the habitat.

Indirect or secondary impacts to the essential features are not as easily discernable. Improperly controlled sediments from upland construction sites can change elevations within the critical habitat leading to the death of mangroves or filling in of shallow channels used by juvenile smalltooth sawfish as a haven from predators. Construction of docks over mangroves can reduce mangrove productivity and lead to the death of the trees. Propeller dredging by marine construction vessels operating in shallow water can deepen the water depths to the point of rendering the area unsuitable for sawfish for predator avoidance. Clam-related aquaculture activities may affect shallow water habitats by modifying the benthic habitat and by altering the range of available habitat within the water column. No red mangrove impacts are anticipated from clam-related aquaculture activities because this activity occurs in open-water habitats devoid of mangroves.

### **Water Control Structures**

Construction of water control structures can modify downstream salinity regimes to the point that mangrove ecosystems are stunted by hypersaline conditions or allow too much water into mangrove basins resulting in shifts in mangrove species or in the deaths of mangroves and/or alteration of the euryhaline conditions.

## **General Permits**

The USACE has authority to issue general permits covering one or more categories of actions in specific locations. When a general permit is proposed, consultation occurs only when the general permit for the specific activity/location is established or renewed and all subsequent activities meeting the conditions for the general permit do not need to undergo Section 7 consultation. Applicants whose projects will conform to the prescribed descriptions and limitations for that action in the general permit do not have to apply for individual permits. These permits involve the same types of projects included in the construction/repairs category above. NMFS records indicate one consultation specific to the Charlotte Harbor Unit, one consultation specific to the TTI/E unit, and nine Florida-wide general permits were completed. To be conservative, these were included as individual consultations in the number of consultations for the Charlotte Harbor unit only. Both of the single unit permits are expressly inapplicable to projects that would impact mangroves; in other words, if a project would involve adverse effects to mangroves, an individual permit would be required. The nine statewide general permits do not specifically prohibit project impacts on mangroves but cannot be used for projects in EFH, which includes mangroves. All 11 permits may require reinitiation of consultation to determine whether the general permit allows adverse impacts to the shallow euryhaline habitats essential feature, and inclusion of a condition requiring consultations on individual permits where a proposed project may affect the feature. One consultation is expected to be conducted with the USACE for a general permit to cover clam-related aquaculture activities. A general permit would be issued that applies to all clam-related aquaculture activities in Florida. We accounted for the general permit for clam-related aquaculture activities in the Charlotte Harbor Unit because this is where the activity will most likely occur.

## ***U.S. Coast Guard/Federal Highway Administration***

One or both of these agencies, as well as the USACE, can be involved in implementing or permitting road or bridge replacement or expansion projects that may affect coastal ecosystems when the bridge structures are constructed in or over aquatic habitats. Such projects may involve both removal of vegetation, including mangroves, or dredging, and thus could affect both essential features.

### **3.2.3 Review of Future Management and Development Plans**

In addition to reviewing historical patterns of consultations, proposed development plans of State and other agencies within the two areas (comprising five counties) were reviewed to identify future projects that may require consultations. Documents reviewed include development plans of Charlotte, Lee, Collier, Monroe, and Miami-Dade counties. Where necessary, the review was followed up by telephone calls with local planning staff to seek clarification on the nature of approved and proposed projects. No impacts to the final critical habitat from actions requiring Section 7 consultation were identified from State or local agencies at this time.

Planning related documents for protected areas (e.g., national and State parks and preserves) within the final critical habitat were examined to evaluate the nature of any future development projects. Any action potentially impacting the smalltooth sawfish critical habitat would most likely require a permit issued by the USACE, who in turn would consult with the NMFS.

Based on discussions with authorities at the Everglades National Park, three to four minor projects are proposed within the park during the next 2–3 year timeframe (NPS, 2007); these types of actions may also require a USACE permit. Additionally, the Everglades National Park is currently preparing an Environmental Assessment for the Cape Sable Canals Dam Restoration Project that could affect both essential features. This project will likely require a USACE permit and consultation may be initiated for sawfish critical habitat.

The USACE is also coordinating the Comprehensive Everglades Restoration Project (CERP). The CERP project involves the restoration of water flows in the Everglades. The CERP will eventually restore water

flows into south Florida by removing water control structures, creating new water storage areas, and by restoring habitats to their historic conditions. These projects may trigger consultations with the NMFS, particularly if the euryhaline conditions are expected to be altered. Given the uncertain nature, location or timing of such projects, future consultations are not projected for these activities.

### 3.2.4 Projected Type and Number of Future Consultations

Tables 13 and 14 summarize the categories of future Federal activities that may affect smalltooth sawfish and the final critical habitat for the two areas. The first column is the category of activity, the second column is the Federal action agency, and the third column indicates the estimated number of consultations over the planning period. The fourth column indicates whether the party likely to implement the action is a Federal agency or a third party (non-Federal) either authorized or funded by a Federal agency, or both. The next column indicates whether the consultation would be triggered by potential impacts to the sawfish itself (“listing”). The next three columns indicate whether projects are projected to have impacts on each of the essential features of the final critical habitat units; since there are two specific important qualities of the shallow euryhaline habitats feature (areas of water depths between the MHW line and 3 feet [0.9 meter] measured at MLLW, and fluctuating salinity regimes), potential impacts to both qualities based on the effects of past projects were evaluated.

No categories of future activities will require consultation solely due to the final designation—all categories of activities have the potential to affect both sawfish and one or both of the essential features. As discussed above, for this analysis NMFS assumes formal consultations will be driven by predicted adverse effects to the essential features.

As presented in the Table 13, all the projected consultations within Unit 1 (Charlotte Harbor Estuary Unit) that may adversely affect critical habitat involve the USACE, and three consultations may also involve the U.S. Coast Guard (USCG) and the Federal Highway Administration (FHA). The total number of consultations resulting from the final designation in Unit 1 is estimated to be 77 over the 10-year planning period. Based on past consultation data, 43 projects are projected to adversely impact mangroves, 40 projects will adversely impact water depth, and 13 projects will affect the salinity regime. One consultation was added to the total for Unit 1 to account for the expected consultation for a general permit for clam-related aquaculture activities. A general permit would be issued that applies to all clam-related aquaculture activities in Florida, including the areas covered by Unit 1 and Unit 2.

Within Unit 2, the TTI/E Unit, the total number of consultations that will result from the final designation is estimated to be eight over the 10-year planning period (Table 14). The projected consultations within Unit 2 will involve the USACE, and three may also involve the USCG and FHA.

Overall, a total of 85 consultations are projected to result from the final critical habitat designation over the next 10 years, which is approximately 8 consultations per year.

### 3.3 Potential Project Modifications

This section provides a description of the project modifications that NMFS may recommend to avoid destruction or adverse modification of the critical habitat through Section 7 consultation. Although the assumption has been made that all future projects will require modifications (i.e., RPAs), not all of the project modifications identified for a specific category of activity would be necessary for an individual project within that category. For example, if a shoreline stabilization project were altered to include alternative stabilization methods, relocating the project would not be necessary; however, conducting conditions monitoring to ensure the project does not have adverse effects may be necessary.

**Table 13: Projected Future Actions Requiring Consultation in Unit 1 – Charlotte Harbor Estuary**

Category of Activity	Agency	Total Number of Projected Future Consultations	Federal/ Non-Federal	Actions that May Impact Species	Actions that May Impact Mangroves	Actions that May Impact Water Depth	Actions that May Impact Salinity Regime	Future Actions Due to Both Listing and Designation
Construction/Repairs/Dredging (docks, piers, private dredging, private disposal, shoreline stabilization, sub-aqueous utility cables, aquaculture, and boat ramps)	USACE	160	Non-Federal	160	37	23		60
General permits authorizing construction activities listed above	USACE	11	Non-Federal	11		11	10	11
Water Control Structure Repair and Replacement	USACE	3	Non-Federal	3	3	3	3	3
Road/Bridge Expansions, Repairs and Removals	USACE/ USCG/ FHA	3	Federal	3	3	3		3
Research Permits	NMFS	3	Both	3				
<b>TOTAL</b>		180		180	43	40	13	77 <sup>a</sup>

Source: Extrapolation from PCTS Database, NOAA, April 2008 and discussions with Federal/State Entities.

<sup>a</sup> Some projects affected more than one feature and were only counted once in the overall total of future actions.

**Table 14: Projected Future Actions Requiring Consultation in Unit 2 – Ten Thousand Islands/Everglades**

Category of Activity	Agency	Total Number of Projected Future Consultations	Federal/ Non-Federal	Actions that May Impact Species	Actions that May Impact Mangroves	Actions that May Impact Water Depth	Actions that May Impact Salinity Regime	Future Actions Due to Both Listing and Designation
Construction/Repairs/Dredging (docks, piers, private dredging, private disposal, shoreline stabilization, sub-aqueous utility cables, and boat ramps)	USACE	3	Non-Federal	3	3	3		3
General Permits authorizing construction activities listed above	USACE	1	Non-Federal	1		1	1	1
Road/Bridge Expansions, Repairs and Removals	USACE/ USCG/ FHA	3	Federal	3	3	3		3
Research Permits	NMFS	10	Both	10				
Seagrass Restoration/Over-Water Structure Repairs	NPS	7	Federal	7				
Water Control Structure Repair and Replacement	USACE/ DOI	1	Federal	1	1	1	1	1
<b>TOTAL</b>		25		25	7	8	2	8 <sup>a</sup>

Source: Extrapolation from PCTS Database, NOAA, April 2008 and discussions with Federal/State Entities.

<sup>a</sup> Some projects affected more than one feature and were only counted once in the overall total of future actions.

Conversely, it is also possible that multiple modifications could be necessary for individual projects that may adversely affect both of the essential features, if a single project modification cannot avoid impacts to both. Table 15 illustrates the relationship between activities that could be conducted in Areas 1 and 2 and potential project modifications.

There are two possible characterizations of project modification costs stemming from the final designation: co-extensive or incremental. As stated above, project costs resulting from this designation are assumed not to be co-extensive with the listing of the species. The costs of project modifications could also be characterized as co-extensive if such modifications are required under an existing statutory or regulatory authority. Based on the nature of existing authorities that are applicable to impacts to mangroves or shallow euryhaline habitats discussed above, project modifications required to avoid destruction or adverse modification of critical habitat are assumed to be incremental costs of the final designation. Many of the existing authorities provide very general protection to natural resources and balancing of interests in determining whether impacts are permissible. None of the existing authorities provides protection to the essential features for the purpose of protecting sawfish habitat and facilitating its recovery. Thus, to be conservative and avoid understating the impacts, the final designation is assumed to always require greater protection of the essential features than would be provided by existing authorities.

**Table 15: Potential Project Modifications for each Category of Activity**

Project Type	Project Modification								
	Action Agency	Project Relocation	Horizontal Directional Drilling	Restriction of Road/Utility Corridor Widths	Use of Alternative Shoreline Stabilization Methods	Limitations on Dock Widths and Size	Limitations/Restrictions on Modifying Freshwater Flow	Sediment and Turbidity Control Measures	Conditions Monitoring
Construction/Repairs/Dredging (docks, piers, private dredging, private disposal, shoreline stabilization, sub-aqueous utility cables, aquaculture, and boat ramps)	USACE	X	X	X	X	X	X	X	X
General Permits authorizing construction activities listed above		X	X	N/A	X	X	N/A	X	X
Water Control Structures		X					X	X	X
Road/Bridge Expansions, Repairs and Removals	USACE/ USCG/ FHA	X		X			X	X	X

The following discussion provides descriptions of project modifications that may be recommended by NMFS (i.e., RPAs) to avoid destruction or adverse modification of critical habitat. Whether each modification would be capable of addressing adverse impacts to both of the essential features is indicated.

### **Project Relocation**

The categories of potential future projects all have the potential to directly affect the final critical habitat. The first goal of a project relocation strategy is to avoid or minimize adverse impacts by relocating the project out of the critical habitat. NMFS would first ask the Federal agency or applicant to explore relocating the project so that impacts to the smalltooth sawfish habitat would be entirely avoided. If this

is not feasible, an incremental process of seeking to move portions of the projects out of the sawfish critical habitat would likely take place.

For example, if new dredging was proposed in shallow water, less than 3 feet (0.9 meter) deep, NMFS would ask the applicant to seek a location with deeper water, so that the water depth utilized by juvenile sawfish could be maintained at or below 3 feet (0.9 meter) at MLLW. Additionally, NMFS may ask an applicant to relocate residential or commercial facilities to avoid mangrove impacts. The costs associated with project relocations are difficult to estimate because they are site and project-specific. This modification could be used to avoid adverse impacts to both essential features.

### **Horizontal Directional Drilling**

The use of HDD is becoming more prevalent for the installation of pipelines and communication cables under bodies of water. This method allows pipes and cables to be installed below the bottoms of water bodies without open-trench methods. Generally, a tunnel is bored from uplands on one side of the water body under the floor of the water body, and exits on uplands on the other side of the water body.

Use of HDD in mangrove ecosystems is especially useful as it eliminates the need to create an open-trench corridor through the mangroves or shallow water habitats. The use of this method is encouraged by the FDEP, water management districts, and USACE when impacts to mangroves and marsh habitats are anticipated. NMFS could recommend HDD to avoid adverse impacts to mangroves or the water depth aspect of the shallow euryhaline habitats feature.

### **Restriction of Utility/Road Corridor Widths**

Another project modification that could be recommended is the restriction of utility and road corridor widths through mangrove habitats. Utilities prefer to have the widest corridor width possible for ease of maintenance; however, regulatory agencies in Florida have restricted utility corridor widths through wetlands to reduce wetland impacts. If HDD was not feasible in a particular situation, NMFS could recommend that the construction and permanent corridor be the minimum necessary to install and maintain the utility line. Methods to reduce the corridor width include requiring stem walls instead of side slopes on fill sections and putting road sections on structures. This modification could be required to avoid adverse impacts to mangroves or the water depth aspect of the shallow euryhaline habitats feature.

### **Use of Alternative Shoreline Stabilization Methods**

Many shorelines in Florida's urban areas have been hardened by artificial methods. This has resulted in the loss of thousands of acres of mangrove habitat, and has significantly reduced the shorelines ability to support mangroves. Currently the most popular stabilization methods include the use of riprap and bulkheads (seawalls). These stabilization methods are often utilized where mangroves already exist, and the installation either directly or indirectly leads to the death or decline of the existing mangroves.

In situations where mangroves already exist on the site, NMFS could require "soft" shoreline stabilization methods to preserve the existing mangroves. Soft stabilization techniques include small offshore rock sills supplemented by native plantings (including mangroves) installed along the shoreline to stabilize the shoreline, or cutting the shoreline back into the bank, making the bank gentler, and then using native plantings to prevent erosion. Using these techniques would allow for stabilization while preserving the existing mangrove fringe. Use of soft shoreline stabilization methods is generally less expensive than construction of bulkheads or riprap revetments. This modification could also be used to prevent adverse impacts to the water depth aspect of the shallow euryhaline habitats feature, since dredging is often associated with hard shoreline stabilization techniques.

### **Limitations on Dock Widths and Size**

Currently, the State of Florida and USACE have developed rules and guidance concerning the width of docks that traverse submerged resources, including mangroves. The current State rules only address single- and multi-family docks in State Aquatic Preserves, while USACE rules address single- and multi-

family docks in all navigable waters. These rules are not applicable to commercial or public docks, such as docks at marinas or public boat ramps.

To reduce the impacts of all dock construction projects (commercial or private) on the mangrove and shallow euryhaline habitats features, NMFS may require limitations on dock widths and sizes. Limiting width and total size reduces the footprint of impacts and reduces the amount of ancillary mangrove trimming that is required to keep walkways clear. In general, limiting the width and size of docks decreases construction costs over larger-sized alternatives. Smaller docks may also alleviate the need for dredging that often accompanies installation of large docks and thus could be used to avoid impacts to the water depth aspect of the shallow euryhaline habitats feature.

### **Restrictions and Limitations on Modifying Freshwater Flow**

The shallow euryhaline habitats feature must have a naturally controlled range of salinity. In certain locations, such as the fringing mangroves of the Everglades and riverine mangrove habitat, the input of freshwater to the system is an important component of maintaining a balanced healthy ecosystem. Blocking or limiting freshwater flow to these mangrove systems can lead to increasing salinities that can limit mangrove growth or lead to mangrove death.

If an impoundment or structure is proposed that would reduce freshwater flows to downstream critical habitat, NMFS could require modifications to the structure or operating limitations that would require outflows from the impoundment or structure to maintain euryhaline conditions within the downstream critical habitats. This modification could be required to address adverse impacts to mangroves as well as the salinity aspect of the shallow euryhaline habitats feature.

### **Sediment and Turbidity Control Measures**

Use of sediment and turbidity control measures is a requirement of NMFS, the State of Florida, and USACE for all marine construction projects, and NMFS has recommended use of such measures in previous consultations. Typically, these measures consist of using silt screen and floating turbidity barriers to keep sediment from being transported into wetlands, or in the case of dredging, suspended sediment (turbidity) from leaving the disturbance area. If these measures are not used, sediment from adjoining construction could fill-in shallow areas and bury mangroves and kill them.

### **Conditions Monitoring**

Projects often have an indirect effect on adjacent critical habitat. For example, during the construction of a waterfront residential subdivision, 0.5 acre (0.2 hectare) of mangrove fringe may be inadvertently filled by a construction crew. Habitat loss due to construction errors is usually minimal; however, the loss can be substantial over time. Monitoring of projects that are constructed in or adjacent to critical habitat is important to ensure that unintended negative impacts do not occur. The type and scope of monitoring is variable because it is project-specific. This modification could be required to prevent adverse impacts to both the mangrove and shallow euryhaline essential features.

## **3.4 Estimated Section 7 Costs**

As discussed above, the costs associated with ESA Section 7 include two main components, administration and project modification. Administrative costs arise due to consultations between agencies from the final rule. Project modification costs include potential material and labor costs borne by agencies or third parties to modify certain physical structures or processes within the designated critical habitat area. *Section 3.4.1* evaluates the administrative costs associated with consultations, while *Section 3.4.2* evaluates the project modification costs resulting from the consultations and in relation to other existing laws and regulations. Potential benefits of the critical habitat designation are discussed in *Section 5*.

The assumptions made in considering the economic impact of Section 7 consultation and project modification implementation are summarized in the table below.

Key Assumptions Applied to the Section 7 Impacts Consideration	
Key Assumption	Effect on Cost
The presence of other listed species or designated critical habitat has no influence on consultation.	+
Past 10-year consultation history is indicative of next 10-year consultation projection.	-
All future consultations are expected to be formal.	+
All project modifications are required.	+
All modifications will be incremental impact of the designation	+
-: This assumption may result in underestimate of real costs.	
+: This assumption may result in an overestimate of real costs.	

### 3.4.1 Administrative Costs

Estimates of the cost of an individual consultation were developed from a review and analysis of the PCTS database, as discussed above, and from the estimated Section 7 costs identified in the *Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon* (IEc 2003) inflated to 2009 (March) dollars (Table 16). Cost figures are based on an average level of effort for consultations of low or high complexity (based on NMFS and other Federal agency information), multiplied by the appropriate labor rates for NMFS and other Federal agency staff. Additionally, the costs to conduct surveys of the project area to determine the presence and amount of the essential features are included in the estimates.

**Table 16: Estimated Administrative Costs of Section 7 Consultation (Per Effort)**

	NMFS	Action Agency	Third Party	Total Cost
Informal Consultation				
Low Complexity	\$1,200	\$2,400	\$1,400	\$5,000
High Complexity	\$3,700	\$11,400	\$3,400	\$18,500
Formal Consultation				
Low Complexity	\$3,700	\$11,400	\$3,400	\$18,500
High Complexity	\$7,200	\$24,500	\$5,000	\$36,500

Source: IEc, (2003) 2002 dollars inflated to 2009 (March) dollars using CPI index and then rounded

As discussed above, no categories of future actions will require consultation due solely to the final designation; thus, the total number of future consultations is not expected to increase relative to the number of consultations that will be required due to the presence of the species in project areas. However, we predict that incremental administrative costs of consultation will result from the final designation. In this analysis NMFS assumes that all future projects will require formal consultation due to potential adverse effects to one or both of the essential features. Thus, the difference in cost associated with a formal consultation relative to an informal consultation is assumed to be an impact of the final designation. The incremental administrative cost for each consultation would be the difference between the cost of an informal consultation and a formal consultation (\$13,500 for low complexity and \$18,000 for high complexity). The total impact on administrative costs would be the incremental cost of the formal consultation multiplied by the number of consultations. For example, if three informal

consultations (low complexity) become formal consultations (low complexity) per year, the estimated annual administrative costs would be \$40,500 (3\* (\$18,500 – \$5,000)).

The total incremental administrative costs for Unit 1 are estimated to range from \$1,039,500 to \$1,386,000 (depending on complexity of the consultation) over the 10-year planning period. The total incremental administrative costs for Unit 2 are estimated to range from \$108,000 to \$144,000 (depending on complexity of the consultation) over the 10-year planning period.

### 3.4.2 Project Modification Costs

Potential project modification costs were developed based on Florida Department of Transportation Historic Unit Prices database for similar types of projects in southern Florida. Table 17 summarizes the project modifications and potential costs that would likely result.

**Table 17: Potential Project Modification Costs**

Project Modification	Cost	Unit	Range	Approx. Totals
Project Relocation	Undeterminable	N/A	N/A	N/A
HDD	\$1.39–2.44 million	per mile	0.2–31.5 Miles	\$278,000–\$76,900,000
Restriction of Utility/Road Corridor Widths	Roadway Retained Sides, 2 Lane = \$1,875 Roadway Retained Sides, 4 Lane = \$2,150 Roadway Bridge, 2 Lane = \$3,370 Roadway Bridge 4 Lane = \$5,050	linear foot	N/A	\$1,875–\$5,050 per linear foot
Alternative Shoreline Stabilization Methods	Undeterminable	N/A	N/A	N/A
Limitations on Dock Size	Undeterminable	N/A	N/A	N/A
Limitation/Restrictions on Modifying Freshwater Flow	Undeterminable	N/A	N/A	N/A
Sediment Controls	Staked Silt Fence = \$2 Floating Turbidity Barrier = \$12	linear foot	N/A	\$2–\$12 per linear foot
Conditions Monitoring	Undeterminable	N/A	N/A	N/A

Note: Where information was available, the estimated ranges (extents) of the impacts are included.

Given the uncertainties in predicting the precise scope and location of future Federal actions or actions with a Federal nexus requiring consultation, and the resultant uncertainty in predicting future project modifications, estimating the total Section 7 costs of the final critical habitat designation with certainty is not possible.

## 4 NATIONAL SECURITY IMPACTS

Previous critical habitat designations have recognized that impacts to national security result if a designation would trigger future Section 7 consultations because a proposed military activity may affect the physical or biological features essential to the listed species' conservation, and which form the basis for including areas in a critical habitat designation. Potential project modifications may also affect national security. Anticipated interference with mission-essential training, testing, or unit readiness, either through delays caused by the consultation process or through expected requirements to modify the action to prevent adverse modification of critical habitat, has been identified as a negative impact of critical habitat designations (See, e.g., *Proposed Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover*, 71 FR 34571 at 34583, June 15, 2006, and *Proposed Designation of Critical Habitat for Southern Resident Killer Whales*, 69 FR 75608 at 75633, Dec. 17, 2004). These past designations also recognized that national security impacts resulting from the

designation depend on whether future consultations would be required under the jeopardy standard, regardless of the critical habitat designation, and whether the designation would add new burdens beyond those related to the jeopardy consultation.

On April 11, 2008, NMFS sent a letter to DOD requesting information on national security impacts of the final designation. Responses were received from the Departments of the Army, Navy, and Air Force indicating that they did not have facilities or managed areas located within the final critical habitat. Based on the location of the critical habitat, it is unlikely that consultations with respect to activities on DOD facilities or training would be required as a result of the final critical habitat designation. Therefore, no national security impacts are anticipated as a result of this final critical habitat designation.

## 5 OTHER RELEVANT IMPACTS

In addition to the impacts described in Sections 3 and 4, this analysis has identified three broad categories of other relevant impacts: educational and awareness benefits; conservation benefits, both to the smalltooth sawfish and to society; and impacts on natural resources agencies that implement management plans in the areas covered by the final designation.

As discussed below, mangroves and shallow euryhaline habitats provide a range of important uses and services to society. As these benefits currently exist, NMFS does not interpret them as resulting from the critical habitat designation per se. However, protection of the critical habitat from destruction or adverse modification may at a minimum prevent loss of the benefits provided by these resources, and would contribute to any benefits associated with increased future abundance of the smalltooth sawfish as it recovers. NMFS determined that unique benefits will result from this designation because of the focus on the essential features and the recovery of the smalltooth sawfish. The project modifications discussed above are assumed to be incremental requirements of this designation, in which case the benefits of implementing projects to avoid destroying or adversely modifying critical habitat will also be incremental impacts of the final rule.

The economic values presented in this section are derived from a number of studies and databases. Where possible, the impacts of critical habitat designation should be described on an area-by-area basis. As noted below, data are not currently available to quantify or monetize some of the expected benefits of the designation on an area-by-area basis; these data are presented by county.

Potential conservation benefits resulting from the designation are discussed in this section because they flow from the requirement to base the designation on features essential to the conservation of the sawfish. As indicated above, the economic values presented in the remainder of this section are measures of *existing* benefits in the areas covered by the final designation. These data are presented as context for the conclusion that non-negligible economic benefits will result from the final designation, because protection of the final critical habitat from destruction or adverse modification is expected at minimum to prevent loss of existing benefits the habitat provides to society.

### 5.1 Education, Awareness, and Other General Benefits of the Protected Habitat That May Result from the Designation

Education and awareness benefits could potentially arise from the final critical habitat designation. This potential stems from two sources: (1) entities that engage in Section 7 consultation and (2) members of the general public interested in smalltooth sawfish. The potential exists for the former to alter their activities to benefit the species or essential features because they are made aware of the critical habitat designation. The latter may engage in similar efforts because they learn of the critical habitat designation through outreach materials. The voluntary reporting of sawfish encounters or observations by members of the public, and reporting of data such as environmental features associated with the encounters, is evidence of benefits resulting from increased awareness of the status of the sawfish.

NOAA has observed an increase in the public's awareness that there are special considerations to be taken for areas with a critical habitat designation. Voluntary efforts of the general public could include altering their activities to reduce the impact to the environment (e.g., mangrove trimming) or engaging in non-consumptive recreational activities to view the habitat. Similarly, State and local governments may be prompted to enact laws or rules to compliment the final critical habitat designation and benefit the listed species and critical habitat essential features. However, quantifying the beneficial effects of the awareness gained through or the secondary impacts from State and local regulations resulting from the final critical habitat designation is impossible with available data.

## **5.2 Conservation Benefits**

The primary goal of the critical habitat provisions of the ESA is to protect critical habitat from destruction or adverse modification by Federal activities and, therefore, enhance the potential for species recovery. This is accomplished through the designation of areas that contain the identified essential features. Hence, implementation of ESA Section 7 is expected to increase the probability of recovery for listed species. In addition to contributing to sawfish recovery, benefits associated with project modifications required through Section 7 consultation would include avoiding the destruction or adverse modification of the essential features and the ecosystem services that they provide.

### **5.2.1 Benefits of the Designation to the Smalltooth Sawfish**

By definition, the final critical habitat features are "essential to the conservation" of the smalltooth sawfish; in other words, conservation of the species as defined in the ESA is not possible without the presence and protection of the features. As discussed above, NMFS has determined that the two specific areas designated as critical habitat are juvenile nursery areas where young sawfish spend the first few years of their lives. The essential features found on these areas, red mangroves (with their prop root systems), and shallow euryhaline habitats, provide protection from predators and abundant and diverse prey resources, and thus provide key nursery area functions for the sawfish.

### **5.2.2 Benefits of Preventing Loss of Mangroves and Shallow Euryhaline Habitats**

#### **5.2.2.1 Benefits to Biodiversity**

Because the smalltooth sawfish has limited commercial or recreational value, and because the species recovery is expected to take decades, no direct or indirect monetary value is predicted to result from the final designation because of its contribution to the recovery of the smalltooth sawfish. However, other benefits are expected to accrue to society in the course of protecting the essential features of the sawfish's critical habitat from destruction or adverse modification.

While the shallow water euryhaline habitats offer important ecosystem services to various juvenile fish, invertebrates, and benthic and epibenthic organisms as described in *Section 1.5.2*, their conservation benefits are related to the benefits offered by conservation of red mangroves. Consequently, this discussion focuses on the conservation benefits of mangroves.

The mangrove forest, as a primary producer, is the basic source of energy to sustaining the faunal diversity of south Florida's estuaries and offshore areas. Organic carbon from decomposing mangrove litter is utilized by the microbial community (Benner et al., 1986) and crustaceans, such as copepods, shrimp, and crabs (Camilleri and Ribí, 1986). These species in turn are utilized by a diverse collection of higher consumers.

The mangrove ecosystem provides habitat and breeding areas for numerous species of birds, mammals, reptiles, and invertebrates. Florida mangrove systems are utilized by 24 species of reptiles and amphibians, 18 species of mammals, and 181 bird species (Odum and McIvor, 1990). Tables 18–20 list common amphibian and reptile, mammal, and bird species found in the Florida mangroves.

**Table 18: Florida Mangrove Amphibian and Reptile Species**

Species	Common Name	Characteristics	Endangered Species Status
<i>Alligator mississippiensis</i>	American Alligator	Mangrove resident, found in low salinity areas. Ranges throughout the southeastern United States.	Not Listed
<i>Crocodylus acutus</i>	American Crocodile	Mangrove resident, quite rare, rely heavily on mangrove habitats for survival. Occurs in the north Florida Bay and nearby swamps, as well as the north end of Key Largo.	Threatened
<i>Nerodia clarkia compressicauda</i>	Mangrove Water Snake	Mangrove resident.	Not Listed
<i>Nerodia floridana</i>	Florida Green Water Snake	Mangrove resident.	Not Listed
<i>Drymarchon corais couperi</i>	Eastern Indigo Snake	Mangrove resident.	Threatened
<i>Elaphe guttata rosacea</i>	Rosy Rat Snake	Mangrove resident.	Not Listed
<i>Opheodrys aestivus carinatus</i>	Florida Rough Green Snake	Mangrove resident.	Not Listed
<i>Nerodia fasciata pictiventris</i>	Florida Banded Watersnake	Mangrove resident.	Not Listed
<i>Lampropeltis getula floridiana</i>	Florida King Snake	Mangrove resident.	Not Listed
<i>Agkistrodon piscivorus</i>	Eastern Cottonmouth	Mangrove resident.	Not Listed
<i>Crotalus adamanteus</i>	Eastern Diamondback Rattlesnake	Mangrove resident.	Not Listed
<i>Nerodia clarkia taeniata</i>	Atlantic Saltmarsh Snake	Mangrove resident.	Threatened
<i>Anolis carolinensis</i>	Green Anole	Mangrove resident, resides in the trees feeding on insects.	Not Listed
<i>Anolis sagrei</i>	Brown Anole	Mangrove resident, resides in trees.	Not Listed
<i>Anolis distichus</i>	Bark Anole	Mangrove resident, resides in trees.	Not Listed
<i>Malaclemys terrapin macrospilota and M. t. rhizophorarum</i>	Ornate Diamondback Terrapin	Mangrove resident.	Not Listed

Source: USFWS, 2007

**Table 19: Florida Mangrove Mammal Species**

Species	Common Name	Characteristics	Endangered Species Status
<i>Felis concolor</i>	Florida panther	Carnivores residing in the mangroves of South Florida. Rarely observed, most of the recent sightings have been within the Everglades mangrove systems.	Endangered
<i>Procyon lotor</i>	Raccoon	Carnivores residing in the mangroves of South Florida.	Not Listed
<i>Mustela vison</i>	Mink	Carnivores residing in the mangroves of South Florida.	Threatened
<i>Lutra canadensis</i>	River Otter	Carnivores residing in the mangroves of South Florida.	Not Listed

Species	Common Name	Characteristics	Endangered Species Status
<i>Odocoileus virginianus</i>	White-Tailed Deer	Mangrove resident.	Not Listed
<i>Odocoileus virginianus clavium</i>	Key Deer	Mangrove resident.	Endangered
<i>Didelphis virginiana</i>	Opossum	Mangrove resident.	Not Listed
<i>Sylvilagus palustris</i>	Marsh Rabbits	Mangrove resident.	Endangered
<i>Sigmodon hispidus</i>	Cotton Rats	Mangrove resident.	Not Listed
<i>Pryzomys palustris</i>	Marsh Rice Rat	Mangrove resident.	Not Listed
<i>Oryzomys argentatus</i>	Silver Rice Rat	Mangrove resident.	Endangered

Source: USFWS, 2007

**Table 20: Florida Mangrove Bird Species**

Species	Common Name	Characteristics	Endangered Species Status
<i>Eudocimus albus</i>	White Ibis	Feed on mangrove crabs.	Not Listed
<i>Ajaja ajaja</i>	Roseate Spoonbill	Prey on mangrove mollusks and other invertebrates living within the sediments.	Not Listed
<i>Nyctanassa violacea</i>	Yellow-Crowned Night Herons	Feed on a variety of prey including mangrove crabs, crayfish, and small fishes.	Not Listed
<i>Botaurus lentiginosus</i>	American Bitterns	Feed on a variety of prey including mangrove crabs, crayfish, and small fishes.	Not Listed
<i>Pelecanus occidentalis</i>	Brown Pelican	Mangrove resident.	Endangered
<i>Anhinga anhinga</i>	Anhinga	Mangrove resident.	Not Listed
<i>Anas platyrhynchos</i>	Mallard	Mangrove resident.	Not Listed
<i>Anas acuta</i>	Pintail	Mangrove resident.	Not Listed
<i>Aythya affinis</i>	Lesser Scaup	Mangrove resident.	Not Listed
<i>Aythya valisineria</i>	Canvasback	Mangrove resident.	Not Listed
<i>Gallinule chloropus</i>	Common Gallinule	Mangrove resident.	Not Listed
<i>Haliaeetus leucocephalus</i>	Southern Bald Eagle	Feed on fishes in the mangroves.	Not Listed
<i>Padion haliaetus</i>	Osprey	Feed on fishes in the mangroves.	Not Listed
<i>Falco columbarius</i>	Merlin Falcon	Feed on fishes in the mangroves.	Not Listed
<i>Cathartes aura</i>	Turkey Vulture	Frequent on mangroves.	Not Listed
<i>Coragyps atratus</i>	Black Vulture	Frequent on mangroves.	Not Listed
<i>Accipiter cooperii</i>	Cooper's Hawk	Frequent on mangroves.	Not Listed
<i>Buteo jamaicensis</i>	Red-Tailed Hawk	Frequent on mangroves.	Not Listed
<i>Buteo lineatus</i>	Red-Shouldered Hawk	Frequent on mangroves.	Not Listed
<i>Circus cyaneus</i>	Marsh Hawk	Frequent on mangroves.	Not Listed
<i>Falco sparverius</i>	American Kestrel	Frequent on mangroves.	Not Listed
<i>Tyto alba</i>	Great Horned Owl	Frequent on mangroves.	Not Listed
<i>Strix varia</i>	Barred Owl	Frequent on mangroves.	Not Listed

Source: USFWS, 2007

### 5.2.2.2 Benefits to Fisheries

Due to their physical structural complexity, mangroves provide habitat and nursery grounds to many aquatic species by decreasing the efficiency of predatory fish when feeding. Fish species composition and richness in any mangrove system depends primarily upon: (a) the size and diversity of habitats,

together with flood and tidal regimes; (b) the proximity to mangrove and other systems (such as coral reefs); and (c) the nature of the offshore environment, particularly water depth and current patterns (Bell, 1989).

An estimated 75 percent of the game fish and 90 percent of the commercial fish in south Florida depend on the mangrove system (Law and Arny, 2007). Table 21 lists common fish species found in the Florida mangroves. Section 3.2.6 discusses the recreational benefits of mangroves and Tables 3, 5, 7, 9, and 11 specify the value of commercial fish landings in each of the five counties comprising Areas 1 and 2.

**Table 21: Florida Mangroves Fish Species**

Species	Common Name	Characteristics	Endangered Species List
<i>Centropomus undecimalis</i>	Snook	Found in mangrove areas during entire year.	Not Listed
<i>Caranx</i> spp.	Jacks	Utilize mangrove roots as habitat.	Not Listed
<i>Archosargus probatocephalus</i>	Sheepshead	Utilize mangrove roots as habitat.	Not Listed
<i>Haemulon</i> spp.	Grunts	Utilize mangrove roots as habitat.	Not Listed
<i>Gobiosoma</i> spp.	Gobies	Utilize mangrove roots as habitat.	Not Listed
<i>Lutjanus apodus</i>	Schoolmasters	Utilize mangrove roots as habitat.	Not Listed
<i>Lutjanus griseus</i>	Gray Snappers	Utilize mangrove roots as habitat.	Not Listed
<i>Epinephelus itajara</i>	Small Goliath Grouper	Utilize mangrove roots as habitat.	Not Listed
<i>Megalops atlanticus</i>	Tarpon	Found in waters adjacent to mangroves.	Not Listed
<i>Cynoscion nebulosus</i>	Spotted Seatrout	Thrive in mangroves habitats taking advantage of feeder fish in the mangrove and seagrass beds.	Not Listed
<i>Lepisosteus platyrhincus</i>	Florida Gar	Top level carnivore, feeding on a variety of smaller fishes in mangrove areas.	Not Listed
<i>Lutjanus griseus</i>	Gray Snapper	Utilize the mangrove roots primarily as nursery areas.	Not Listed
<i>Sciaenops ocellatus</i>	Red Drum	Utilize the mangrove roots primarily as nursery areas.	Not Listed
<i>Pristis pectinata</i>	Smalltooth Sawfish	Utilize mangrove roots as nursery area and juvenile habitat.	Endangered

Source: USFWS, 2007

### 5.2.2.3 Benefits to Air Quality Protection

Mangroves fix carbon dioxide from the air through photosynthesis, store the carbon as biomass, and return organic material to the sediment when they decompose. Mangroves play a major role in regulating greenhouse gas concentrations in the atmosphere by pumping atmospheric carbon into the ocean. Because mangrove roots and the sediment around them are regularly washed by tides, much of this organic carbon leaches into the ocean (Ditmar et al., 2006). Worldwide, mangroves are estimated to contribute nearly 10 percent to the ocean's dissolved organic carbon. Much of the carbon produced by mangroves is in the form of molecules that are highly resistant to decomposition, so they are likely to remain in the ocean for decades instead of being returned to the atmosphere as carbon dioxide.

### 5.2.2.4 Benefits to Water Quality Protection

Tides and runoff control the exchange of materials across the boundaries of the mangrove-estuarine ecosystem and are the major processes associated with the exchange of material with this system. Mangroves can remove some of the nutrients in the water, which, improves water quality and helps to prevent eutrophication. This function is particularly valuable in the disposal of nitrate pollutants that can be converted to gaseous nitrogen and circulated back to the atmosphere as the result of denitrification.

### **5.2.2.5 Benefits to Shoreline Protection**

#### **Erosion Control**

Mangroves stabilize shorelines by reducing the energy of waves, currents, or other erosive forces, while simultaneously binding the bottom sediment in place with plant roots. This prevents the erosion of valuable agricultural and residential land. In addition, capturing and retaining sediment in headwater wetlands lengthens the lifespan of downstream reservoirs and channels, and reduces the need for costly removal of accumulated sediment.

In some cases, mangroves may actually help to build up land. Sediment is often the major water pollutant in many estuarine systems. In riverine systems, mangroves commonly serve as pools where sediment generated upstream can settle. Although the build-up of too much sediment in a wetland may alter its biological functions, floodwater storage, and ground water exchange, the quality of downstream estuaries is maintained if suspended sediment is retained in the upstream mangrove systems.

#### **Flood Regulation**

Through their capacity for storing precipitation and releasing runoff evenly, mangroves can diminish the destructive onslaught of flood crests. Preservation of natural stormwater storage can prevent the costly construction of dams and reservoirs.

#### **Storm and Wave Impact Reduction**

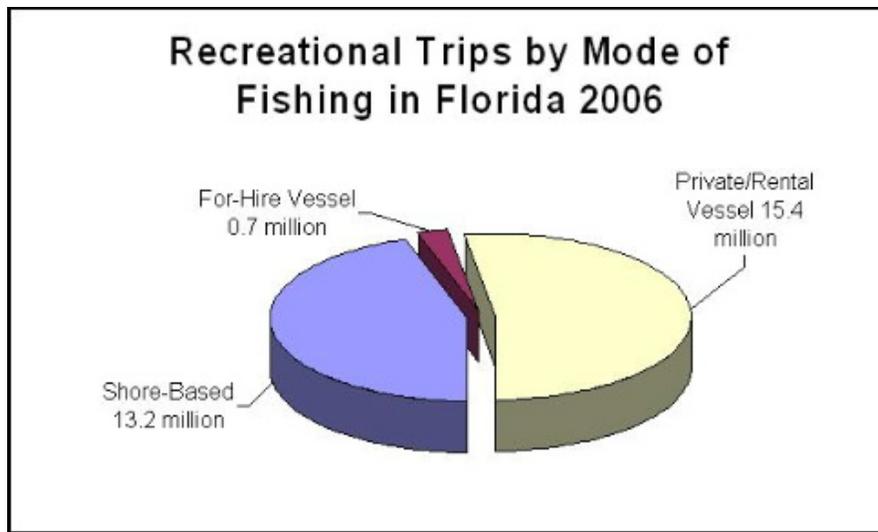
Hurricanes and other coastal storms cause wind damage and flooding, resulting in great financial and human life lost. Mangroves help dissipate the force and lessen the damage of coastal storms. The capacity of mangroves to protect adjacent areas from storms can be measured by the difference between the wind intensity and wave action in the open area of the forest and in the protected area, and the estimated value of the possible damages if the houses close to the area did not have the mangroves to protect them.

Recent studies on the impacts of the Indian Ocean Tsunami in 2004 have shown that areas covered by mangrove and shelterbelt vegetation were significantly less damaged than other areas (Danielson et al., 2005; Hiraishi and Harada, 2003). Hiraishi and Harada have compared the area of the tsunami damage within 3,281 feet (1,000 meters) of the shore between tree vegetation cover categories and observed a significant damage reduction in areas covered by coastal vegetation (e.g., mangroves) (2003). Through an analytical model, the authors show that 30 trees per 1,080 square feet (100 square meters) in a 328-foot (100-meter) wide belt may reduce the maximum tsunami flow pressure by more than 90 percent.

### **5.2.2.6 Benefits to Recreation and Tourism**

Recreation and tourism are principal components of the economies of the counties in the final designated areas and the State of Florida. Recreation and tourism within the final designated area include both consumptive (e.g., recreational fishing) and non-consumptive (e.g., wildlife viewing) activities. Although the discussion below is not specific to the smalltooth sawfish or the final designation, mangroves and the ecological services they provide are a critical component of the benefits discussed.

According to the Florida Fish and Wildlife Conservation Commission, Florida's recreational fishery is among the largest in the country, and is an important component of the State's tourism economy. Close to half the estimated recreational fishing trips in Florida are made by visitors to the State. The Marine Recreational Fisheries Statistics Survey estimates more than 6.6 million recreational anglers took more than 29.3 million saltwater fishing trips statewide in Florida during 2006. These trips were primarily conducted using private or rental vessels (Figure 7) (Florida Fish and Wildlife Conservation Commission, 2007).



Source: Florida Fish and Wildlife Conservation Commission, 2007

**Figure 7: Recreational Trips in Florida**

In a report funded by the Florida Fish and Wildlife Conservation Commission, in 2006 the total economic impact of wildlife viewing in Florida was an estimated \$5.248 billion (Southwick Associates, 2008). The report estimates that approximately 1,289,500 persons or 82 percent of the people who participated in wildlife viewing in Florida specifically sought to view shorebirds or birds (herons), which depend on mangrove ecosystems during part of their lifecycle. Of the people who participated in wildlife viewing activities, almost half were not Florida residents. The report also estimates that wildlife viewing supported a minimum of 34,523 full- and part-time jobs in 2006.

### 5.3 Impact on Natural Resource Agencies with Existing Management Plans

Many previous critical habitat impact analyses have evaluated the impacts of the designation on relationships with, or the efforts of, private and public entities that are involved in management or conservation efforts benefiting listed species. These analyses found that the additional regulatory layer of a designation would negatively impact the conservation benefits provided to the listed species by existing or proposed management or conservation plans. For example, NMFS previously considered the impacts of designation on Indian Tribal sovereignty and participation in conservation activities (69 FR 74572, 74622, December 14, 2004, Proposed Designation of Critical Habitat for 13 Evolutionarily Significant Units of Pacific Salmon [*Oncorhynchus* spp.] and Steelhead [*O. mykiss*] in Washington, Oregon, and Idaho). USFWS considered the impacts of designation on private entities that have entered into Habitat Conservation Plan agreements under the ESA, and Federal, State, or local conservation plans implemented under a variety of legal authorities (e.g., 72 FR 33808, June 19, 2007, Proposed Revised Critical Habitat for the San Bernardino Kangaroo Rat [*Dipodomys merriami parvus*]; 72 FR 30279, May 31, 2008, Clarification of the Economic and Non-Economic Exclusions for the Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon). One court held that this type of impact is a permissible interpretation of "other relevant impacts" under Section 4(b)(2) (*Center for Biological Diversity et al., v. Dept of the Interior*, 240 F. Supp. 2d 1090, 1105 [D. Ariz. 2003]): "It is certainly reasonable to consider a positive working relationship relevant, particularly when that relationship results in the implementation of beneficial natural resource programs, including species preservation."

Similar to national security impacts, impacts on entities responsible for natural resource management or conservation plans that benefit listed species, or on the functioning of those plans, depend on the type and number of Section 7 consultations that may result from the final critical habitat designation in the areas

covered by the plans, as well as any potential project modifications recommended by these consultations. Thus, there must be a Federal nexus for an action proposed by the managing entity of a protected area or Section 7 impacts would not be associated with that action. For management actions on Federal lands or conducted by a Federal agency, the management action itself provides the Federal nexus. There are several Federal, State, and local resource management areas that overlap with the final designation, and these are summarized in Table 22 below.

**Table 22: Major Resource Management Areas that Overlap with the Final Critical Habitat Designation for Smalltooth Sawfish**

Management Area	Notes
Everglades National Park, NPS	Preserve essential primitive conditions including the natural abundance, diversity, behavior, and ecological integrity of its flora and fauna
Collier Seminole State Park	Prohibits water resource development projects, water supply projects, stormwater management projects that alter the existing habitat within the park
Rookery Bay National Estuarine Research Reserve, NOAA	Prohibits extractive activities from the reserve and other activities that might harm or damage existing mangroves or fish species
Cape Romano-Ten Thousand Islands Aquatic Preserve	Limit trimming and/or removal of saltmarsh vegetation and other shoreline vegetation
Gasparilla Sound-Charlotte Harbor Aquatic Preserve	Limit trimming and/or removal of saltmarsh vegetation and other shoreline vegetation
Charlotte Harbor Preserve State Park	Limit trimming and/or removal of saltmarsh vegetation and other shoreline vegetation
Estero Bay Aquatic Preserve	Limit trimming and/or removal of saltmarsh vegetation and other shoreline vegetation
J.N. "Ding" Darling Wildlife Refuge, USFWS	Preserve natural vegetation within the preserve
Pine Island Sound Aquatic Preserve	Limit trimming and/or removal of saltmarsh vegetation and other shoreline vegetation
Lovers Key Recreation Area	Preserve natural vegetation within the preserve
Matlacha Pass National Wildlife Refuge – USFWS/Matlacha Pass Aquatic Preserve	Limit trimming and/or removal of saltmarsh vegetation and other shoreline vegetation
Cape Haze Aquatic Preserve	Limit trimming and/or removal of saltmarsh vegetation and other shoreline vegetation
Caloosahatchee National Wildlife Refuge, USFWS	Protect and preserve the suitable habitat for endangered and threatened species

NMFS concludes that any Section 7 impacts that would result from State or local resource management agencies' actions would be included in predicted future permitting actions by the USACE. As discussed in *Section 3.2* above, based on the NMFS database of past consultations and discussions with area managers about future actions, one joint consultation with the USACE and DOI, for the Everglades National Park's Cape Sable Canal Dam Restoration Project is projected as a result of the final designation. NMFS does not project consultation for activities related to CERP, given the uncertain nature, location, and timing of such projects.

Negative impacts to the Everglades National Park could result if the expected future consultation would interfere with DOI's ability to provide for the conservation of listed species that benefit from their management actions in Everglades National Park, or otherwise hampers management of these areas, or negatively affects NMFS' working relationship with DOI. As described above, NMFS assumes the single consultation projected with DOI over the next 10 years will be required based on both the presence of the

sawfish and the designation of critical habitat, so the designation is not expected to increase the number of consultations that DOI would otherwise be required to conduct with NMFS. However, NMFS is assuming that the critical habitat designation will require the future consultation to be formal, that the consultation will result in required modifications to the project to avoid destroying or adversely modifying the critical habitat, and that these modifications will be an incremental impact of this designation. Thus, DOI may experience increased administrative costs of consultation (\$9,000–\$13,100, depending on complexity of the consultation), and the costs of project modifications to prevent the destruction or adverse modifications of either or both essential features. Sediment and turbidity controls during construction, environmental conditions monitoring, and modifications to prevent alteration of the downstream salinity regime within designated critical habitat have been identified as modifications that NMFS may request for a project like the one identified by DOI (i.e., repairing existing water control structure(s)), but the costs of such modifications are not been projected. However, in the case of DOI's project, the water control structures have been in place for many years, and their purpose is to protect freshwater marshes in the inland reaches of the Park from saltwater intrusion. The purpose of the proposed project is to repair damage to the structures to maintain the salinity regime in the relevant channels. Thus, project modifications and associated costs are expected to be more modest than they would be for construction of new water control structures, or for water control structures that regulate residential or commercial human use of water above and below the structure. Therefore, the costs associated with the single projected future consultation in Everglades National Park are not expected to interfere with DOI's management of the Park or its ability to protect park resources, and negative impacts on the NMFS relationship with DOI are not anticipated as a result of the consultation that will result from the final designation.

## **6 SYNTHESIS: IMPACTS OF INCLUDING THE IDENTIFIED AREAS IN THE FINAL CRITICAL HABITAT DESIGNATION FOR SMALLTOOTH SAWFISH**

As discussed above, the ESA requires that the economic, national security, and other relevant impacts be taken into consideration when proposing to designate critical habitat. Because the ESA does not specify methods or criteria for the consideration of impacts, the proposing agency has considerable discretion in evaluating the various impacts and determining how the impacts will be used in deciding whether to propose any particular area for exclusion.

As discussed above, no categories of Federal actions in either final critical habitat unit would require consultation in the future solely due to the critical habitat designation; all projected categories of future actions have the potential to adversely affect both the essential features and the listed smalltooth sawfish. To be conservative, NMFS assumes that all future projects that may affect one or both of the features will require formal consultation and that all of these consultations will require mandatory modifications to prevent destruction or adverse modification of critical habitat. Further, NMFS assumes that the protections to the essential features provided by the final designation will not be co-extensive with the requirements of existing laws and regulations that protect resources more generally. Thus, incremental administrative costs of consultation and incremental project modification costs are projected to be associated with the final designation. Given the conservative nature of these assumptions, projected costs of the designation are likely an overestimate.

In the following subsections, the impacts of designation identified above, including the limitations of available information and the assumptions used, are summarized and discussed.

## 6.1 Impacts in Unit 1: Charlotte Harbor Estuary Unit

### 6.1.1 Economic Impacts

The economic impacts of the final designation were categorized as administrative and project modification costs. As presented in *Section 3.2.4*, the final designation is projected to result in a total of 77 consultations over the next 10 years in Unit 1, or between 7 and 8 consultations per year. Table 13 summarizes the number of consultations projected over the next 10 years for Unit 1, the Federal action agency, and whether the entity conducting the activity will be a Federal agency or third party. All projected consultations will involve the USACE as the action agency, and three consultations may also involve the USCG and the FHA. USACE-permitted construction activities comprise 61 of the projected 77 future consultations in Unit 1. These consultations are projected to occur throughout the final unit.

NMFS projects there will not be an increase in the number of future consultations required solely due to the designation; however, NMFS does project incremental administrative costs of consultation will result, due to the assumption that formal consultations will be required to avoid adverse impacts to the essential features. The incremental administrative costs for Unit 1 are estimated to range from \$1,039,500 to \$1,386,000 (depending on complexity of the consultation) over the 10-year planning period. These costs may be an overestimate of administrative costs resulting from the designation, due to the assumption that all future projects will require formal consultation to avoid destroying or adversely modifying critical habitat and such costs will not be co-extensive with other laws, including ESA protection of the sawfish itself.

A range of project modifications, described in Table 17, would be applicable to preventing the destruction or adverse modification of the essential features for the actions projected to require consultation in Unit 1. Due to the lack of specific information on future projects, and an inability to accurately forecast the exact type and number of modifications required, the total project modification costs of the critical habitat designation cannot be estimated. Nevertheless, the analysis indicates that consultations in Unit 1 would be required due to adverse impacts on the essential features, and project modifications would be implemented to avoid destruction or adverse modification of the features. The impacts of the final designation may be overestimated in the assumption that all costs of required project modifications will be incremental impacts of the designation, not co-extensive costs of the listing of the sawfish, and not imposed by State, local, or other Federal entities to avoid adverse impacts to resources under their jurisdictions that might include mangroves or shallow coastal ecosystems.

Avoiding the destruction or adverse modification of mangroves and shallow euryhaline habitats through designation of critical habitat is expected to result in positive impacts. As discussed above, these features provide crucial nursery area functions to sawfish in Unit 1, and NMFS has determined these features in this area are essential to the conservation of the sawfish. Preventing the destruction or adverse modification of these features would therefore contribute to the retention of existing economic and other benefits that they provide to society.

Based on the above consideration of the positive and negative economic impacts of including Unit 1 in the final critical habitat designation, NMFS does not exercise its discretion to propose for exclusion all or any part of Unit 1 from the designation on the basis of these impacts.

### 6.1.2 National Security Impacts

Correspondence between the NMFS and the Departments of the Army, Navy, and Air Force indicated that no DOD facilities or managed areas are located within the final critical habitat. Based on the location of the critical habitat, consultations with respect to activities on DOD facilities or training are unlikely to be required as a result of the final critical habitat designation. Therefore, no national security impacts are anticipated as a result of this final critical habitat designation and no exclusions are proposed on the basis of such impacts.

### 6.1.3 Other Relevant Impacts

In addition to the economic benefits addressed above, the designation offers potential education benefits as discussed in *Section 5.1*. Specifically, the designation may expand the awareness raised by the listing of the smalltooth sawfish. Mangroves are often used for recreational activities, such as kayaking and bird watching. The designation may increase the attractiveness of conducting recreational activities within the boundaries of the critical habitat. Additionally, Federal and State protected areas may benefit from that added awareness of the endangered smalltooth sawfish within their boundaries, as well as support their conservation goals with the protection critical habitat designation affords.

The benefits associated with project modifications described previously would be the avoidance of destruction or adverse modification of the mangrove and shallow euryhaline habitats and the ecosystem services that they provide. The conservation of mangroves and shallow waters offers many benefits, including shoreline protection, fisheries sustainability, biodiversity, and water quality regulation. The conservation benefits would be realized from every acre protected as a result of the critical habitat designation (incremental to the listing of the smalltooth sawfish and other laws and regulations). Because current literature is not available for the South Florida region, this analysis does not estimate a monetary value for the protected habitats but discusses the benefits qualitatively. However, studies have been conducted on mangroves for other parts of the world. These studies have shown a direct link between the health of the mangrove forests and the economic and resource benefits that are provided to the local communities. Based on the above consideration of positive and negative other relevant impacts of including Unit 1 in the final critical habitat designation, NMFS does not exercise its discretion to exclude all or any part of Unit 1 from the designation on the basis of these impacts.

## 6.2 Impacts in Unit 2: Ten Thousand Islands/Everglades Unit

### 6.2.1 Economic Impacts

The economic impacts of the final designation were categorized as administrative and project modification costs. As presented in *Section 3.2.4*, the final designation is projected to result in a total of eight consultations over the next 10 years in Unit 2, which is less than one consultation per year on average. Table 14 summarizes the consultations projected over the next 10 years for Unit 2, the Federal action agency, and whether the entity conducting the activity will be a Federal agency or third party. All eight consultations are projected to involve the USACE as the action agency, three of these consultations may also involve the USCG and the FHA, and one will involve DOI.

NMFS projects that these eight consultations will not represent an increase in the number of future consultations required solely due to the designation; i.e., these consultations would be required based on the listing and the presence of the sawfish in this area. However, NMFS projects incremental administrative costs of consultation will result, due to the assumption that formal consultations will be required to avoid adverse impacts to the essential features. The incremental administrative costs for Unit 2 are estimated to range from \$108,000 to \$144,000 (depending on complexity of the consultation) over the 10-year planning period. These costs may be an overestimate of administrative costs resulting from the designation, due to the assumption that all future projects will require formal consultation to avoid destroying or adversely modifying critical habitat, and such costs will not be co-extensive with other laws, including ESA protection of the sawfish itself.

A range of project modifications, described in Table 17, would be applicable to preventing adverse impacts to the essential features for the actions projected to require consultation in Unit 2. Due to the lack of specific information on future projects, and an inability to accurately forecast the exact type and number of modifications required, the total project modification costs of the critical habitat designation cannot be estimated. Nevertheless, the analysis indicates that consultations in Unit 2 would be required due to adverse impacts on the essential features, and project modifications would be implemented to avoid destruction or adverse modification of the features. The impacts of the final designation may be

overestimated in the assumption that all costs of required project modifications will be incremental impacts of the designation, not co-extensive costs of the listing of the sawfish, and not imposed by State, local, or other Federal entities to avoid adverse impacts to resources under their jurisdictions that might include mangroves or shallow coastal ecosystems.

Avoiding the destruction or adverse modification of mangroves and shallow euryhaline habitats through designation of critical habitat is expected to result in positive impacts. As discussed above, these features provide crucial nursery area functions to sawfish in Unit 2, and NMFS has determined these features in this Unit are essential to the conservation of the sawfish. Preventing the destruction or adverse modification of these features would contribute to the retention of existing economic and other benefits that they provide to society.

Based on the above consideration of the positive and negative economic impacts of including Unit 2 in the final critical habitat designation, NMFS does not exercise its discretion to exclude all or any part of Unit 2 from the designation on the basis of these impacts.

### **6.2.2 National Security Impacts**

Correspondence between the NMFS and the Departments of the Army, Navy, and Air Force indicated that no DOD facilities or managed areas are located within the final critical habitat. Based on the location of the critical habitat, consultations with respect to activities on DOD facilities or training are unlikely to be required as a result of the final critical habitat designation. Therefore, no national security impacts are anticipated as a result of this final critical habitat designation and no exclusions will be proposed on the basis of such impacts.

### **6.2.3 Other Relevant Impacts**

In addition to the economic benefits addressed above, the designation offers potential education benefits as discussed in *Section 5.1*. Specifically, the designation may expand the awareness raised by the listing of the smalltooth sawfish. Mangroves are often used for recreational activities, such as kayaking and bird watching. The designation may increase the attractiveness of conducting recreational activities within the boundaries of the critical habitat. Additionally, Federal and State protected areas may benefit from that added awareness of the endangered smalltooth sawfish within their boundaries, as well as support their conservation goals with the protection critical habitat designation affords.

The benefits associated with project modifications described previously would be the avoidance of destruction or adverse modification of the mangrove and shallow euryhaline habitats and the ecosystem services that they provide. The conservation of mangroves and shallow euryhaline habitats offers many benefits, including shoreline protection, fisheries sustainability, biodiversity, and water quality regulation. The conservation benefits would be realized from every acre protected as a result of the critical habitat designation (incremental to the listing of the smalltooth sawfish and other laws and regulations). Because current literature is not available for the Southern Florida region, this analysis does not estimate a monetary value for the protected habitats but discusses the benefits qualitatively. However, studies have been conducted on mangroves for other parts of the world. These studies have shown a direct link between the health of the mangrove forests and the economic and resource benefits that are provided to the local communities.

Based on the above consideration of positive and negative other relevant impacts of including Unit 2 in the final critical habitat designation, NMFS does not exercise its discretion to propose for exclusion all or any part of Unit 2 from the designation on the basis of these impacts.

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**APPENDIX A**

**BOUNDARIES OF THE AREAS FINAL FOR CRITICAL HABITAT DESIGNATION**

**Unit 1: Charlotte Harbor Estuary Unit**

The Charlotte Harbor Estuary Unit includes Charlotte Harbor, Gasparilla Sound, Pine Island Sound, Matlacha Pass, San Carlos Bay, Estero Bay, and the Caloosahatchee River. The unit is defined by the following boundaries. It is bounded by the Peace River at the eastern extent at the mouth of Shell Creek at 81° 59.467' W, and the northern extent of the Charlotte Harbor Preserve State Park at 26° 58.933' N. At the Myakka River the estuary is bounded by the State Road (SR)-776 Bridge and in Gasparilla Sound by the SR-771 Bridge. The International Regulations for Preventing Collisions at Sea 1972 (COLREGS-72) lines between Gasparilla Island, Lacosta Island, North Captiva Island, Captiva Island, Sanibel Island, and the northern point of Estero Island are used as the coastal boundary for the unit. The southern extent of the area is the Estero Bay Aquatic Preserve, which is bounded on the south by the Lee/Collier County line. Inland waters are bounded by SR-867 (McGregor Boulevard) from Punta Rassa Road to SR-80 near Fort Myers, then by SR-80 (Palm Beach Boulevard) to Orange River Boulevard, then by Orange River Boulevard to Buckingham Road, then by Buckingham Road to SR-80, and then following SR-80 until it is due south of the Franklin Lock and Dam (S-79), which is the eastern boundary on the Caloosahatchee River and a structural barrier for sawfish access. Additional inland water boundaries north and west of the lock are bounded by North Franklin Lock Road to North River Road, then by North River Road to SR-31, then by SR-31 to SR-78 near Cape Coral, then by SR-78 to SR-765, then by SR-765 to US-41, then by US-41 to US-17 (Marion Avenue) in Punta Gorda, then by US-17 to Riverside Drive, and then by Riverside Drive to the eastern extent of the Peace River at 81° 59.467' W. From the northern extent of the Charlotte Harbor Preserve State Park at 26° 58.933' N, inland waters are bounded westward along that latitude to Harbor View Road, then by Harbor View Road to US-41, then by US-41 to SR-776, then by SR-776 to the Myakka River Bridge.

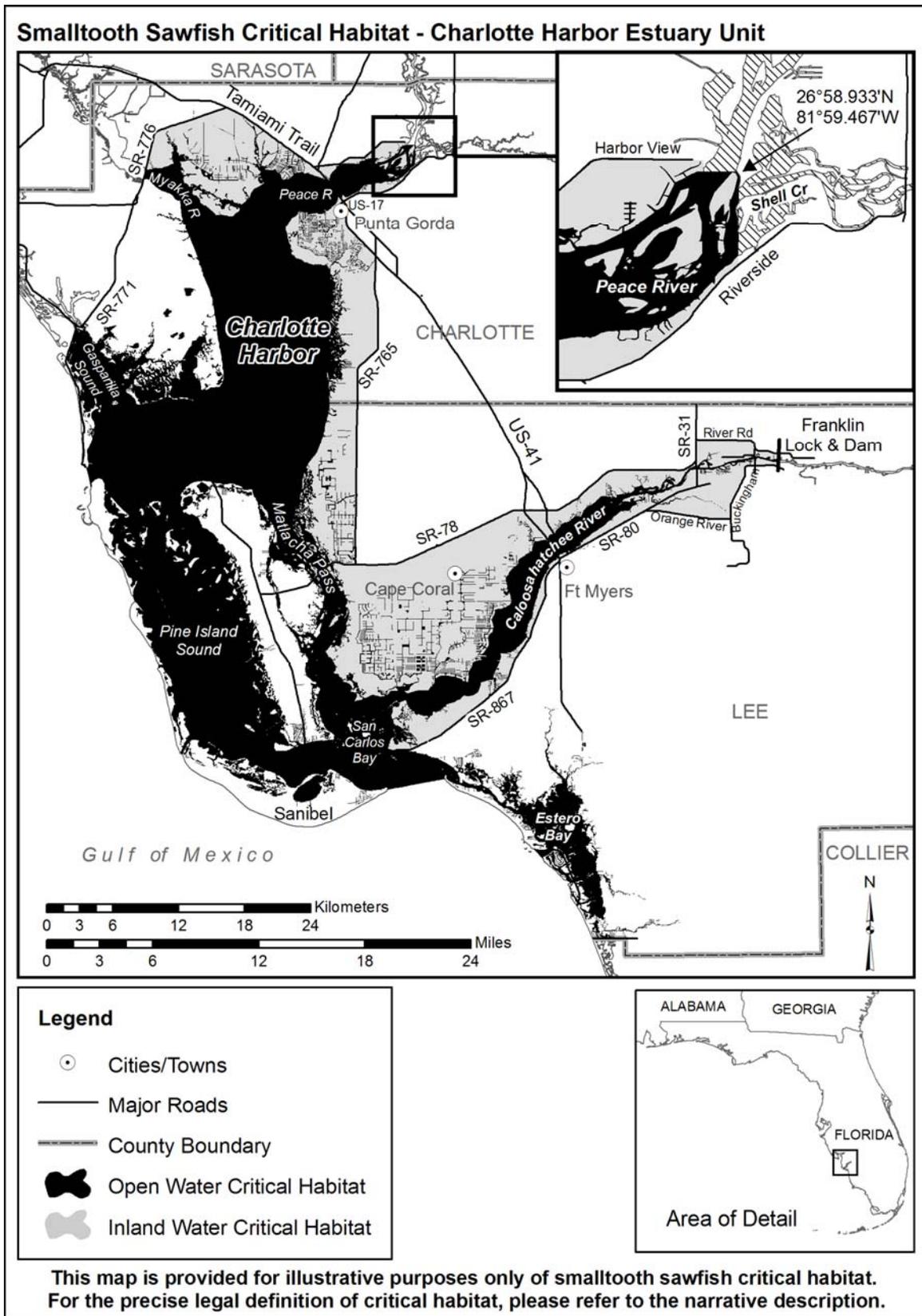
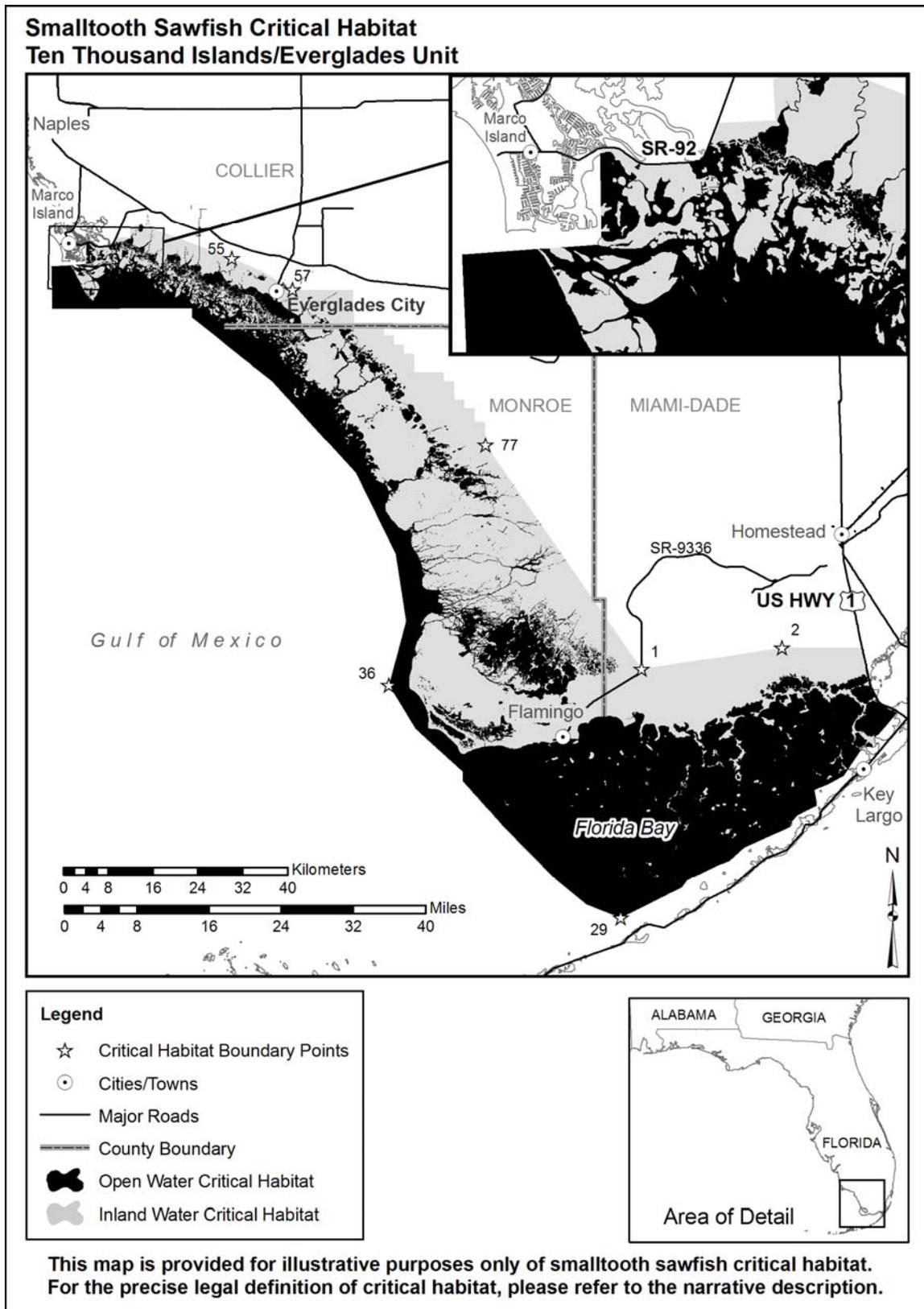


Figure A1: Final Critical Habitat Designation for Unit 1

## **Unit 2: Ten Thousand Islands/Everglades Unit**

The TTI/E Unit is located between Cape Romano and Florida Bay. It is bounded on the north by Rookery Bay Aquatic Preserve from SR-92 southward, Cape Romano-Ten Thousand Islands Aquatic Preserve southern boundary, and then closely follows the Everglades National Park coastal boundary, which includes Florida Bay, to U.S. Highway 1. Inland waters within the critical habitat would extend no further than the Aquatic Preserve and Everglades National Park boundary, with exceptions between Point 55 (see Table A1 for latitude and longitude point boundaries) at Cape Romano-Ten Thousand Islands Aquatic Preserve, and Point 56 and 57, near Everglades City. The boundary again follows the Everglades National Park boundary with exceptions between Point 77 and Point 1, at Main Park Road (SR-9336) at Nine Mile Pond, and Point 2, where it rejoins the Everglades National Park boundary due west of U.S. Highway 1 (Figure A2).



**Figure A2: Final Critical Habitat Designation for Unit 2**

**Table A1: Unit 2 Latitude and Longitude Point Boundaries**

ID	LATITUDE	LONGITUDE	DESCRIPTION
1	25.2527	-80.7988	Main Park Road (SR-9336) at Nine Mile Pond
2	25.2874	-80.5736	Everglades National Park boundary
3	25.2872	-80.4448	Everglades National Park boundary at US-HWY 1
4	25.2237	-80.4308	Everglades National Park boundary at US-HWY 1
5	25.1979	-80.4173	Everglades National Park boundary at US-HWY 1
6	25.1846	-80.3887	Everglades National Park boundary at US-HWY 1
7	25.1797	-80.3905	Everglades National Park boundary at US-HWY 1
8	25.1480	-80.4179	Everglades National Park boundary at Intercoastal Waterway (ICW)
9	25.1432	-80.4249	Everglades National Park boundary at ICW
10	25.1352	-80.4253	Everglades National Park boundary at ICW
11	25.1309	-80.4226	Everglades National Park boundary at ICW
12	25.1282	-80.4230	Everglades National Park boundary at ICW
13	25.1265	-80.4268	Everglades National Park boundary at ICW
14	25.1282	-80.4432	Everglades National Park boundary at ICW
15	25.0813	-80.4747	Everglades National Park boundary at ICW
16	25.0676	-80.4998	Everglades National Park boundary at ICW
17	25.0582	-80.5218	Everglades National Park boundary at ICW
18	25.0373	-80.5178	Everglades National Park boundary at ICW
19	25.0326	-80.5188	Everglades National Park boundary at ICW
20	25.0168	-80.5487	Everglades National Park boundary at ICW
21	25.0075	-80.5578	Everglades National Park boundary at ICW
22	24.9990	-80.5609	Everglades National Park boundary at ICW near Plantation
23	24.9962	-80.5648	Everglades National Park boundary at ICW
24	24.9655	-80.6347	Everglades National Park boundary at ICW
25	24.9430	-80.6585	Everglades National Park boundary at ICW
26	24.9388	-80.6716	Everglades National Park boundary at ICW
27	24.9124	-80.7255	Everglades National Park boundary at ICW
28	24.9006	-80.7348	Everglades National Park boundary at ICW
29	24.8515	-80.8326	Everglades National Park boundary at COLREG-72
30	24.8730	-80.8875	Everglades National Park boundary at Arsenic Bank Light
31	24.9142	-80.9372	Everglades National Park boundary at Sprigger Bank Light
32	25.0004	-81.0221	Everglades National Park boundary
33	25.0723	-81.0859	Everglades National Park boundary
34	25.0868	-81.0858	Everglades National Park boundary
35	25.1567	-81.1620	Everglades National Park boundary at Middle Cape Sable
36	25.2262	-81.2044	Everglades National Park boundary
37	25.3304	-81.1776	Everglades National Park boundary at Little Shark River
38	25.4379	-81.1940	Everglades National Park boundary
39	25.5682	-81.2581	Everglades National Park boundary
40	25.7154	-81.3923	Everglades National Park boundary at Pavillion Key
41	25.8181	-81.5205	Everglades National Park boundary
42	25.8326	-81.5205	Everglades National Park boundary at Cape Romano-Ten Thousand Islands Aquatic Preserve
43	25.8315	-81.7450	Rookery Bay Aquatic Preserve boundary (southwest corner)
44	25.9003	-81.7468	Rookery Bay Aquatic Preserve boundary
45	25.9030	-81.6907	Rookery Bay Aquatic Preserve boundary
46	25.9380	-81.6907	Rookery Bay Aquatic Preserve boundary at SR-92
47	25.9378	-81.6834	Rookery Bay Aquatic Preserve boundary at SR-92

ID	LATITUDE	LONGITUDE	DESCRIPTION
48	25.9319	-81.6718	Rookery Bay Aquatic Preserve boundary at SR-92
49	25.9330	-81.6508	Rookery Bay Aquatic Preserve boundary at SR-92
50	25.9351	-81.6483	Rookery Bay Aquatic Preserve boundary at SR-92
51	25.9464	-81.6433	Rookery Bay Aquatic Preserve boundary at SR-92
52	25.9470	-81.6200	Cape Romano-Ten Thousand Islands Aquatic Preserve boundary
53	25.9615	-81.6206	Cape Romano-Ten Thousand Islands Aquatic Preserve boundary
54	25.9689	-81.6041	Cape Romano-Ten Thousand Islands Aquatic Preserve boundary
55	25.9130	-81.4569	Cape Romano-Ten Thousand Islands Aquatic Preserve boundary
56	25.8916	-81.4082	Everglades National Park boundary west of Everglades City
57	25.8630	-81.3590	Everglades National Park boundary east of Everglades City
58	25.8619	-81.2624	Everglades National Park boundary
59	25.8040	-81.2602	Everglades National Park boundary
60	25.8040	-81.2126	Everglades National Park boundary
61	25.7892	-81.2128	Everglades National Park boundary
62	25.7892	-81.1969	Everglades National Park boundary
63	25.7743	-81.1966	Everglades National Park boundary
64	25.7740	-81.1803	Everglades National Park boundary
65	25.7591	-81.1803	Everglades National Park boundary
66	25.7592	-81.1641	Everglades National Park boundary
67	25.7295	-81.1638	Everglades National Park boundary
68	25.7299	-81.1165	Everglades National Park boundary
69	25.7153	-81.1164	Everglades National Park boundary
70	25.7154	-81.1002	Everglades National Park boundary
71	25.6859	-81.0997	Everglades National Park boundary
72	25.6862	-81.0836	Everglades National Park boundary
73	25.6715	-81.0835	Everglades National Park boundary
74	25.6718	-81.0671	Everglades National Park boundary
75	25.6497	-81.0665	Everglades National Park boundary
76	25.6501	-81.0507	Everglades National Park boundary
77	25.6128	-81.0497	Everglades National Park boundary

**APPENDIX B**

**FINAL REGULATORY FLEXIBILITY ANALYSIS  
FOR THE FINAL DESIGNATION OF CRITICAL HABITAT  
FOR SMALLTOOTH SAWFISH**

# FINAL REGULATORY FLEXIBILITY ANALYSIS

## Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to ensure that such proposals are given serious consideration. An RFA analysis does not contain any decision criteria; instead, the purpose of the RFA analysis is to inform the agency, as well as the public, of the expected economic impacts of alternatives to the proposed action, and to ensure that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the proposed action and applicable statutes.

The following Final Regulatory Flexibility Analysis (FRFA) has been prepared pursuant to Section 603 of the RFA to provide information to the public about the impacts of the action and significant alternatives to the proposed action. According to the RFA, an FRFA must contain the following information: (1) a description of the reasons why action by the agency is being considered; (2) a succinct statement of the objectives of, and legal basis for, the final rule; (3) a description, and, where feasible, an estimate of the number of small entities affected by the final rule; (4) a description of the projected reporting, record keeping, and other compliance requirements of the final rule, including an estimate of the classes of small entities that will be subject to the requirements of the Report or record; and (5) identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap, or conflict with the final rule. The FRFA must also describe significant alternatives to the final rule that accomplish the stated objectives of applicable statutes and that minimize any significant economic impact of the final rule on small entities. Analysis of these factors is based on the impacts analysis developed in the Section 4(b)(2) Report.

## Succinct statement of the need for, and objectives of, the rule

The purpose and need, issues, problems, and objectives of the ESA critical habitat designation for endangered smalltooth sawfish are discussed in the preamble to the final rule to designate critical habitat for the smalltooth sawfish and the *Impacts Analysis for Critical Habitat Designation for Endangered Smalltooth Sawfish*, prepared pursuant to Endangered Species Act (ESA) Section 4(b)(2). These discussions are incorporated herein by reference. In summary, the purpose of the final critical habitat designation is to designate, to the maximum extent prudent and determinable, the specific areas that contain the physical and biological features essential to the conservation of the species and that may require special management considerations or protections. For smalltooth sawfish, the physical and biological features essential to the conservation of the species because they provide juvenile nursery area functions are red mangroves and shallow euryhaline waters with depths of less than or equal to 3 feet (0.9 meter) at mean lower low water (MLLW).

## Significant issues raised by public comments

Public comments on the Draft 4(b)(2) Report are contained within the final rule designating critical habitat for the species, and are incorporated by reference. No comments were received on the RFA analysis.

## Description and estimate of the number of small entities to which the final rule may apply

This rule may affect small businesses, small nonprofit organizations, and small governmental jurisdictions that engage in activities that may affect the essential feature identified in this final

designation, if they receive funding or authorization for such activity from a Federal agency. Such activities would trigger ESA Section 7 consultation requirements, and potential recommendations to modify proposed activities to avoid destroying or adversely modifying the critical habitat. The consultation record from which the National Marine Fisheries Service (NMFS) projects likely actions occurring over the next 10 years indicates that applicants for Federal permits or funds have included small entities. For example, marine contractors have been the recipients of U.S. Army Corps of Engineers (USACE) permits for dock construction; some of these contractors may be small entities. According to the Small Business Administration, businesses in the Heavy and Civil Engineering Construction subsector (NAICS Code 237990), which includes firms involved in marine construction projects such as breakwater, dock, pier, jetty, seawall and harbor construction, must have average annual receipts of no more than \$31 million to qualify as a small business (dredging contractors that perform at least 40 percent of the volume dredged with their own equipment, or equipment owned by another small concern are considered small businesses if their average annual receipts are less than or equal to \$18.5 million). The NMFS consultation database does not track the identity of past permit recipients or any particulars that would allow the NMFS to determine whether the recipients were small entities, so there is no basis to determine the number or percentage of future grantees or permittees that may be small businesses. Small businesses in the tourist and commercial fishing industries may benefit from the rule, as conservation of the critical habitat features, particularly mangroves, is expected to at minimum prevent loss of current direct and indirect use of, and values derived from, these habitats within the areas included in the final designation. Small businesses, small governmental jurisdictions, and other small entities are encouraged to provide comment on whether they may be affected by this rulemaking to help us provide an accurate estimate of the number of small entities to which the final rule will apply.

A review of historical ESA Section 7 consultations involving projects in the final designated areas is described in *Section 3.2.2* of the Section 4(b)(2) Report prepared for this rulemaking. NMFS projects that, on average, approximately eight Federal projects with non-Federal grantees or permittees will be affected by implementation of the final critical habitat designation, annually, across both areas included in the critical habitat designation. Some of these grantees or permittees could be small entities, or could hire small entities to assist in project implementation. Historically, these projects have involved dock/pier construction and repair, water control structure installation or repair, bridge repair and construction, dredging, cable installation, and shoreline stabilization. Potential project modifications that may be required to prevent these types of projects from adversely modifying critical habitat include: project relocation; environmental conditions monitoring; horizontal directional drilling (HDD); road/utility corridor restrictions; alternative shoreline stabilization methods; dock size and width limits; restrictions on structures that modify freshwater flows; and sediment and turbidity control measures. See Table 15 of the Section 4(b)(2) report. The project modification costs table is excerpted below.

Even though NMFS cannot determine relative numbers of small and large entities that may be affected by this rule, there is no indication that affected project applicants would be limited to, nor disproportionately comprised of, small entities. It is unclear whether small entities would be placed at a competitive disadvantage compared to large entities. However, as described in the Section 4(b)(2) Report, consultations and project modifications will be required based on the type of permitted action and its associated impacts on the essential critical habitat feature. The costs of many potential project modifications that may be required to avoid adverse modification of critical habitat may be unit costs (e.g., cost per mile or per linear foot of the project). Thus, total project modification costs would be proportional to the size of the project, and it is not unreasonable to assume that larger entities would be involved in implementing the larger projects with proportionally larger project modification costs.

It is also unclear whether the final rule will significantly reduce profits or revenue for small businesses. As discussed throughout the Section 4(b)(2) Report, assumptions are made that all of the future consultations will be formal, that all will require project modifications, and that all costs of project modifications will be incremental impacts of the final designation and not a requirement of other existing

regulatory requirements. These assumptions likely overestimate the impacts of the final designation. In addition, as stated above, though it is not possible to determine the exact cost of any given project modification resulting from consultation, the smaller projects most likely to be undertaken by small entities would likely result in relatively small modification costs.

Small businesses, small governmental jurisdictions, and other small entities that may be affected by this rule were encouraged to provide comment on the potential economic impacts of the final designation, such as anticipated costs of consultation and potential project modifications, to improve the above analysis.

**Table B1: Potential Project Modification Costs**

Project Modification	Cost	Unit	Range	Approx. Totals
Project Relocation	Undeterminable	N/A	N/A	N/A
HDD	\$1.39–2.44 million	per mile	0.2–31.5 Miles	\$278,000–\$76,900,000
Restriction of Utility/Road Corridor Widths	Roadway Retained Sides, 2 Lane = \$1,875 Roadway Retained Sides, 4 Lane = \$2,150 Roadway Bridge, 2 Lane = \$3,370 Roadway Bridge 4 Lane = \$5,050	linear foot	N/A	\$1,875–\$5,050 per linear foot
Alternative Shoreline Stabilization Methods	Undeterminable	N/A	N/A	N/A
Limitations on Dock Size	Undeterminable	N/A	N/A	N/A
Limitation/Restrictions on Modifying Freshwater Flow	Undeterminable	N/A	N/A	N/A
Sediment Controls	Staked Silt Fence = \$2 Floating Turbidity Barrier = \$12	linear foot	N/A	\$2–\$12 per linear foot
Conditions Monitoring	Undeterminable	N/A	N/A	N/A

Note: Where information was available, the estimated ranges (extents) of the impacts are included.

## Description of projected reporting, record keeping, and other compliance requirements of the final rule

The final critical habitat rule will require that Federal agencies ensure their actions do not destroy or adversely modify critical habitat through a Section 7 consultation. See *Section 1.2* for a description of the final rule. The primary compliance mechanism for the final rule involves the implementation of project modifications to reduce the impact of federally conducted and permitted actions on the final critical habitat. Where available, costs for these modifications are set forth above. Other than any monitoring or reporting recommended during a Section 7 consultation, no record keeping or reporting requirements are associated with the final rule. There are, however, administrative costs associated with compliance requirements of the critical habitat designation, and a higher percentage of the actions are assumed to require a formal consultation (historical consultation records used as the basis of this analysis have all been informal). Based on comments received on the proposed rule, we expect an increase of one section 7 consultation (general permit) for hard clam aquaculture activities in Florida. We increased the number of future section 7 consultations into Unit 1 because we expect this type of activity will occur only in Unit 1. The overall cost associated with future section 7 administrative cost is now \$1,039,500 to \$1,386,000.

## Description of significant alternatives

### **Alternative 1: No Action Alternative**

No action (status quo): NMFS would not designate critical habitat for smalltooth sawfish. Under this alternative conservation and recovery of the listed species would depend exclusively upon the protection provided under the “jeopardy” provisions of Section 7 of the ESA. Under the status quo, there would be no increase in the number of ESA consultations or project modifications in the future that would not otherwise be required due to the listing of the smalltooth sawfish. However, the physical and biological features forming the basis for the final critical habitat designation are essential to sawfish conservation, and conservation for this species will not succeed without the availability of this feature. Thus, the lack of protection of the critical habitat feature from adverse modification could result in continued declines in abundance of smalltooth sawfish, and loss of associated values sawfish provide to society. Further, this alternative is not consistent with the requirement of the ESA to designate critical habitat to the maximum extent prudent and determinable.

### **Alternative 2: Preferred Alternative**

Under this alternative, two specific areas that provide nursery functions for juvenile sawfish are designated as critical habitat. These areas are located along peninsular Florida, encompassing portions of Charlotte, Lee, Collier, Monroe, and Miami-Dade counties. This area contains the physical and biological features essential to the conservation of the U.S. distinct population segment (DPS) of smalltooth sawfish. The essential features are red mangroves and shallow euryhaline habitats characterized by water depths between the mean high water (MHW) line and 3 feet (0.9 meter) measured at MLLW that provide nursery area functions to smalltooth sawfish.

The preferred alternative was selected because it best implements the critical habitat provisions of the ESA, by defining the specific features that are essential to the conservation of the species, and due to the important conservation benefits are expected to result from this alternative relative to the no action alternative.

### **Alternative 3: Varying Numbers of Units Alternative**

Under this alternative, NMFS considered both combining the Charlotte Harbor Estuary Unit and the Ten Thousand Islands/Everglades (TTI/E) Unit into a single unit for designation and splitting both units into multiple smaller units. Under the first scenario, the unit would have included the Naples beach area between the final two units, and thus would encompass a larger total area than the final two units. Though juveniles have been encountered in the Naples beach area, they have not been encountered in high densities. Juveniles are not believed to move between the Charlotte Harbor Estuary and TTI/E Units along this stretch of beach. Furthermore, while red mangroves exist along this area (though they are much more sparsely distributed than in the final two units), the salinity regimes are much more purely marine than estuarine, and the features are not considered to provide nursery functions essential to the conservation of the species in these areas. Thus, NMFS rejected this alternative because the Naples Beach area is not considered to meet the definition of critical habitat.

Under the second scenario, NMFS considered options to split both the Charlotte Harbor Estuary Unit and the TTI/E Unit into multiple smaller units. NMFS considered designating Charlotte Harbor and the Caloosahatchee Rivers as separate units, including limiting the sizes of each of these areas strictly to locations of past high density encounters of juveniles. The same type of partitioning of the TTI/E Unit into smaller isolated units was considered based on past high density encounters alone.

NMFS rejected the alternative of separating Charlotte Harbor and the Caloosahatchee River because State and local water resource managers consider the systems as a single integrated aquatic system. For both final units, NMFS rejected the alternative of multiple smaller units drawn around past high density juvenile encounters because it would have omitted habitat that is almost certain nursery habitat for the sawfish between the units. In addition, the essential features are continuously distributed from the harbor

to the river, so this option would have omitted areas that meet the definition of critical habitat. Moreover, a designation limited to past encounters would not take into account the limits of this type of data in defining the extent of habitat use by the sawfish, and it would not provide protection for expanded nursery habitat needed for a recovering population. In addition, it was not clear that designating multiple smaller units would result in lower economic impacts of the designation, as the precise location of future consultations within these areas cannot be predicted based on available information.