ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE GULF STURGEON

January 2003

IEc INDUSTRIAL ECONOMICS, INCORPORATED

Final Report - January 2003

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EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts that may result from the proposed critical habitat designation for the Gulf sturgeon *(Acipenser oxyrinchus desotoi*). This report was prepared by Industrial Economics, Incorporated, for the U.S. Fish and Wildlife Service's Division of Economics and the National Marine Fisheries Service.

2. Section 4(b)(2) of the Endangered Species Act (Act) requires the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NOAA Fisheries) (the Services) to designate critical habitat on the basis of the best scientific data available, after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Services may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Framework for the Analysis

3. The focus of this economic analysis is on section 7 of the Act, which requires Federal agencies to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. Federal agencies are required to consult with the Services whenever they propose an action that may affect a listed species or its designated critical habitat. Aside from the protection that is provided under section 7, critical habitat does not provide other forms of protection to designated lands. Because consultation under section 7 only applies to activities that are carried out, permitted, or funded by a Federal agency, the designation of critical habitat will not afford any additional protections for species with respect to strictly private activities.

4. This analysis first identifies land use activities within or in the vicinity of those areas being proposed for critical habitat that are likely to be affected by section 7 of the Act. The resulting impacts that section 7 can have on such activities constitute the upper-bound estimate of the proposed critical habitat economic analysis. By defining the upper-bound estimate to include critical habitat impacts, occurring alone and co-extensively with jeopardy considerations, the analysis recognizes the difficulty in differentiating between the two in evaluating only the critical habitat effects associated with the proposed rulemaking. This step is adopted in order to ensure that any critical habitat impacts that may occur co-extensively with the listing of the species (i.e., jeopardy) are not overlooked in the analysis.

5. Upon identifying section 7 impacts, the analysis proceeds to consider the subset of impacts that can be attributed exclusively to the critical habitat designation. To do this, the analysis adopts a "with and without critical habitat approach." This approach is used to determine those effects found in the upper-bound estimate that may be attributed solely to the proposed designation of critical habitat. In many cases, impacts associated with the jeopardy standard remain unaffected by the designation of critical habitat and thus would not

normally be considered an effect of a critical habitat rulemaking. The subset of section 7 impacts likely to be affected solely by the designation of critical habitat represents the lower-bound estimate of this analysis.

6. Costs associated with section 7 consultations represent the direct costs of the proposed rule.[1] This analysis also qualitatively discusses potential secondary economic impacts on local industries and enterprises resulting from the physical changes to habitat areas that may be associated with project modifications (e.g., regional economic impacts).

Key Findings

7. The present value expected direct costs of implementation of section 7 for activities that may affect the sturgeon or its habitat over the next ten years range from $23.2 million to $34.8 million (using a seven percent real social discount rate). The present value of expected costs attributable solely to the critical habitat designation over the same period range from $616,000 to $762,000. While a range of activities may be affected by the proposed designation, the majority of total section 7 costs are expected to stem from consultations with the U.S. Army Corps of Engineers (USACE) for proposed O&M navigation projects (e.g., dredging and disposal) and other civil works projects. Forecast costs impacts are associated with expected administrative requirements and project modifications that are expected to be recommended by the Services during the consultation process.

8. The proposed sturgeon habitat consists of 1,580 river miles and 2,333 square miles of estuarine and marine areas from Louisiana to Florida. The region is dominated by water-based commercial and recreational activities, and local and regional economic growth in the region is inextricably linked to these activities. A network of ports, harbors, and riverways facilitates waterborne commerce, commercial fishing, sport fishing and other water-based recreational activities, and hydropower generation. The importance of water-related activity to this region suggests that, although these industries are unlikely to be directly affected through the implementation of section 7, certain secondary effects could result from the designation. Concerns have been raised, in particular, about impacts to (1) the navigation industry and associated ports; (2) industries dependent on the Jim Woodruff Dam and associated upstream reservoirs for recreation, tourism, water supply, and hydropower; (3) the commercial fishing industry; and (4) various counties in Mississippi.

[1] Generally, if a consultation is triggered for any listed species, the consultation process will also take into account all other listed species known or thought to occupy areas on or near the project lands. However, due to the difficulty in apportioning the costs of consultations between various species as well as awareness that a consultation for the sturgeon would need to be conducted absent consultations for or involving other species, this analysis does not attempt to apportion the consultations and related costs reported by Action agencies between the sturgeon and other listed species.

9. This analysis concludes that secondary impacts to the activities described in the previous paragraph are unlikely to occur. First, all available evidence indicates that future USACE projects will be able to proceed without changes to timing and scope; therefore, secondary effects to waterborne commerce are highly unlikely to occur. Based on available information, to the extent that flow regime changes are implemented at Jim Woodruff Dam to protect sturgeon, secondary economic effects on hydropower, users of upstream water resources, and the regional economy are likely to be modest.[2] No evidence from past consultation records or conversations with the Services suggests that commercial fishing will be affected by section 7 implementation. Because no limitations to commercial fishing activities are expected, secondary effects to the industry are unlikely. Finally, concerns that counties' ability to attract industry will be compromised by, for example, limitations on expansion of community wastewater facilities, contradict regulatory history. Review of the consultation history provides no evidence of that section 7 consultation will hamper growth. For example, water quality standards already provided for under the Clean Water Act are protective of sturgeon habitat, and therefore limitations due to these standards should not be attributed to the designation of sturgeon habitat.

10. Most of the economic impacts of the proposed designation will be manifested primarily as increased administrative and operating costs for Federal agencies. In particular, based on upper-bound cost estimates, approximately 76 percent will be administrative and operational costs borne by Federal agencies carrying out projects (primarily USACE), and approximately ten percent will be administrative costs to the Services of engaging in section 7 consultation. Estimation of whether complying with the administrative requirements imposed by the designation will require additional funding for these agencies, or how Federal budgets will be adjusted to meet these needs, is difficult to predict based on existing information.

Section 7 Costs

11. Federal agencies that may consult with the Services include USACE, Department of Defense (DOD), Minerals and Management Service (MMS), Federal Highway Administration (FHWA), Environmental Protection Agency (EPA), Coast Guard, and Federal Emergency Management Agency (FEMA). State and private entities receiving Federal funding or applying for Federal permits will also incur costs related to section 7 implementation for the sturgeon. The state and private activities most likely to result in section 7 consultations are: bridge replacement; construction in waterways requiring a section 404 or section 10 permit from ACOE; and construction of interstate oil and gas pipelines requiring a FERC license. Other activities on private land with no Federal nexus, such as most private development, forestry, and farming practices, will not be subject to any additional consultations or project modifications. Results of the economic analysis are summarized below in terms of type of activity likely to be affected:

[2] Despite all evidence to the contrary, were USACE projects and flow regimes sufficiently affected to constrain waterborne commerce and related activities, secondary economic impacts could be significant.

- **Operation and Maintenance (O&M) Navigation Projects.** USACE and the Coast Guard undertake dredging and sediment disposal activities to maintain and improve waterways to support navigation. These agencies are expected to engage in 60 section 7 consultations for O&M navigation activities, resulting in a total upper-bound cost of $22.7 million (in 2002 dollars).

- **USACE Operations Projects (e.g., Beach Nourishment, Flood Bank Control/Bank Stabilization, Clearing and Snagging, Dam and Reservoir Operations).** USACE undertakes beach nourishment as part of its mission to protect beach areas from hurricane and coastal storm damage, and maintains waterways and protects shorelines through flood bank control, bank stabilization, and clearing and snagging activities. USACE also manages reservoirs and dams that serve a variety of purposes, including navigation, flood control, hydropower generation, water supply, and recreation. These activities are expected to result in 102 consultations, for a total cost of $2.0 million.

- **Regulated Modifications of Surface Water Bodies.** Private parties may request permits from the USACE for a variety of activities that occur in waterways or involve modifying navigable waterways, such as construction in waterways (e.g., docks, piers), private dredging projects, shoreline stabilization, aquaculture, mining, construction and maintenance of oil and gas pipelines, and state or local water supply projects. These activities are likely to result in 798 consultations (which involve private parties) for a total cost of $12.6 million. The majority of these consultations are likely to be informal.

- **Oil and Gas Leases in Federal Waters.** MMS typically conducts consultations on risk of oil spills when offering leases for oil and gas sites in the Gulf of Mexico to private companies, resulting in 18 consultations (which involve private parties), for a total cost of $439,000.

- **Review of State Water Quality Standards, Listings of Impaired Water Bodies, and Total Maximum Daily Loads (TMDLs).** The USEPA consults with the Service when it reviews state water quality standards, lists impaired water bodies, and when TMDLs for waterbodies are exceeded as a result of point and non-point source pollution. These activities are expected to result in 363 consultations (which may involve state agencies and/or private parties) for a total cost of $4.7 million. The majority of these consultations are likely to be informal.

- **Road and Bridge Construction, Removal, and Maintenance.** The FHWA consults with the Services when it provides funding to state Departments of Transportation (DOTs) for road and bridge construction projects. In addition, the Coast Guard may consult with the Services on bridge replacement activities. These activities are expected to result in 22 consultations (which likely involve state Departments of Transportation) for a total cost of $4.3 million.

- **Relicensing of Hydroelectric Projects, Permitting of Interestate Oil and Gas Pipelines.** FERC consults with the Services on relicensing of private, municipal, and state hydroelectric projects and the interstate transmission of electricity, oil, and natural gas by pipeline. These activities are expected to result in 21 consultations (which involve third parties) for a total cost of $828,000 thousand. All of these consultations are likely to be informal.

- **Fisheries Management.** NOAA Fisheries develops Fisheries Management Plans (FMPs), which contain conservation and management measures designed to prevent overfishing and rebuild overfished stock, and to protect, restore, and promote the long-term health and stability of each fishery. The development of these plans is likely to result in 13 internal consultations within the Services, for a total cost of $207,000.

- **Emergency Response Projects.** FEMA consults with the Services regarding emergency response projects, such as construction of drainage ditches and berms for beach nourishment and debris removal. These activities are likely to result in two consultations, for a total cost of $25,000. These consultations are likely to be informal.

- **Department of Defense Facilities.** DOD consults with the Services for activities on facilities located adjacent to proposed critical habitat for the sturgeon, including Eglin Air Force Base, Tyndall Air Force Base, John C. Stennis Space Center, Pensacola Naval Air Station, and Naval Station Pascagoula. The analysis anticipates that DOD will undertake approximately 77 consultations, for a total cost of $1.7 million.

- **Aids to Navigation.** The Coast Guard maintains channel lights, buoys, and permanent pilings. The Coast Guard does not expect to consult with the Services on these activities.

- **Forest Land Management.** The Forest Service does not anticipate consulting with the Services for the sturgeon or its habitat for activities on Federal land managed by the Forest Service bordering the proposed critical habitat. No costs are anticipated in association with activities on these lands.

- **National Wildlife Refuges, National Seashore, and Estuarine Research Facility.** Significant impacts are not anticipated in association with Federal agencies' operation and management of national wildlife refuges, a national seashore, and an estuarine research facility located within or adjacent to proposed critical habitat.

Section 7 Benefits

12. The listing of the sturgeon and the designation of critical habitat may engender certain societal benefits. Survival and recovery of the species may lead to benefits such as enhanced existence values, as well as the development of commercial and recreational

sturgeon fisheries. Protecting sturgeon habitat may produce benefits such as preservation of habitat suitable for recreational uses, improved water quality, and habitat improvement for other species.

13. Insufficient information exists to quantify the benefits of sturgeon habitat protection. However, several studies reported in the economics literature attempt to estimate the non-use value the public holds for preservation of various threatened or endangered fish species or the conservation of their habitat. These studies support the notion that preservation of threatened and endangered fish species and their habitat are likely to generate benefits to the public.

Summary

14. Exhibit ES-1 provides an overview of the present value of total section 7 costs associated with the listing and designation of critical habitat for the sturgeon over a ten year period. To discount and annualize costs, guidance provided by the Office of Management and Budget (OMB) specifies the use of a rate of seven percent, reflecting the social opportunity cost of capital (measured by the before-tax rate of return for private investment.) In addition, OMB recommends sensitivity analysis using other discount rates. One commonly applied rate is three percent, reflecting a social rate of time preference (estimated using average rates on long-term Treasury bonds).[3] This analysis presents results using both of these rates.

Exhibit ES-1

SECTION 7 COSTS ASSOCIATED WITH THE LISTING AND DESIGNATION OF CRITICAL HABITAT FOR THE GULF STURGEON

	Total Co-Extensive Costs	Costs Attributed Solely to Critical Habitat Designation
Nominal value of total section 7 costs	$33,096,000 to $49,526,000	$877,000 to $1,084,000
Present Value (7% discount rate)	$23,245,000 to $34,785,000	$616,000 to $762,000
Annualized over ten years	$3,310,000 to $4,953,000	$88,000 to $108,000
Present Value (3% discount rate)	$28,232,000 to $42,246,000	$748,000 to $925,000
Annualized over ten years	$3,310,000 to $4,953,000	$88,000 to $108,000

Note: Present value and annualized cost estimates are based on an assumption that consultation and project modification costs will be distributed evenly over a ten year period.

[3] U.S. Office of Management and Budget, "Guidelines to Standardize Measures of Costs and Benefits and the Format of Accounting Statements," in *Appendix 4: Report to Congress on the Costs and Benefits of Federal Regulations*, March 22, 2000.

15. Exhibit ES-2 provides a more detailed summary of the consultation and technical assistance costs likely to be associated with the proposed critical habitat units over a ten year period (table presentation is in 2002 dollars).

Exhibit ES-2

ESTIMATED TOTAL COSTS ASSOCIATED WITH SECTION 7 IMPLEMENTATION FOR THE GULF STURGEON BY UNIT (TEN YEARS, 2002$)

Unit	Total Co-Extensive Costs	Costs Attributable to Critical Habitat
Unit 1	$619,000 to $2,341,000	$32,000 to $38,000
Unit 2	$390,000 to $1,292,000	$24,000 to $27,000
Unit 3	$261,000 to $833,000	$17,000 to $18,000
Unit 4	$324,000 to $1,182,000	$21,000 to $23,000
Unit 5	$198,000 to $551,000	$13,000 to $14,000
Unit 6	$387,000 to $1,207,000	$26,000 to $28,000
Unit 7	$262,000 to $985,000	$14,000 to $16,000
Unit 8	$942,000 to $2,807,000	$266,000 to $298,000
Unit 9	$482,000 to $1,482,000	$126,000 to $172,000
Unit 10	$980,000 to $3,523,000	$108,000 to $142,000
Unit 11	$483,000 to $1,322,000	$33,000 to $35,000
Unit 12	$1,061,000 to $3,811,000	$92,000 to $118,000
Unit 13	$322,000 to $1,005,000	$58,000 to $77,000
Unit 14	$71,000 to $298,000	$5,000
Multiple Units	$274,000 to $846,000	$43,000 to $73,000
Consultation Cost Sub-Total	**$7,056,000 to $23,486,000**	**$877,000 to $1,084,000**
Project Modification Cost (All Units)	**$26,040,000**	**$0**
Total [a]	**$33,096,000 to $49,526,000**	**$877,000 to $1,084,000**

Note: Costs may not sum due to rounding.

[a] Total does not include cost reductions from future potential programmatic consultations on O&M navigation project activities.

16. Exhibit ES-3 presents the key assumptions of this economic analysis, as well as the potential direction and relative scale of bias introduced by the assumption.

Exhibit ES-3

CAVEATS TO THE ECONOMIC ANALYSIS

Key Assumption	Effect on Cost Estimate
Consultation rates will not change over time.	?
The presence of other species (i.e., Kemp's Ridley turtle, Inflated heelsplitter mussel, etc.) has no influence on consultation/project modification costs.	+
Action agencies will consult with FWS and NOAA Fisheries according to the jurisdictional responsibilities outlined in the proposed designation. They will not need to consult with both Services on a single project.	-
High-end estimates of future numbers of consultations are used.	+
Historical administrative consultation costs and project modification cost estimates are good predictors of future consultation behavior.	?
Total cost estimates assume that USACE will not engage in up to three programmatic consultations on O&M navigation projects, although doing so could streamline the consultation process.	+
Dredging windows will not be recommended as project modifications in formal consultations, unless they coincide with USACE's previously planned dredging schedule.	-
Regional economic impacts on waterborne commerce, commercial fishing, and Mississippi counties are unlikely.	-
To the extent that flow regime changes are implemented at Jim Woodruff Dam to protect sturgeon, secondary economic effects will be limited.	-
New information on sturgeon behavior and migratory patterns may become available.	?
The consultation process between the Services and USACE is in flux.	?
Modification cost scenario is based on upper-bound modification cost estimates for O&M navigation, bridge construction, interstate pipeline, and research and monitoring projects.	+
Modification costs for other activities are unlikely or cannot be predicted at this time (e.g., regulated modifications of surface water bodies, operations of Jim Woodruff Dam).	-
Designation of critical habitat will not alter the consultation process for FWS except to add an increment of administrative effort to each consultation.	-
Increases in section 7 costs associated solely with the critical habitat provision of section 7 will be administrative in nature. Project modifications are attributable co-extensively to the listing and designation of critical habitat for the sturgeon.	-
Consultation and project modification costs will be distributed evenly over a ten year period.	?

- : This assumption may result in an underestimate of real costs.
+ : This assumption may result in an overestimate of real costs.
? : This assumption has an unknown effect on estimates.

INTRODUCTION AND BACKGROUND SECTION 1

17. The U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NOAA Fisheries) (the Services) are in the process of proposing designation of critical habitat for the Gulf sturgeon (*Acipenser oxyrinchus desotoi*). The purpose of this report is to identify and analyze potential economic impacts that could result from the designation.

18. Section 4(b)(2) of the Endangered Species Act (the Act) requires that the Services base the designation of critical habitat upon the best scientific and commercial data available, after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Services may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas as critical habitat, provided the exclusion will not result in extinction of the species.

19. Under the listing of a species, section 7(a)(2) of the Act requires Federal agencies to consult with the Services in order to ensure that activities they fund, authorize, permit, or carry out are not likely to jeopardize the continued existence of the species. For designated critical habitat, section 7(a)(2) also requires Federal agencies to consult with the Services to ensure that activities they fund, authorize, permit, or carry out do not result in destruction or adverse modification of critical habitat.

20. In March 2001, the United States Court of Appeals for the Fifth Circuit instructed the Services to reconsider their previous determination that designation of critical habitat for the sturgeon is not prudent (*Sierra Club* v. *U.S. Fish and Wildlife Service, 245 F.3d 434*, 5th Circuit, 2001). The *Proposed Designation of Critical Habitat for the Gulf Sturgeon*, published June 6, 2002, reflects the Services' interpretation of recent judicial opinions on critical habitat designation and the standards for making a prudency determination. However, the March 2001 decision of the Fifth Circuit Court of Appeals found the Services' definition of destruction or adverse modification as currently contained in 50 CFR 402.02 to be invalid. In response to this decision, the Services are "reviewing the regulatory definition of adverse modification in relation to the conservation of the species."[4] The Services define jeopardy as any action that would appreciably reduce the likelihood of both the survival and recovery of the species. Adverse modification of critical habitat is currently

[4] U.S. Fish and Wildlife Service, *Proposed Designation of Critical Habitat for the Gulf Sturgeon*, June 6, 2002 (67 FR 109).

construed as any direct or secondary alteration that appreciably diminishes the value of critical habitat for conservation of a listed species.

1.1 Description of Species and Habitat[5]

21. The Gulf sturgeon (sturgeon) is an anadromous fish (ascending rivers from the sea for breeding), inhabiting coastal rivers from Louisiana to Florida during the warmer months and overwintering in estuaries, bays, and the Gulf of Mexico. It is a nearly cylindrical fish embedded with bony plates or scutes, with an extended snout and a suction-type mouth located beneath the head with four barbels in front of the mouth.

22. Adult sturgeon range between four and eight feet in length, with adult females larger than males. Sturgeon feeding habits in freshwater vary depending on the fish's life history stage (young-of-year, juvenile, sub-adult, adult). Young-of-year sturgeon remain in freshwater through early February, feeding on aquatic invertebrates and detritus. Juvenile feeding is widely distributed, exploiting scarce food resources throughout the river, including aquatic insects, worms, and bivalve molluscs. It is believed that sub-adult and adult sturgeon do not feed in freshwater but rather fast and lose up to 30 percent of their total body weight and then compensate for the loss during winter feeding in the sea.

23. Sturgeon are long-lived, with some reaching 42 years in age. Females reach sexual maturity between the ages of 8 and 17, and males between 7 and 21 years. Gulf sturgeon eggs are demersal (they are heavy and sink to the bottom), adhesive, and vary in color from gray to brown to black. Mature females produce an average of 400,000 eggs. Breeding habitat consists of riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay.

24. Historically, the sturgeon occurred from the Mississippi River to Tampa Bay. Its present range extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi east to the Suwannee River in Florida. Incidental sightings are still reported from the mouth of the Mississippi River and Tampa Bay.

25. The sturgeon supported a commercial fishery in the early twentieth century, providing eggs for caviar, flesh for smoked fish, and swim bladders for isinglass, a gelatin used in food products and glues. Sturgeon numbers declined due to overfishing throughout most of the twentieth century; the decline was exacerbated by habitat loss associated with the construction of water control structures, such as dams and sills, and habitat degradation due to poor water quality. In several rivers throughout its range, dams have severely restricted sturgeon access to historic migration routes and spawning areas.

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[5] Information on the sturgeon and its habitat is taken from the U.S. Fish and Wildlife Service, *Proposed Designation of Critical Habitat for the Gulf Sturgeon*, June 6, 2002 (67 FR 109) and the *Gulf Sturgeon Recovery/Management Plan*, 1995.

26. In identifying areas as critical habitat for the sturgeon, the Services considered those physical and biological features which are essential to the conservation of the species. Such requirements include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historical geographical and ecological distribution of the species. Based on the best available information, the primary constituent elements for the sturgeon are:

- Abundant food items, such as detritus, aquatic insects, worms, and/or molluscs, within riverine habitats for larval and juvenile life stages; and abundant prey items, such as amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, molluscs and/or crustaceans, within estuarine and marine habitats and substrates for sub-adult and adult life stages;

- Riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay;

- A flow regime (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging, and for maintaining spawning sites in suitable condition for egg attachment, egg sheltering, resting, and larval staging;

- Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;

- Sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and

- Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g., an unobstructed river or a dammed river that still allows for passage).

1.2 Proposed Critical Habitat[6]

27. The areas proposed for designation as critical habitat for the sturgeon provide one or more of the primary constituent elements described above. All of the proposed areas

[6] Information on the sturgeon and its habitat is taken from the U.S. Fish and Wildlife Service, *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Gulf Sturgeon*, June 6, 2002 (67 FR 109); and the *Gulf Sturgeon Recovery/Management Plan*, 1995.

require special management considerations to ensure their contribution to the conservation of the sturgeon. The critical habitat area consists of 1,580 river miles and 2,333 square miles of estuarine and marine habitat within 14 units. The lateral extent of proposed riverine critical habitat is up to the ordinary high-water line on each river bank, and up to the mean high-water line for estuarine and marine habitat. All of the proposed critical habitat areas are currently seasonally occupied by the sturgeon. Descriptions of each critical habitat unit are provided below:

- **Unit 1: Pearl River System in St. Tammany and Washington Parishes in Louisiana, and Walthall, Hancock, Pearl River, Marion, Lawrence, Simpson, Copiah, Hinds, Rankin, and Pike Counties in Mississippi.** Unit 1 includes the Pearl River main stem from the spillway of the Ross Barnett Dam, downstream to where the main stem river drainage discharges at its mouth joining Lake Borgne, Little Lake, or The Rigolets. It includes the main stems of the East Pearl River, West Pearl River, West Middle River, Holmes Bayou, Wilson Slough, downstream to where these main stem river drainages discharge at the mouths of Lake Borgne, Little Lake, or the Rigolets. Unit 1 also includes the Bogue Chitto River main stem, a tributary of the Pearl River, from its confluence with Lazy Creek just upstream of its crossing with Mississippi State Highway 570, downstream to its confluence with the West Pearl River.

- **Unit 2: Pascagoula River System in Forrest, Perry, Greene, George, Jackson, Clarke, Jones, and Wayne Counties, Mississippi.** Unit 2 includes all of the Pascagoula River main stem and its distributaries, portions of the Bowie, Leaf, and Chickasawhay tributaries, and all of the Big Black Creek tributary. It includes the Bowie River main stem beginning at its confluence with Bowie Creek and Okatoma Creek, downstream to its confluence with the Leaf River. The Leaf River main stem beginning from Mississippi Sate Highway 588 downstream to its confluence with the Chickasawhay River is included. The main stem of the Chickasawhay River from the mouth of Oaky Creek downstream to its confluence with the Leaf River is included. Unit 2 also includes Big Black Creek main stem from its confluence with Black and Red Creeks, to its confluence with the Pascagoula River. All of the main stem of the Pascagoula River from its confluence with the Leaf and Chickasawhay Rivers to the discharge of the East and West Pascagoula Rivers into Pascagoula Bay is included.

- **Unit 3: Escambia River System in Santa Rosa and Escambia Counties, Florida, and Escambia, Conecuh and Covington Counties, Alabama.** Unit 3 includes the Conecuh River main stem beginning just downstream of the spillway of Point A Dam, downstream to the Florida State line, where its name changes to the Escambia River. It includes the entire main stem of the Escambia River downstream to its discharge into Escambia Bay and Macky Bay. All of the distributaries of the Escambia River including White River, Little White River, Simpson River, and Dead River are included. The Sepulga River main stem from Alabama County Road 42 downstream to its confluence with the Conecuh River is also included.

- **Unit 4: Yellow River System in Santa Rosa and Okaloosa Counties, Florida, and Covington County, Alabama.** Unit 4 includes the Yellow River main stem from Alabama State Highway 55, downstream to its discharge at Blackwater Bay. All Yellow River distributaries (including Weaver River and Skim Lake) discharging into Blackwater Bay are included. The Shoal River main stem, a Yellow River tributary, from Florida Highway 85, to its confluence with the Yellow River, is included. The Blackwater River from its confluence with Big Coldwater Creek, downstream to its discharge into Blackwater Bay is included. Wright Basin and Cooper Basin on the Blackwater River are included.

- **Unit 5: Choctawhatchee River System in Holmes, Washington, and Walton Counties, Florida, and Dale, Coffee, Geneva, and Houston Counties, Alabama**. Unit 5 includes the Choctawhatchee River main stem from its confluence with West Fork Choctawhatchee River and East Fork Choctawhatchee River, downstream to its discharge at Choctawhatchee Bay. The distributaries discharging into Choctawhatchee Bay known as Mitchell River, Indian River, Cypress River, and Bells Leg are included. Boynton Cutoff, which joins the Choctawhatchee River main stem, and Holmes Creek are included. The section of Holmes Creek from Boynton Cutoff to the mouth of Holmes Creek is included. The Pea River main stem, a Choctawhatchee River tributary, is included from the Elba Dam to its confluence with the Choctawhatchee River.

- **Unit 6: Apalachicola River System in Franklin, Gulf, Liberty, Calhoun, Jackson, and Gadsen Counties, Florida.** Unit 6 includes the Apalachicola River mainstem, beginning from the Jim Woodruff Lock and Dam, downstream to its discharge at East Bay or Apalachicola Bay. All Apalachicola River distributaries, including East River, Little St. Marks River, St. Marks River, to their discharge into East Bay and/or Apalachicola Bay are included. The entire main stem of the Brothers River, a tributary of the Apalachicola River, is included.

- **Unit 7: Suwannee River System in Hamilton, Suwannee, Madison, Lafayette, Gilchrist, Levy, Dixie and Columbia counties, Florida**. Unit 7 includes the Suwannee River main stem, beginning from its confluence with Long Branch Creek, downstream to the mouth of the Suwannee River. It includes all Suwannee River distributaries, including the East Pass, West Pass, Wadley Pass, and Alligator Pass, to their discharge into Suwannee Sound or the Gulf of Mexico. The Withlacoochee River main stem from Florida State Road 6 to its confluence with the Suwannee River is included.

- **Unit 8: Lake Pontchartrain, Lake St. Catherine, the Rigolets, Little Lake, Lake Borgne, and Mississippi Sound in Jefferson, Orleans, St. Tammany, and St. Bernard Parishes in Louisiana, Hancock, Jackson, and Harrison Counties in Mississippi, and Mobile County in Alabama.** Unit 8 encompasses Lake Pontchartrain east of the Lake Pontchartrain Causeway, all of Little Lake, the Rigolets, Lake St. Catherine, Lake Borgne, including Heron Bay, and the Mississippi Sound. The Mississippi Sound includes adjacent open bays including Pascagoula Bay, Point aux Chenes Bay, Grand Bay, Sandy Bay, and barrier island passes,

including Ship Island Pass, Dog Keys Pass, Horn Island Pass, and Petit Bois Pass. The northern boundary of Mississippi Sound is the shorelines of the mainland between Heron Bay Point, Mississippi and Point aux Pins, Alabama. Proposed critical habitat excludes St. Louis Bay, north of the railroad bridge across its mouth; Biloxi Bay, north of the US Highway 90 bridge; and the Back Bay of Biloxi. The southern boundary follows along the broken shoreline of Lake Borgne created by low swampy islands from Malheureux Point to Isle au Pitre. From the northeast point of Isle au Pitre, the boundary continues in a straight north-northeast line to one nautical mile off the western most extremity of Cat Island at 30°13' N, 89°10' W. The southern boundary continues one nautical mile offshore of the barrier islands and offshore of the 72 COLREGS lines at barrier island passes (defined at 33 CFR 80.815 (c), (d) and (e)) to the eastern boundary. The eastern boundary is the line of longitude 88°18.8' W from its intersection with the shore (Point aux Pins) to its intersection with the southern boundary.

- **Unit 9: Pensacola Bay System in Escambia and Santa Rosa Counties, Florida**. Unit 9 includes Pensacola Bay and its adjacent main bays and coves. These include Big Lagoon, Escambia Bay, East Bay, Blackwater Bay, Bayou Grande, Macky Bay, Saultsmar Cove, Bass Hole Cove, and Catfish Basin. All other bays, bayous, creeks, and rivers are excluded at their mouths. The western boundary is the Florida State Highway 292 Bridge crossing Big Lagoon to Perdido Key. The southern boundary is the 72 COLREGS line between Perdido Key and Santa Ross Island (defined at 33 CFR 80.810 (g)). The eastern boundary is the Florida State Highway 399 Bridge at Gulf Breeze, FL.

- **Unit 10: Santa Rosa Sound in Escambia, Santa Rosa and Okaloosa Counties, Florida**. Unit 10 includes Santa Rosa Sound, bounded on the west by the Florida State Highway 399 bridge at Gulf Breeze, FL. The eastern boundary is the U.S. Highway 98 bridge in Fort Walton Beach, FL. The northern and southern boundaries are formed by the shorelines to the mean high water (MHW) or by the entrance to rivers, bayous, and creeks.

- **Unit 11: Florida Nearshore Gulf of Mexico Unit in Escambia, Santa Rosa, Okaloosa, Walton, Bay, and Gulf Counties in Florida.** Unit 11 includes a portion of the Gulf of Mexico as defined by the following boundaries. The western boundary is the line of longitude 87°20.0' W (approximately one nautical mile west of Pensacola Pass) from its intersection with the shore to its intersection with the southern boundary. The northern boundary is the MHW of the mainland shoreline and the 72 COLREGS lines at passes as defined at 30 CFR 80.810 (a-g). The southern boundary is one nautical mile offshore of the northern boundary. The eastern boundary is line of longitude 85°17.0' W from its intersection with the shore (near Money Bayou between Cape San Blas and Indian Peninsula) to its intersection with the southern boundary.

- **Unit 12: Choctawhatchee Bay in Okaloosa and Walton Counties, Florida**. Unit 12 includes the main body of Choctawhatchee Bay, Hogtown Bayou, Jolly Bay, Bunker Cove, and Grassy Cove. All other bayous, creeks and rivers are excluded

at their mouths/entrances. The western boundary is the US Highway 98 bridge at Fort Walton Beach, FL. The southern boundary is the 72 COLREGS line across East (Destin) Pass as defined at 33 CFR 80.810 (f).

- **Unit 13: Apalachicola Bay in Gulf and Franklin County, Florida**. Unit 13 includes the main body of Apalachicola Bay and its adjacent sounds, bays, and the nearshore waters of the Gulf of Mexico. These consist of St. Vincent Sound, including Indian Lagoon; Apalachicola Bay including Horseshoe Cove and All Tides Cove; East Bay including Little Bay and Big Bay; and St George Sound, including Rattlesnake Cove and East Cove. Barrier Island passes (Indian Pass, West Pass, and East Pass) are also included. The southern boundary of this proposed critical habitat unit includes water extending into the Gulf of Mexico one nautical mile from the MHW line of the barrier islands and from 72 COLREGS lines between the barrier islands (defined at 33 CFR 80.805 (e-h)). The western boundary is the line of longitude 85°17.0' W from its intersection with the shore (near Money Bayou between Cape San Blas and Indian Peninsula) to its intersection with the southern boundary. The eastern boundary is formed by a straight line drawn from the shoreline of Lanark Village at 29°53.1'N, 84°35.0' W to a point that is one nautical miles offshore from the northeastern extremity of Dog Island at 29°49.6' N, 84°33.2' W.

- **Unit 14: Suwannee Sound in Dixie and Levy Counties, Florida**. Unit 14 includes Suwannee Sound and a portion of adjacent Gulf of Mexico waters extending nine nautical miles out to the state territorial water boundary. Its northern boundary is formed by a straight line from the northern tip of Big Pine Island (at approximately 29°23' N, 83°12' W) to the Federal-State boundary at 29°17' N, 83°21' W. The southern boundary is formed by a straight line from the southern tip of Richards Island (at approximately 29°11' N, 83°04' W) to the Federal-State boundary at 29°04' N, 83°15' W.

1.3 Framework for Analysis

28. The focus of this economic analysis is on section 7 of the Act, which requires Federal agencies to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. Federal agencies are required to consult with the Services whenever they propose an action that may affect a listed species or its designated critical habitat. Aside from the protection that is provided under section 7, the Act does not provide other forms of protection to lands designated as critical habitat. Because consultation under section 7 only applies to activities that are carried out, permitted, or funded by Federal agencies, the designation of critical habitat will not afford any additional protections for species with respect to such strictly private activities.

29. This analysis first identifies land use activities within or in the vicinity of those areas being proposed for critical habitat that are likely to be affected by section 7 of the Act. To do this, the analysis evaluates a "without section 7" scenario and compares it to a "with

section 7" scenario. The "without section 7" scenario constitutes the baseline of this analysis. It represents the level of protection that would be afforded the species under the Act if section 7 protective measures were absent. This level of protection would include other Federal, state, and local laws. The "with section 7" scenario identifies land use activities likely to involve a Federal nexus that may affect the species or its designated critical habitat, which accordingly have the potential to be subject to future consultations under section 7 of the Act.

30. Economic activities identified as likely to be affected under section 7 and the resulting impacts that section 7 can have on such activities constitute the upper bound estimate of the proposed critical habitat economic analysis. By defining the upper bound estimate to include critical habitat impacts occurring alone and co-extensively with jeopardy considerations, the analysis recognizes the difficulty in differentiating between the two in evaluating only the critical habitat effects associated with the proposed rulemaking. This step is adopted in order to ensure that any critical habitat impacts that may occur co-extensively with the listing of the species (i.e., jeopardy) are not overlooked in the analysis.[7]

31. Upon identifying section 7 impacts, the analysis proceeds to consider the subset of impacts that can be attributed exclusively to the critical habitat designation. To do this, the analysis adopts a "with and without critical habitat" approach. This approach is used to determine those effects found in the upper-bound estimate that may be attributed solely to the proposed designation of critical habitat. Specifically, the "with and without critical habitat" approach considers section 7 impacts that will likely be associated with the implementation of the *jeopardy* provisions of section 7 and those that will likely be associated with the implementation of the *adverse modification* provision of section 7. In many cases, impacts associated with the jeopardy standard remain unaffected by the designation of critical habitat and thus would not normally be considered an effect of a critical habitat rulemaking. The subset of section 7 impacts likely to be affected solely by the designation of critical habitat represents the lower-bound estimate of this analysis.

32. The critical habitat designation for the sturgeon encompasses state-owned lands beneath tidally influenced and navigable waters up to the high water mark. The states of Louisiana, Mississippi, Alabama, and Florida were granted ownership of these lands upon statehood in 1811, 1817, 1819, and 1845, respectively.[8] The majority of riparian lands bordering riverine critical habitat units are in private ownership. Areas adjacent to the

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[7] For the purposes of this analysis, the Services have concluded that certain project modifications (e.g., dredging windows) that may result from the consultation process exclusively concern measures to avoid or minimize incidental take of the species. Accordingly, this assessment considers these modifications to be part of the analytic baseline.

[8] It is possible that prior sovereigns or the states have made grants to private parties which include lands below mean high waters of the navigable waters included within the proposed critical habitat designation. Thus, the proposed rule may affect limited parcels of private land. However, the Services believe that the majority of lands proposed as critical habitat are owned by the states of Louisiana, Mississippi, Alabama, and Florida.

proposed critical habitat designation also include lands under state, local, and Federal ownership, with Federal lands being managed by the Forest Service, the Air Force, the Navy, the National Aeronautics and Space Administration, the U.S. Army Corps of Engineers, and the Fish and Wildlife Service. For private lands subject to critical habitat designation, section 7 consultations and modifications to land uses and activities can only be required when a Federal nexus, or connection, exists. A Federal nexus arises if the activity or land use of concern involves Federal permits, Federal funding, or another form of Federal involvement. Section 7 consultations are not required for activities on non-Federal lands that do not involve a Federal nexus.

33. In addition to activities occurring within the areas proposed for critical habitat designation, this report will examine adjacent activities sponsored or permitted by Federal agencies that may affect the sturgeon and/or adversely modify the proposed critical habitat area.

34. This report estimates impacts of listing and critical habitat designation on activities that are reasonably foreseeable, including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. Accordingly, the analysis bases estimates on activities that are likely to occur within a ten-year time horizon.

1.4 Methodological Approach

35. This report relies on a sequential methodology and focuses on distilling the salient and relevant aspects of potential economic impacts of designation. The methodology consists of:

- Determining the current and projected economic activity within and around the proposed critical habitat area;
- Considering how current and future activities that currently take place or will likely take place on Federal and private land could adversely affect proposed critical habitat;
- Identifying whether such activities taking place on privately owned property within the proposed critical habitat boundaries are likely to involve a Federal nexus;
- Evaluating the likelihood that identified Federal actions and non-Federal actions having a Federal nexus will require consultations under section 7 of the Act and, in turn, that such consultations will result in modifications to projects;
- Estimating per-unit costs of expected section 7 consultations, project modifications and other economic impacts (e.g., secondary impacts to the regional economy) associated with activities in or adjacent to areas proposed as critical habitat;

- Estimating the upper bound of total costs associated with the area proposed for the designation (including costs that may be attributed co-extensively with the listing of the species) and the lower bound of costs (i.e., costs attributable solely to critical habitat);

- Determining the benefits that may be associated with the designation of critical habitat; and

- Assessing the extent to which critical habitat designation will create costs for small businesses and/or affect property values as a result of modifications or delays to projects.

1.5 Information Sources

36. The primary sources of information for this report were communications with FWS (Panama City, FL; Jacksonville, FL; Daphne, AL; Jackson, MS; and Lafayette, LA Offices) and NOAA Fisheries biologists (St. Petersburg, FL Southeast Regional Office), and personnel from affected agencies, including: U.S. Army Corps of Engineers (New Orleans, LA; Vicksburg, MS; Mobile, AL; and Jacksonville, FL Districts), Minerals Management Service, Environmental Protection Agency, State Departments of Transportation in Florida and Alabama, Federal Energy Regulatory Commission, Federal Emergency Management Agency, Eglin Air Force Base, Tyndall Air Force Base, John C. Stennis Space Center, Pensacola Naval Air Station, Coast Guard, and Forest Service. Publicly available data (e.g., information available on the Internet) were also used to augment the analysis.

37. This section discusses the socioeconomic characteristics of areas proposed as critical habitat for the Gulf sturgeon. In addition, this section provides relevant information about regulations and requirements that exist in the baseline (i.e., the "without section 7" scenario) and potentially link to sturgeon conservation.

2.1 Socioeconomic Profile of the Critical Habitat Areas

38. This section summarizes key economic and demographic information for the counties containing proposed critical habitat for the sturgeon, including (1) population characteristics, (2) general economic activity, and (3) water-related economic activity. County level data are presented to provide context for the discussion of potential economic impacts, and to illuminate trends that may influence these impacts. Although county level data may not precisely reflect the socioeconomic characteristics of the areas immediately surrounding the proposed critical habitat for the sturgeon (because the units are located in rivers and other water bodies that cross county barriers), it provides a useful context for the broader analysis.

2.1.1 Population Characteristics

39. This critical habitat designation spans a diverse array of urban and rural areas. Exhibit 2-1 lists the population size, per capita income, and population density for all the counties that have critical habitat designated within their boundaries and for the states as a whole. The percent of the state population living within a county containing critical habitat ranges from less than 0.05 percent (Lafayette and Liberty Counties in Florida) to nearly 11 percent (Orleans County in Louisiana). Of the 53 counties, 41 have a lower per capita income and 37 have fewer persons per square mile than their respective state averages. Although these measures vary considerably across states, the data suggest that overall the counties are less densely populated, and have a lower than average income per capita than is found on average in their respective states.

Exhibit 2-1

BASELINE CHARACTERISTICS OF ALL COUNTIES CONTAINING CRITICAL HABITAT FOR THE GULF STURGEON

State	County	Population	Percent of State	Per Capita Income	Persons per square mile
Alabama	**State Total**	**4,447,100**		**$30,790**	**87.6**
	Coffee	43,615	1.00%	$31,316	64.2
	Conecuh	14,089	0.30%	$22,643	16.6
	Covington	37,631	0.85%	$25,691	36.4
	Dale	49,129	1.10%	$30,476	87.6
	Escambia	38,440	0.86%	$25,712	40.6
	Geneva	25,764	0.58%	$26,009	44.7
	Houston	88,787	2.00%	$32,086	153.1
	Mobile	399,843	9.00%	$29,943	324.3
Florida	**State Total**	**15,982,378**	**100%**	**$32,877**	**296.4**
	Bay	148,217	0.93%	$32,047	194
	Calhoun	13,017	0.08%	$25,362	23
	Columbia	56,513	0.35%	$28,521	70.9
	Dixie	13,827	0.09%	$21,982	19.6
	Escambia	294,410	1.84%	$31,069	444.7
	Franklin	11,057	0.07%	$24,088	20.3
	Gadsden	45,087	0.28%	$24,881	87.4
	Gilchrist	14,437	0.09%	$27,483	41.4
	Gulf	13,332	0.08%	$28,605	24
	Hamilton	13,327	0.08%	$24,174	25.9
	Holmes	18,564	0.12%	$23,416	38.5
	Jackson	46,755	0.29%	$25,953	51
	Lafayette	7,022	0.04%	$27,354	12.9
	Levy	34,450	0.22%	$24,838	30.8
	Liberty	7,021	0.04%	$27,178	8.4
	Madison	18,733	0.12%	$24,980	27.1
	Okaloosa	170,498	1.07%	$36,788	182.2
	Santa Rosa	117,743	0.74%	$37,201	115.8
	Suwannee	34,844	0.22%	$26,070	50.6
	Walton	40,601	0.25%	$27,211	38.4
	Washington	20,973	0.13%	$25,224	36.2

Exhibit 2-1

BASELINE CHARACTERISTICS OF ALL COUNTIES CONTAINING CRITICAL HABITAT FOR THE GULF STURGEON

State	County	Population	Percent of State	Per Capita Income	Persons per square mile
Louisiana	**State Total**	**4,468,976**		**$30,466**	**102.6**
	Jefferson	455,466	10.19%	$37,312	1483.6
	Orleans	484,674	10.85%	$25,200	2677.8
	St. Bernard	67,229	1.50%	$32,478	144.6
	St. Tammany	191,268	4.28%	$43,653	224
	Washington	43,926	0.98%	$22,584	65.6
Mississippi	**State Total**	**2,844,658**	**100%**	**$28,527**	**60.6**
	Clarke	17,955	0.63%	$26,236	26
	Copiah	28,757	1.01%	$23,107	37
	Forrest	72,604	2.55%	$27,652	155.5
	George	19,144	0.67%	$28,656	40.1
	Greene	13,299	0.47%	$24,753	18.7
	Hancock	42,967	1.51%	$29,168	90.1
	Harrison	189,601	6.67%	$30,706	326.3
	Hinds	250,800	8.82%	$32,033	288.6
	Jackson	131,420	4.62%	$34,411	180.8
	Jones	64,958	2.28%	$26,639	93.6
	Lawrence	13,258	0.47%	$24,574	30.8
	Marion	25,595	0.90%	$22,516	47.2
	Pearl River	48,621	1.71%	$27,091	60
	Perry	12,138	0.43%	$24,328	18.8
	Pike	38,940	1.37%	$21,689	95.2
	Rankin	115,327	4.05%	$41,627	148.8
	Simpson	27,639	0.97%	$25,392	46.9
	Walthall	15,156	0.53%	$20,201	37.5
	Wayne	21,216	0.75%	$24,508	26.2

2.1.2 Economic Activity

40. The proposed designation of critical habitat for the sturgeon lies within the vicinity of several major centers of industrial and commercial economic activity. Understanding the current level of economic activity in areas in or around critical habitat provides context for the activities that may experience section 7 impacts (discussed in Section 3). To that end, this section (1) summarizes private industry in the Southeast region and by state, (2) provides employment data by state and for counties containing proposed critical habitat, and (3) summarizes the number of establishments in various industry categories.

41. The proposed critical habitat designation for sturgeon involves four states (Alabama, Florida, Louisiana, and Mississippi) located in the Southeast economic region, as defined by the U.S. Bureau of Economic Analysis. In order to establish an economic baseline, total "valued added" by private industry located within these states is reported in Exhibit 2-2.[9] Among the Bureau of Economic Analysis regions, the Southeast region represented 21.3 percent, the largest share of total private industry value added in the nation during 2000. Since 1986, inflation-adjusted value added in the Southeast region has grown at an annual rate of 3.9 percent, which is slightly faster than the national rate. Three western regions, Rocky Mountains, Southwest, and Far West, grew faster than the Southeast. Of the four states potentially affected by the proposed critical habitat designation for the sturgeon, Florida accounts for the largest share of value added in the region (22.2 percent) and the largest inflation-adjusted growth rate (4.1 percent). Accounting for a 14.9 percent combined share of regional valued added, annual growth in private industry Gross State Product trailed the regional and national rates in each of the three other states potentially affected by the critical habitat designation. Of the three, Louisiana had the slowest rate of growth with 1.3 percent annually.

[9] Gross State Product is the value added in production by the labor and property located in a state. GSP for a state is derived as the sum of the gross state product originating in all industries in a State. In concept, an industry's GSP, referred to as its "value added", is equivalent to its gross output (sales or receipts and other operating income, commodity taxes, and inventory change) minus its intermediate inputs (consumption of goods and services purchased from other U.S. industries or imported). Thus, GSP is often considered the state counterpart of the nation's gross domestic product (GDP).

Exhibit 2-2

GROSS STATE PRODUCT, ALL PRIVATE INDUSTRY, 2000

	Gross State Product All Private Industry 2000 (millions of dollars)	Annual Inflation-Adjusted Growth Rate: 1986-2000 (in percentage)	Percent of U.S. Total Private Industry 2000	Percent of Southeast Total Private Industry 2000
United States	$ 8,786,997	3.7 %	100.0 %	n/a
BEA Regions:				
NEW ENGLAND	529,206	3.5 %	6.0 %	n/a
MIDEAST	1,634,877	3.1 %	18.6 %	n/a
GREAT LAKES	1,372,817	3.2 %	15.6 %	n/a
PLAINS	561,633	3.5 %	6.4 %	n/a
SOUTHEAST	1,869,904	3.9 %	21.3 %	100.0 %
SOUTHWEST	922,082	4.5 %	10.5 %	n/a
ROCKY MTNS	274,563	5.1 %	3.1 %	n/a
FAR WEST	1,621,914	4.3 %	18.5 %	n/a
Selected States:				
Alabama	101,760	3.4 %	1.2 %	5.4 %
Florida	414,868	4.1 %	4.7 %	22.2 %
Louisiana	121,174	1.3 %	1.4 %	6.5 %
Mississippi	56,392	3.3 %	0.6 %	3.0 %

Source: U.S. Bureau of Economic Analysis, Regional Accounts Data, www.bea.gov/bea/regional/gsp, accessed November 12, 2002.

42. In addition to state-level Gross State Product, the U.S. Bureau of Economic Analysis provides time-series employment data at the state and county level. Exhibit 2.3 summarizes growth in total private full-time and part-time employment from 1990 to 2000 in those states and counties facing potential economic effects from designation of critical habitat for sturgeon. As illustrated in Exhibit 2-3, annual job growth in the four states ranged from 2.0 percent in Alabama to 3.1 percent in Florida over the 1990 to 2000 decade. Comparable annual combined job growth in those counties overlapping potential critical habitat area exhibits a broader range, from 1.4 percent in Louisiana to 3.3 percent in Florida. Whereas Florida has the highest statewide job total of the four states, Louisiana has the largest number of jobs located in counties that include portions of proposed critical habitat. Furthermore, combined employment growth in these Louisiana counties was less than the respective statewide average from 1990 to 2000.

Exhibit 2-3

TOTAL PRIVATE EMPLOYEES IN ALABAMA, FLORIDA, LOUISIANA, AND MISSISSIPPI, 2000

	Total Private Employees: Full and Part-Time (2000)	Percentage of Statewide Employees Working in Designated Counties	Annual Job Growth: 1990-2000 (in percent)
Alabama	1,985,543	n/a	2.0 %
8 Counties	314,804	15.9 %	1.9 %
Florida	7,765,500	n/a	3.1 %
21 Counties	432406	5.6 %	3.3 %
Louisiana	1,966,801	n/a	2.1 %
5 Counties	614,793	31.3 %	1.4 %
Mississippi	1,177,383	n/a	2.5 %
19 Counties	507,340	43.1 %	2.7 %

Source: Bureau of Economic Analysis, Local Area Personal Income, Regional Economic Information System, www.bea.gov/bea/regional/reis/, accessed November 12, 2002.

43. Exhibit 2-4 provides economic statistics for the 53 counties that include portions of the proposed critical habitat for the sturgeon. The "Number of Establishments" columns show the total number of physical locations at which business activities are conducted with one or more paid employee in the year 2000 for each state. As the exhibit shows, at least 689,000 business establishments operate in the 53 counties containing habitat designation. These figures provide a measure of the average density of commercial and industrial establishments in the region. Specific potential impacts to activities within these industries as a result of section 7 implementation for the sturgeon are discussed in Section 3.

Exhibit 2-4

ECONOMIC ACTIVITY AROUND PROPOSED GULF STURGEON CRITICAL HABITAT BY INDUSTRY

	Number of Establishments			
Economic Activity	**Alabama**	**Florida**	**Louisiana**	**Mississippi**
Agricultural Services, Forestry, and Fishing	1,152	1,170	816	877
Mining	254	248	1,525	319
Utilities	489	638	557	616
Construction	9,725	39,211	8,376	5,036
Manufacturing	5,261	15,345	3,463	2,843
Transportation & Warehousing	3,105	10,605	3,708	2,271
Wholesale Trade	6,132	30,671	6,192	3,116
Retail Trade	19,723	67,396	17,755	12,794
Finance and Insurance	5,767	26,431	7,227	4,246
Real Estate	3,731	22,325	4,105	2,179
Services	41,662	201,269	44,681	23,733
TOTAL	**99,817**	**428,438**	**101,016**	**59,788**

Source: *2000 County Business Patterns*, U.S. Census Bureau, http://censtats.census.gov/cgi-bin/cbpnaic/cbpsect.pl.

2.1.3 Water-Based Economic Activity

44. The Gulf region is also dominated by water-based commercial and recreational activity. A network of ports, harbors, and riverways in Alabama, Florida, Louisiana, and Mississippi facilitate waterborne commerce, which contributes significantly to local and regional growth on the Gulf Coast. Other key water-based industries in the Gulf region include commercial fishing, recreation (e.g., sport fishing, boating, tourism), and hydropower. The following sections provide detailed economic data on these industries that are based in and around waterways proposed for critical habitat designation.

2.1.3.1 Waterborne Commerce

45. Barges and vessels carrying thousands of tons of domestic and international cargo pass through the major ports, harbors, and rivers in areas within and adjacent to the proposed designation. These harbors and riverways connect to the Gulf Intracoastal Waterway (GIWW) a major water transit system extending from Florida to Texas. This section describes the volume and value of vessel and barge traffic in the major ports within the proposed designation. Exhibit 2-5 summarizes traffic in the major ports within the proposed designation from 1994 to 2000. Exhibit 2-6 summarizes traffic volume in the major ports based on number of vessel transits and vessel type. Finally, Exhibit 2-7 summarizes international cargo value by port from 1998-2001 in millions of U.S. dollars. Data are gathered from the U.S. Foreign Waterborne Transportation Statistics, Maritime Administration (U.S. Department of Transportation) and USACE and Waterborne Commerce

of the United States, 2000, Part 2, Waterways and Harbors, Gulf Coast, Mississippi River System and Antilles.[10]

- *Pascagoula Harbor, Mississippi*. In 2000, Pascagoula Harbor ranked 26th in the US for cargo volume with 28.7 million short tons shipped.[11] Nearly 15,000 vessels carried cargo such as forest/paper products, frozen foods, bulk and bagged grains, machinery, vehicles, fertilizer, petroleum products, general cargo, chemicals, bulk fish, and rubber and crude oil.[12] Combined international imports and exports were valued at $2.8 billion in 2001. Latin American trade through the Gulf of Mexico is projected to triple by the year 2020 and large increases are expected in the next two decades for all waterborne trade as well.

- *Gulfport Harbor, Mississippi*. In 2000, Gulfport ranked 32nd among U.S. ports for cargo shipment. Over 2,600 vessels moved 2.2 million tons of cargo in 2000, a 16 percent increase over tonnage handled in the previous year. In 2001, the total value of international cargo shipped to and from Gulfport was valued at $3 billion. Commodities frequently handled by the port include tropical fruit, frozen poultry, ilmenite ore, limestone, and forest products.

- *Biloxi Harbor, Mississippi*. 3,448 vessels transported nearly 2.5 million short tons of cargo to and from Biloxi Harbor in 2000. Commodities typically passing through Biloxi include coal, gasoline, limestone, aluminum, vehicles and parts, and manufactured products.

- *Pensacola Harbor, Florida*. Pensacola Harbor is northwest Florida's leading deep-water port. In 2000, the total tonnage shipped to and from Pensacola Harbor was 1,617 thousand short tons. The dollar value of Pensacola's total international cargo in 2001 was valued at $175 million. Cargo products include bagged agricultural products, forest products, asphalt, sulphur, lime, steel products, and frozen and refrigerated foods.[13] Total vessel traffic amounted to 2,526 trips in 2000.

- *Panama City Harbor, Florida*. In 2000, the total tonnage shipped to and from Panama City Harbor was 2,573 thousand short tons. The dollar value of Panama City Harbor's total international cargo in 2001 was $259 million. The 3,198 vessels that traveled through the harbor carried breakbulk, general commodities, domestic aggregate, and export bulk cargo. Exports include linerboard, woodpulp, machinery,

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[10] Available at http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm.

[11] One short ton is equivalent to 2,000 pounds.

[12] Port of Pascagoula Report, vol. VII, no. 4, http://www.portofpascagoula.com, accessed on November 11, 2002.

[13] Port of Pensacola website, http://www.portofpensacola.com, accessed on November 8, 2002.

and miscellaneous general cargo while imports typically include steel plate, steel coils, lumber, liquid bulk.[14]

- *Escambia and Conecuh Rivers, Alabama and Florida*. In 2000, approximately 2.8 million short tons of commodities were shipped from Escambia Bay. Commodities frequently shipped to and from Escambia Bay include coal, petroleum, and chemicals. The Escambia and Conecuh Rivers experienced traffic amounting to 4,285 vessels in 2000.

- *Apalachicola, Chattahoochee, and Flint Rivers*. In 2000, 276,000 short tons of cargo were transported on the Apalachicola, Chattahoochee, and Flint Rivers. Commodities shipped include petroleum, chemicals, limestone, sand, gravel, and machinery. In 2000, approximately 1,037 vessels traveled inbound and outbound on the these riverways.

Exhibit 2-5

TRAFFIC IN MAJOR PORTS WITHIN THE PROPOSED DESIGNATION FOR THE GULF STURGEON, 1991-2000 (thousand short tons)

Location	1994	1995	1996	1997	1998	1999	2000
Pascagoula Harbor	30,049	26,927	29,343	31,270	2,6404	28,095	28,710
Gulfport Harbor	1,842	2,023	2,124	2,448	2,207	1,988	2,229
Biloxi Harbor	1,607	1,739	2,266	2,521	2,783	2,957	2,508
Pensacola Harbor	1,466	1,623	1,379	1,674	1,580	1,400	1,617
Panama City Harbor	2,503	2,891	3,124	2,878	2,683	2,491	2,573
Escambia and Conecuh Rivers	2,251	2,072	1,990	2,288	3,086	2,970	2,779
Apalachicola, Chattahoochee, and Flint Rivers	636	588	567	541	443	358	276

Source: Waterborne Commerce of the United States, Calendar Year 2000, Part 2: Waterways and Harbors, Gulf Coast, Mississippi River System and Antilles.

[14] Port of Panama City website, http://www.portpanamacityusa.com, accessed on November 8, 2002.

Exhibit 2-6

TRIPS OF VESSELS BY LOCATION, 2000

Location	Self Propelled Vessel Trips			Non-Self Propelled Vessel Trips		TOTAL
	Pass & Dry Cargo	Tanker	Tow or Tug	Dry Cargo	Tanker	
Pascagoula Harbor	4,996	660	4,186	1,498	3,141	**14,481**
Gulfport	1,804	0	707	139	5	**2,655**
Biloxi	0	0	390	2,855	203	**3,448**
Pensacola	103	0	1,302	407	714	**2,526**
Panama City Harbor	314	12	555	1,734	583	**3,198**
Escambia and Conecuh Rivers	0	0	1,101	2,848	336	**4,285**
Apalachicola, Chattahoochee, and Flint Rivers	0	0	381	610	46	**1,037**

Source: Waterborne Commerce of the United States, Calendar Year 2000, Part 2: Waterways and Harbors, Gulf Coast, Mississippi River System and Antilles.

Exhibit 2-7

INTERNATIONAL CARGO VALUE IN MAJOR PORTS WITHIN THE PROPOSED DESIGNATION FOR THE GULF STURGEON, 1998-2001 (million U.S. dollars)

Location	1998	1999	2000	2001
U.S. Total	$613,149	$630,297	$737,362	$719,391
Gulf Total	$101,322	$104,981	$141,854	$129,305
Pascagoula Harbor	$1,956	$2,021	$3,112	$2,798
Gulfport Harbor	$930	$1,873	$2,914	$3,056
Biloxi Harbor	n/a	n/a	n/a	n/a
Pensacola Harbor	$181	$167	$95	$175
Panama City Harbor	$362	$265	$328	$259
Escambia and Conecuh Rivers	n/a	n/a	n/a	n/a
Apalachicola, Chattahoochee and Flint Rivers	n/a	n/a	n/a	n/a

Source: U.S. Foreign Waterborne Transportation Statistics, Maritime Administration (USDOT) and Army Corps of Engineers, http://www.marad.dot.gov/statistics/usfwts.

2.1.3.2 Commercial Fishing

46. In 2001, the total market value of commercial fishing landings in Alabama, western Florida, Louisiana, and Mississippi was approximately $586 million, or nearly 73 percent of the value of all Gulf Coast commercial landings. Exhibit 2-8 summarizes 2001 Gulf commercial landing statistics by state, while Exhibit 2-9 summarizes landing statistics for the major ports within the proposed designation.

Exhibit 2-8

GULF COMMERCIAL LANDING STATISTICS FOR ALL FISH SPECIES, 2001

Year	State	Millions of Pounds	Millions of Dollars
2001	Alabama	25.6	$44.3
2001	West Florida	80.2	$145.8
2001	Louisiana	1,191.6	$345
2001	Mississippi	213.9	$50.6
	Total	**1,511.3**	**$585.8**
2001	Total Gulf	**1,608.7**	**$803.8**

Source: National Marine Fisheries Service, Fisheries Statistics & Economics Division, Annual Commercial Landing Statistics, http://www.st.nmfs.gov/st1/commercial/, accessed November 13, 2002.

Alabama

47. In 2001, total commercial landings for all fish species in Alabama totaled 25.6 million pounds and were valued at $44 million.

West Florida

48. In 2001, commercial fish landed on West Florida accounted for nearly one-fifth of total commercial fishing value in the Gulf State region. Annual commercial landings on West Florida totaled over 80 million pounds and were valued at $145.8 million. Panama City Harbor accounted for 4.1 million pounds of fish landings valued at $5.2 million in 1999, based on the most recent data available for the port.

Louisiana

49. Of the four state or substate areas highlighted in Exhibit 2-5, Louisiana accounts for the largest commercial fish landing value. Louisiana's total commercial fish catch of 1.2 billion pounds was valued at $345 million in 2001. This value represents more than two-fifths of total commercial fish landed in the Gulf State region.

Mississippi

50. Of the four state or substate areas detailed in Exhibit 2-5, Mississippi has the third largest commercial fishing industry, with an annual commercial catch value exceeding $50 million. Biloxi/Gulfport and Pascagoula/Moss Point are among the nation's leading seafood ports, with Pascagoula ranking 7th for total pounds landed (196.0 million) and Biloxi/Gulfport ranking 27th in the value of seafood landed ($29.1 million).[15]

Exhibit 2-9

COMMERCIAL FISHERY LANDINGS FOR MAJOR PORTS, 2001

Port	Millions of Pounds	Millions of Dollars
Pascagoula Harbor	196.0	$16.3
Biloxi/Gulfport Harbor[a]	14.6	$29.1
Pensacola Harbor	n/a	n/a
Panama City Harbor[b]	4.1	$5.2[2]
Escambia and Conecuh Rivers	n/a	n/a
Apalachicola, Chattahoochee and Flint Rivers	6.2	$10.9

Source: National Marine Fisheries Service, Fisheries Statistics & Economics Division, Commercial Fishery Landings at an Individual U. S. Port, accessed November 13, 2002.

[a] Panama City figures are 1999 figures.
[b] Landings for Biloxi and Gulfport are combined in NMFS data.

2.1.3.3 Sport Fishing and Other Water-Based Recreational Activity

51. Marine, bay, and upstream recreational activities such as sport fishing, boating, and beach activity contribute significantly to the economic and social well-being of the Gulf coastal community. Florida and Alabama consistently rank among the top in the nation for the highest rate of participation in any coastal recreational activity and the highest beach visitation rate.[16]

52. The Gulf coast is also home to a predominant sportfishing industry. In 2001, over 3 million anglers took over 22.8 million trips and caught a total of 163 million fish on the Gulf

[15] City of Biloxi, 2001, General Market Analysis, http://www.biloxi.ms.us/development/marketinganalysis/biloxibook2000.pdf, accessed on November 13, 2002.

[16] NOAA, Marine Economics, National Survey on Recreation and the Environment 2000, http://marineeconomics.noaa.gov/NSRE/NSRE_V1-6_May.pdf, accessed on November 20, 2002.

Coast (excluding Texas). About 72 percent of the trips were made in West Florida, followed by 16 percent in Mississippi. Alabama harvested nearly 5.9 million pounds; Mississippi, 2.8 million pounds; Louisiana, 32 million pounds; and Florida, over 65.9 million pounds.[17] Marine and freshwater recreational fishing in the Gulf Coast also support various industries that provide goods and services to anglers. In 2001, recreational fishing in Alabama, Florida, Mississippi, and Louisiana generated over $5.7 billion in revenue, providing more economic benefit than commercial fishing in the region.[18]

2.1.3.4 Hydropower Generation

53. The Gulf region derives a very small portion of its overall power supply from hydropower. Electricity supply and capacity data are collected and reported by the North American Reliability Council (NERC). Of its ten regional councils, the Southern Electrical Reliability Council (SERC) is most contiguous with areas potentially affected by critical habitat for the sturgeon. Geographic area covered by the Southern section of SERC includes most of Alabama and Georgia, southeastern Mississippi, and the Florida panhandle. Another section of SERC, Entergy, covers southwestern Mississippi, the Gulf coast of Louisiana, and portions of other states. Peninsular Florida is not covered SERC, but by the Florida Reliability Coordinating Council (FRCC). Peak summer demand reached 43,736 megawatts for the Southern region and 25,747 megawatts for the Entergy region in 2001.[19]

54. Only one dam located within the proposed critical habitat designation supplies hydropower. Located near the Florida-Georgia border in Chatahoochee, Florida, the Jim Woodruff Dam is one of 23 hydropower sites operated by the U.S. Army Corps of Engineers (USACE) that generate power. The electric power and energy generated at Jim Woodruff Dam is marketed by the Federal Southeastern Power Administration for the wholesale energy market. Of a total installed capacity of 3,092 megawatts, the Jim Woodruff Dam represented 30 megawatts, or less than one percent of Southeastern Power Administration market capacity during fiscal year 1999.[20] In terms of actual volume marketed, the facility provided 205 gigawatt hours during fiscal year 1999, or 3.6 percent of the Southeastern Power

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[17] "National Marine Fisheries Service, Fisheries of the United States: 2001," U.S. Marine Recreational Fisheries.

[18] U.S. Fish & Wildlife Service, "2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation", accessed at http://www.census.gov/prod/2002pubs/FHW01.pdf on January 10, 2003.

[19] "2002 Summer Assessment: Reliability of the Bulk Electricity Supply in North America," North American Electric Reliability Council, May 2002, ftp://www.nerc.com/pub/sys/all_updl/docs/pubs/summer2002.pdf, accessed November 22, 2002.

[20] "Operation and Maintenance, Southeastern Power Admistration," FY2001 Congressional Budget, http://www.cfo.doe.gov/budget/01budget/pmas/sepa/sepabudg.pdf, accessed November 20, 2002.

Administration total.[21] Based on data from 1995, USACE estimated total electricity capacity in the Apalachicola-Chattahoochee-Flint (ACF) Basin to be 6,657 megawatts. Of this total, 652 megawatts represent hydropower capacity.[22] Compared to 2001 Southern region peak summer demand, hydropower units located in the ACF Basin contribute a small percentage of total regional electricity demand.

55. In 2001, Florida had summer peak demand of 38,285 megawatts out of a total summer peak capacity of 42,609 megawatts.[23] Coal, natural gas, oil, and nuclear sources fuel most of the state's energy needs.[24] Electricity derived from hydropower from the Jim Woodruff Dam can account for only a small fraction of Florida's statewide capacity.

2.2 Baseline Elements

56. The baseline constitutes the "without section 7" scenario for this analysis. The baseline for the sturgeon includes Federal and state laws, including the prohibition against take of the species contained within section 9 of the Act, as well as voluntary environmental programs that provide protection to the sturgeon in the absence of the protection afforded by the listing and any anticipated additional protection afforded by the proposed critical habitat designation.

2.2.1 Recovery Plan

57. An important component of the regulatory baseline is the Gulf Sturgeon Recovery/Management Plan, published in 1995.[25] The Recovery Plan establishes recovery

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[21] "Operation and Maintenance, Southeastern Power Admistration," FY2001 Congressional Budget, http://www.cfo.doe.gov/budget/01budget/pmas/sepa/sepabudg.pdf, accessed November 20, 2002.

[22] "Water Allocation for the Apalachicola-Chattahoochee-Flint (ACF) River Basin: Alabama, Florida, and Georgia," Draft Environmental Impact Statement, Appendix F, Section 4, U.S. Army Corps of Engineers, Mobile District, September 1998.

[23] "Florida...EnergyWise!: A Strategy for Florida's Energy Future," Final Report of the Florida Energy 2020 Study Commission, Tallahassee, FL, December 2001, www.myflorida.com/myflorida/government/taskandcommissions/energy_commission/pdfs/final_report.pdf, accessed November 20, 2002.

[24] "Florida...EnergyWise!: A Strategy for Florida's Energy Future," Final Report of the Florida Energy 2020 Study Commission, Tallahassee, FL, December 2001, www.myflorida.com/myflorida/government/taskandcommissions/energy_commission/pdfs/final_report.pdf, accessed November 20, 2002.

[25] U.S. Fish and Wildlife Service, *Gulf Sturgeon Recovery/Management Plan*, Atlanta, GA, August 1995.

criteria for the sturgeon and proposes actions to restore and maintain sturgeon populations. The ultimate goal of the Recovery Plan is to enable the species to recover to the point that it can be removed from the Federal list of endangered and threatened wildlife and plants. A secondary goal is to recover the species to the point that it can support a commercial fishery. While the Recovery Plan imposes no binding restrictions or obligations on landowners and managers, it serves as an important information source regarding sturgeon habitat areas.

2.2.2 Overlap with Other Listed Species

58. Generally, if a consultation is triggered for any listed species, the consultation process will also take into account all other listed species known or thought to occupy areas on or near the project lands. As such, listing or critical habitat-related protections for other threatened or endangered species may benefit the sturgeon as well (i.e., provide baseline protection). However, due to the difficulty in apportioning the costs of consultations between various species as well as awareness that a consultation for the sturgeon would need to be conducted absent consultations for or involving other species, this analysis does not attempt to apportion the consultations and related costs reported by Action agencies between the sturgeon and other listed species. The Services have conducted consultations on the sturgeon in combination with numerous species, as indicated in Exhibit 2-10.

2.2.3 Federal and State Statutes and Regulations

59. This section provides relevant information about the regulatory elements that exist in the baseline, or the "without section 7" scenario. Where proposed activities directly affect proposed critical habitat areas, these state and local regulations may provide a level of protection to the species even in the absence of section 7. Furthermore, these regulations may influence development and/or affect the section 7 consultation process.

60. The baseline regulatory elements potentially relevant to this analysis are described in Appendix A. As the Appendix shows, a considerable number of Federal, state, and other regulatory initiatives could provide the sturgeon with some measure of protection absent section 7 consultation.

Exhibit 2-10

OTHER LISTED SPECIES INCLUDED IN PAST CONSULTATIONS ON THE STURGEON

Species	Status
Atlantic loggerhead turtle (*Caretta caretta caretta*)	Threatened
Ringed sawback turtle (*Graptemys oculifera*)	Threatened
Gopher tortoise (*Gopherus polyphemus*)	Threatened
Atlantic green turtle (*Chelonia mydas mydas*)	Endangered
Kemp's Ridley turtle (*Lepidochelys kempii*)	Endangered
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Alabama red-bellied turtle (*Pseudemys alabamensis*)	Endangered
American bald eagle (*Haliaeetus leucocephalus*)	Threatened
Fat three-ridge (mussel) (*Amblema neislerii*)	Endangered
Shiny-rayed pocketbook (mussel) (*Lampsilis subangulata*)	Endangered
Ochlockonee moccasinshell (mussel) (*Medionidus*	Endangered
Purple bankclimber (mussel) (*Elliptoideus sloatianus*)	Threatened
Inflated heelsplitter mussel (*Potamilus inflatus*)	Threatened
Sperm whale (*Physeter macrocephalus*)	Endangered
Alabama beach mouse (*Peromyscus polionotus ammobates*)	Endangered
Perdido Key beach mouse (*Peromyscus polionotus*	Endangered
Choctawhatchee beach mouse (*Peromyscus polionotus*	Endangered
St. Andrew beach mouse (*Peromyscus polionotus*	Endangered
Brown pelican (*Pelecanus occidentalis*)	Endangered
Piping plover (*Charadrius melodus*)	Threatened
West Indian manatee (*Trichechus manatus latirostris*)	Endangered

61. The previous two sections introduced the geographic areas in which the Services are proposing to designate critical habitat for the sturgeon, the socioeconomic profile of these areas, and general trends associated with population, economic and urban growth. These sections also outlined the baseline level of protection afforded the sturgeon and its habitat, including existing Federal and state laws and policies. This section will identify the current land and water uses in or near the proposed critical habitat areas that may be affected by section 7 implementation for the sturgeon. Importantly, this discussion includes the effects of section 7 implementation for all activities associated with the proposed critical habitat area, recognizing the difficulty in some instances of distinguishing activities that would trigger jeopardy consultations without also triggering destruction or adverse modification consultations for this designation. As such, this section does not distinguish which impacts may be attributable co-extensively to the listing of the sturgeon, versus those impacts attributable solely to the critical habitat designation. Therefore, the discussion in this section reflects an "upper bound" of impacts caused by the designation.

62. This section begins with a summary of the categories of economic impact associated with section 7 implementation for the sturgeon. It then provides a general description of the activities and potential Federal nexuses affecting the 1,580 river miles and 2,333 square miles of estuarine and marine habitat proposed as critical habitat for the sturgeon. The section then discusses likely modifications to proposed projects and regional economic impacts associated with implementing section 7 of the Act for the sturgeon. This information is augmented by projections of specific projects likely to require section 7 consultation in each critical habitat unit over the next ten years (see Appendix B).

3.1 Categories of Economic Impacts Associated with Section 7 Implementation

63. The following section provides an overview of the categories of economic impacts that are likely to arise due to the implementation of section 7 in the geographic area proposed as critical habitat for the sturgeon.

3.1.1 Technical Assistance

64. Frequently, the Services respond to requests for technical assistance from other Federal agencies, state agencies, local municipalities, and private landowners and developers

with questions regarding whether specific activities may affect a listed species or its critical habitat. Technical assistance costs represent the estimated economic costs of informational conversations between these entities and the Services regarding such potential effects. Most likely, such conversations will occur between municipal or private property owners and the Services regarding lands designated as critical habitat or lands adjacent to critical habitat. The Services' technical assistance activities are voluntary and occur in instances where a Federal nexus does not exist. Costs to the Services of providing technical assistance to private parties are expected to be small relative to other economic impacts to the Services, Action agencies, and third parties; therefore, this analysis does not quantify the instances and costs of technical assistance efforts.[26]

3.1.2 Section 7 Consultations

65. Section 7(a)(2) of the Act requires Federal agencies (Action agencies) to consult with the Services whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Services and another Federal agency only, such as USACE. Often, they will also include a third party involved in projects on non-Federal lands with a Federal nexus, such as private landowners conducting activities that require a Federal permit or public or private entities receiving Federal funding. In addition, Action agencies may engage in programmatic consultations to develop strategies to consider impacts to the sturgeon and its habitat at the program level, rather than at the individual project level. For example, EPA conducts programmatic consultations with FWS to consider endangered and threatened species when reviewing state water quality standards.

66. During a consultation, the Services, the Action agency, and, if applicable, the private entity applying for Federal funding or permitting communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, the potential effects to the species and designated critical habitat associated with the proposed activity, and the parties involved.

67. Section 7 consultations with the Services may be either informal or formal. *Informal consultation*, which consists of informal discussions between the Services, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, is designed to identify and remove potential impacts at an early stage in the planning process. By contrast, a *formal consultation* is required if the Action agency determines that the proposed action may affect a listed species or designated 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

[26] Personal communication with U.S. Fish and Wildlife Service, Panama City, Florida, May 3, 2002.

administrative effort on the part of all participants. The costs of these efforts are an important component of the impacts assessment.[27]

68. Under certain circumstances, the designation of critical habitat can result in section 7 consultations with the Services beyond those required by the listing. These include: new consultations, which can occur when activities involving a Federal nexus are proposed in or near critical habitat not thought to be currently occupied by the species; more intensive consultations, in which actions that would previously have been resolved during informal consultation must proceed to formal consultation in order to consider habitat impacts; and reinitiations of consultations, which result when consultations that previously occurred under the listing are reinitiated due to new information or circumstances generated by the designation of critical habitat.

3.1.3 Project Modifications

69. The section 7 consultation process may involve some modifications to a proposed project. Projects may be modified in response to voluntary conservation measures suggested by the Services during the *informal* consultation process in order to avoid or minimize impact to a species and/or its habitat, 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 description as avoidance and minimization measures. Alternatively, the modifications may be included in the Services' biological opinion on the proposed action as reasonable and prudent measures (RPMs) and/or discretionary conservation recommendations to assist the Action agency in meeting its obligations under section 7(a)(1) of the Act.[28]

70. In some cases, the Services may determine that the project is likely to jeopardize the continued existence of the species and/or destroy or adversely modify its designated critical habitat. In these cases the Services will include reasonable and prudent alternatives to the proposed project. The reasonable and prudent alternatives are typically developed by the Services in cooperation with the Action agency and, when applicable, the applicant. Alternatively, the Action agency can develop its own reasonable and prudent alternatives, or seek an exemption for the project. All of these project modifications have the potential to represent some direct cost to the Action agency and/or the applicant. In certain instances,

[27] In certain cases, consultations may result from issues associated with take and jeopardy, rather than adverse modification. Because it is difficult to distinguish beforehand which issues will drive the consultation process, this analysis attributes all predicted consultations to co-extensive effects.

[28] Section 7(a)(1) requires Federal agencies to utilize their authorities to further the purposes of the Act by carrying out programs for the conservation of listed species.

these modifications can lead to broader secondary impacts on industry and/or the regional economy.[29]

3.1.4 Regional Economic Impacts

71. The consultation process and related project modifications could directly affect the operations of Federal agencies and private entities (e.g., dredging by the USACE, maintenance of oil and gas pipelines by private entities), with secondary impacts on the suppliers of goods and services to these industries, as well as purchasers of products from these industries. For example, changes in dredging activities by the USACE could affect both suppliers of dredging equipment and commercial traffic utilizing the dredged waterways. Thus, project modifications or other restrictions that engender cost and revenue impacts involving commercial enterprises or activities that allow for commercial activity can have a subsequent detrimental effect on other sectors of the local economy, especially when the affected industry or activity is central to the local economy. Industries within a geographic area are interdependent in the sense that they purchase output from other industries and sectors, while also supplying inputs to other businesses. Thus, direct economic effects on a particular enterprise can affect regional output and employment in multiple industries.

3.2 Activities Potentially Affected by Section 7

72. Numerous Action agencies carry out and permit activities and projects in or adjacent to proposed critical habitat areas. These activities may lead to section 7 consultation with the Services, and in some cases specific projects may be modified in order to protect the sturgeon and/or its habitat. This section provides descriptions of activities likely to be affected by section 7 implementation. It also identifies activities unlikely to incur major section 7 impacts. Specific numbers of expected section 7 informal and formal consultations related to these activities in each proposed critical habitat unit are provided in Appendix B. Administrative and project modification costs associated with section 7 implementation for affected projects are provided in Section 4.

73. This analysis assumes that each activity described will lead to section 7 consultation with either FWS or NOAA Fisheries, and that a consultation with both agencies will not be required for a single project. The proposed rule outlines proposed jurisdictional responsibilities for the management of the sturgeon. FWS would be responsible for all consultations on the sturgeon in riverine units and NOAA Fisheries would be responsible for all consultations on the sturgeon in marine units. In estuarine areas, the Services propose to divide consultation responsibilities according to the Action agency involved, such that FWS would consult with the Federal Highway Administration (along with state Departments

[29] In certain instances, project modifications may result only from concern for direct impacts to the fish under the take and jeopardy provisions, rather than being co-extensively or exclusively related to adverse modification. This analysis focuses on project modifications resulting from critical habitat and/or coextensive considerations.

of Transportation), the Environmental Protection Agency, the Coast Guard, and the Federal Emergency Management Agency. NOAA Fisheries would consult with the Department of Defense, U.S. Army Corps of Engineers, Minerals Management Service, and any other affected agencies in estuarine areas. FWS would take the consultation lead for projects extending into the jurisdictions of both Services. Consultations described in this report, below and in Appendix B, are assigned to either FWS or NOAA Fisheries based on this jurisdictional breakdown.[30]

3.2.1 Activities Likely to Require Section 7 Consultation

74. Since the listing of the sturgeon as threatened in 1991, FWS has conducted 320 informal and 14 formal consultations, and NOAA Fisheries has conducted 70 informal and 4 formal consultations involving this species through 2001. This section summarizes activities likely to lead to section 7 consultation over the next ten years, organized in terms of the Action agency that provides the Federal nexus. Information in this section is based on the record of past consultations, as well as conversations with Action agencies and the Services about future activities.[31] Appendix B provides detailed information on specific projects pertaining to the activities described below.

U.S. Army Corps of Engineers

75. USACE is responsible for carrying out and permitting the majority of activities with the potential to affect riverine, estuarine, and marine areas. USACE civil works districts undertake projects to maintain navigation channels and water infrastructure, conduct environmental restoration, and maintain flood control. USACE regulatory districts grant permits for private activities in navigable waterways under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act. Activities in four district offices of USACE are potentially affected by the critical habitat proposal: New Orleans, Louisiana; Vicksburg, Mississippi; Mobile, Alabama; and Jacksonville, Florida.[32]

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[30] Jurisdictional responsibilities are subject to change, and the jurisdictional breakdown may not be perfectly implemented. Conceivably, an Action agency could consult with both FWS and NOAA Fisheries on a single project. However, this analysis assumes that the likelihood of duel consultations on a single project is small, and does not predict such an outcome.

[31] Personal communication with U.S. Army Corps of Engineers, New Orleans District, April 29, 2002; Mobile District, May 1, 2002; Vicksburg District, May 24, 2002; Jacksonville District, May 16 and 17, 2002. Personal communication with the U.S. Fish and Wildlife Service, March 15, May 3, and June 5, 2002. Personal communication with National Marine Fisheries Service, Southeast Regional Office, June 5, 2002. Information also based on written communications from U.S. Army Corps of Engineers, Mobile District, received May 29 and June 19, 2002.

[32] Jurisdictions are as follows: New Orleans District operates and regulates in Louisiana marine areas (Unit 8); Vicksburg District operates and regulates in Louisiana rivers (Unit 1); Mobile District operates in Louisiana, Mississippi, Alabama, and Florida panhandle rivers and marine areas (Units 2-6, 8-13) and regulates in Mississippi and Alabama (Unit 2, portions of Units 3-5); Jacksonville District operates in Florida on the Suwannee River and Suwannee Sound (Units 7 and

76. USACE has engaged in numerous past consultations with the Services, and future impacts to USACE-operated and regulated projects are anticipated in all proposed critical habitat units. Specific projects expected to lead to consultation with the Services are listed in detail in Appendix B.

Dredging

77. USACE is responsible for maintaining and improving waterways to support navigation. USACE uses dredges to maintain navigation channels at specified depths and widths to allow for barge transport of shipped goods and other boat traffic. Furthermore, USACE must occasionally engage in emergency dredging to repair the effects of tropical storms and hurricanes. USACE also conducts contract dredging projects for other Federal agencies, such as the Coast Guard and military facilities (e.g., Eglin Air Force Base and the Pensacola Naval Air Station in Florida).[33]

78. Several types of dredges are used to remove accumulated sediment from channels. Mechanical dredges, such as backhoe and dipper dredges, scoop up material with cranes and place it onto barges for removal. More commonly, USACE uses hydraulic dredges, such as hopper and pipeline dredges, to pump material out of the channel as slurry. Hopper dredges pump slurry into a ship with a large holding compartment, while pipeline dredges pump sediment though a pipe directly into a disposal area. USACE also uses dragline and clamshell dredges to remove accumulated sediment from the mouths of sloughs. Availability of hydraulic dredges is a major concern to USACE, as only 10-20 hopper dredges and approximately 20 pipeline dredges are available for projects along the Gulf Coast.[34] Dredge availability is a key determinant for scheduling of large-scale dredging projects.

79. USACE plans the location and timing of dredging projects to ensure that channel reliability is always maintained. Frequency of dredging varies widely, from almost constant maintenance dredging to once every ten or twenty years, depending on the level of use of the waterway for shipping and the natural rate of sediment deposition. The major navigation channels must be kept at set depths and widths to allow shippers to enter ports. Failure to maintain the navigation channels accordingly greatly affects shippers who may be forced to use smaller vessels, light load (i.e., remove shipped goods to reduce weight and therefore the depth of the vessel), use alternative modes of transport, such as rail or truck transport, or travel on to another port. All of these alternatives increase the cost of transporting goods. In extreme cases, commercial facilities may close and economic activities may transfer to other locations.

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14) and regulates in Florida (Units 6-7, 9-14, portions of Units 3-5).

[33] USACE contracts out many civil works projects to private contractors that own and operate dredges.

[34] The 10-20 hopper dredges that work the Gulf coast also work nationwide, limiting their availability.

80. The major risks of dredging projects to sturgeon habitat are elevated turbidity causing increased siltation on feeding or spawning areas and reduction or change in availability of benthic prey organisms, along with blockage of migratory passage through channels and inlets. Numerous formal and informal consultations on dredging activities are anticipated in the proposed critical habitat units over the next ten years, primarily in the context of consultations on operations and maintenance (O&M) navigation project activities (see Appendix B).[35]

Dredged Material Disposal

81. Material dredged from navigation channels must then be placed in a suitable disposal site. The most common disposal methods are: ocean placement, downdrift disposal on coastal beaches, confined disposal facilities either in openwater or upland, flow-lane or within-banks placement, and open water disposal. Placement of dredged material into openwater or aquatic confined disposal sites located in rivers, estuaries or nearshore Gulf waters poses a risk from disposal of dredged material on spawning and feeding habitat. Upland disposal and downdrift placement of sandy dredged material on beaches and other restoration projects pose less risk to sturgeon habitat. Numerous consultations on O&M navigation project activities are predicted (see Appendix B), and will likely consider impacts of both dredging and disposal activities.[36]

Beach Nourishment

82. Part of the USACE's mission is to protect beach areas from hurricane and coastal storm damage to coastal communities and promote recreation. Typically, USACE authorized storm damage reduction projects include the placement of sandy material on a beach either through overland haul of sand to the beach or by dredging suitable sands from offshore sand deposits. NOAA Fisheries believes that some or all of these consultations on beach nourishment could rise to formal consultation due to the designation of critical habitat; therefore, this analysis predicts formal consultations on most beach nourishment projects for which NOAA Fisheries is the lead agency (see Appendix B).

Wetland Habitat Creation

83. Dredged material may be used for wetland habitat creation, as well as other ecosystem restoration projects. These projects are undertaken with the goal of maintaining

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[35] According to public comments from USACE, Mobile District, additional informal consultations on dredging and disposal may occur in various units, beyond those predicted in Appendix B (U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002). However, due to the lack of specific information on where these consultations would occur and which activities they would cover, they are not included in estimates of future consultations.

[36] U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002.

or re-establishing natural functioning and self-regulating wetland systems. USACE predicts many informal consultations on wetland habitat creation activities over the next ten years (see Appendix B). USACE also expects approximately ten informal consultations and one formal consultation within the next ten years on slough restoration activities on the Apalachicola River.[37]

Flood Control/Bank Stabilization

84. USACE responsibilities include flood control and damage reduction efforts that range from small, local protection projects, such as construction of levees and non-structural flood control measures, to major dams. Erosion control and bank stabilization activities are typically associated with dredging and marsh creation. Shoreline protection efforts may involve construction of jetties, seawalls, and other hard structures, as well as beach nourishment.[38] USACE may consult on certain flood control efforts in several units (see Appendix B).

Clearing and Snagging

85. USACE conducts clearing and snagging activities on an as-needed basis, using barges to remove fallen trees and other debris from river channels. USACE expects to engage in one formal consultation regarding debris removal on the Choctawhatchee River in Unit 5 (see Appendix B).

Dams and Reservoirs

86. USACE manages certain reservoirs and dams, such as the Jim Woodruff Dam on the Apalachicola River, to serve a variety of authorized purposes, including navigation, flood control, hydropower generation, water supply, and recreation. Furthermore, USACE develops engineering safety criteria for safe dams and inspects dams owned or operated by other Federal, state, and local agencies and private interests.[39]

87. USACE is responsible for operations, maintenance, and repair of its dams and related structures. USACE is most likely to consult regarding activities at Jim Woodruff Dam in Unit 6, as well as several reservoirs located upstream of Unit 6 in Georgia and Alabama, within the Apalachicola-Chattahoochee-Flint (ACF) river basin. Typical O&M and repair activities with the potential to lead to consultation include: powerhouse, lock or dam rehabilitation; changes in reservoir release patterns to accommodate hydropower generation schedules; special navigation releases from the dams to facilitate barge traffic; special reservoir operations to facilitate reservoir fishery spawning and other fish management activities; spot dredging to eliminate adverse cross-currents below dams or lock approaches;

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[37] U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002.

[38] U.S. Army Corps of Engineers, Services for the Public, www.usace.army.mil/public.html

[39] U.S. Army Corps of Engineers, Services for the Public, www.usace.army.mil/public.html

upstream levee work; possible modifications to accommodate fish passage; and public use area maintenance activities. Potential future water control activities include: changing the river flow regime to implement water allocation formulas being negotiated by the states of Alabama, Florida, and Georgia; and updating/revising water control plans.[40]

Programmatic Consultations on Multiple O&M Navigation Projects

88. The USACE, Mobile District is in the process of preparing a regional biological assessment for sturgeon on multiple O&M navigation projects (approximately 30), in cooperation with the FWS field offices located in Panama City, Florida; Daphne, Alabama; and Jackson, Mississippi and the NOAA Fisheries office in St. Petersburg, Florida. This regional biological assessment will include specific site impact information intended to streamline the section 7 consultation process. The Mobile District and FWS have not determined the specifics of the programmatic consultation process. For example, it may be organized as two consultations, one on riverine activities and one on marine and estuarine activities. Alternatively, the programmatic consultation process could lead to three separate consultations, encompassing the Mobile District's O&M navigation projects in each affected state (Florida, Alabama, and Mississippi).

89. The preparation of a regional biological assessment with specific site impact information by USACE, Mobile District, combined with follow-up programmatic consultations, could streamline the consultation process and inform the selection of project-appropriate modifications to protect the sturgeon and its habitat. USACE may consider the scheduling of its dredging projects and, if feasible, alter the order, scope, and/or the timing of dredging projects in order to avoid conflicts with sturgeon migratory patterns and cumulative habitat impacts. When projects cannot be rescheduled to occur at times when sturgeon are not present, programmatic consultations could help identify a set of reasonable and prudent measures that would allow the dredging projects to go forward while minimizing harm to the sturgeon and its habitat.

90. This analysis considers both a with- and without-programmatic consultation scenario. Appendix B identifies projects that are likely to be included in programmatic consultations, if up to three programmatic consultations are developed. In the without-programmatic scenario, formal consultations are predicted for individual O&M navigation projects in many critical habitat units. In contrast, the with-programmatic scenario predicts that up to three programmatic consultations will occur.[41] Then, USACE will engage in informal consultations with FWS on individual O&M navigation projects. Therefore, the development of up to three programmatic consultations has the potential to significantly

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[40] U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002.

[41] Three programmatic consultations would be required if USACE, Mobile District consults separately on O&M navigation activities in the states of Florida, Alabama, and Mississippi. Alternatively, two programmatic consultations could occur if USACE, Mobile district consults separately on riverine and estuarine activities. The Services' preference is to organize the programmatic consultation process according to the latter scenario.

reduce both the administrative costs and the number of formal consultations that would be required on navigation projects, as well as the uncertainty regarding the outcome of any individual consultation.

91. NOAA Fisheries is in the final stages of formal programmatic consultation regarding hopper dredging in the Gulf of Mexico. This programmatic consultation encompasses five USACE Districts, four of which are affected by proposed critical habitat.[42]

Regulated Modifications of Surface Water Bodies

92. Apart from its civil works activities, USACE also issues permits under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act for private activities that occur in water bodies or involve modifying navigable waterways for construction and maintenance of structures.[43] USACE typically consults with the Services when issuing individual standard permits for such projects, but the presence of critical habitat may also cause USACE to elevate nationwide and regional permits and consider them as individual permits. Alternatively, USACE may update its State and Local Operating Procedures for Endangered Species (SLOPES), which govern how USACE considers effects on endangered and threatened species when granting section 404 and 10 permits. Updating the SLOPES could streamline the permit process for private activities located in or near sturgeon critical habitat by providing a programmatic approach to consider the sturgeon in nationwide and regional permits, removing the need to elevate each permit and consider it individually.[44] This analysis estimates future consultations based on the past record of permit applications received in each unit and the past proportion of total permits that were individual permits, standard permits, and letters of permission (LOPs). Based on the past permit history across units, approximately 20 percent of total permits are likely to lead to section 7 consultation.[45]

93. USACE section 404 and section 10 permits constitute the primary Federal nexus for consultation regarding private development. Coastal and riverside development is an issue of concern along the Gulf Coast of Mississippi and Alabama, as well as the Florida panhandle. The past consultation history indicates that while development activities are

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[42] Personal communication with National Marine Fisheries Service, Southeast Regional Office, June 19, 2002.

[43] USACE issues four types of permits: (1) individual permit, a type of standard permit requiring public comment; (2) letter of permission (LOP), a type of standard permit requiring coordination with adjacent property owners; (3) nationwide permits, which authorize a category of activities and are issued for individual small projects across the Unites States; and (4) regional or general permits, which authorize a category of activities in a specific region.

[44] Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, June 17, 2002.

[45] Permit data provided by U.S. Army Corps of Engineers, New Orleans District, May 28, 2002; Vicksburg District, May 31, 2002; Mobile District, June 21, 2002; and Jacksonville District, June 3 and 13, 2002.

likely to result in numerous informal consultations, few consultations are likely to become formal or require project modifications (see Appendix B).[46] The typical small-scale development project might involve construction of a dock or other structure; the Services believe such construction is unlikely to adversely affect the sturgeon or its habitat.[47]

94. Private activities regulated under section 404 and section 10 include:

- *Docks, boat launches, fishing piers, and related construction.* Numerous private landowners seek permits to construct docks, boat launches, and other structures in and adjacent to rivers and bays. Most of these projects are very small-scale and are regulated under Nationwide and Regional permits, which do not require individual section 7 consultation. However, large-scale marine construction projects may require individual permits.[48]

- *Private dredging projects*. USACE issues permits to private parties seeking to undertake small dredging projects to maintain local access to navigation channels, as well as large-scale access channels and basins at industrial port facilities.

- *Shoreline stabilization and beach nourishment.* Private parties may request permits to undertake small localized shoreline stabilization, beach nourishment, and restoration projects. Larger-scale industrial sites and local governments may also require USACE permits for bulkheading and shoreline stabilization projects.

- *Oil and gas*. USACE regulates oil and gas pipelines and installations in the Gulf of Mexico out to the three mile limit (in state waters), as well as oil and gas structures that cross rivers. Oil and gas pipelines are established by digging trenches, often using dredges, and burying the pipes or jetting them underground. In addition, old oil and gas installations, such as old tanks, may be used to create offshore artificial

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[46] While certain formal consultations on private development requiring USACE permits may lead to project modifications, such measures cannot be predicted due to uncertainty regarding the type and scope of activities that will potentially involve formal consultation.

[47] Large-scale development projects may constitute a larger threat to the sturgeon because of increased runoff and drainage into water bodies. For example, a large timber company is planning to convert 4,000 acres of forested land to 10,000-home residential development at Port St. Joe, located adjacent to Unit 11. EPA's National Pollutant Discharge Elimination System (NPDES) permit program regulates point source pollution; however, NPDES programs are delegated to all four affected states, so a Federal nexus for consultation on individual development projects is unlikely to exist. Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, June 17 and 24, 2002.

[48] FWS also provides Federal aid for certain projects, such as construction of boat ramps by states. This analysis assumes that such projects are included in the estimates of future consultations on USACE-regulated modifications to surface water bodies. However, in the future, FWS rather than USACE may take the lead role in consultations on Federal aid projects based on the FWS funding nexus.

reefs. The vast majority of oil and gas activity occurs in coastal and nearshore areas of Louisiana, Mississippi, and Alabama. Oil and gas development is rare in Florida.

- *Aquaculture.* Private business owners may engage in aquaculture and cultivate oyster beds, which require a USACE permit. For example, USACE, Mobile District has received several permit applications for extensive aquaculture fields in the Gulf of Mexico and Mississippi Sound.[49]

- *Mining.* Historically, gravel mining is a regulated activity with the potential to harm sturgeon habitat, as in-stream mining may occur in spawning areas and affect water quality. However, in-stream gravel mining is no longer occurring in any proposed critical habitat units.[50] Near-stream gravel mining persists in the Pearl, Bogue Chitto, and Pascagoula watersheds. In addition, phosphate mining has historically been prevalent near the Suwannee River and its tributaries. This activity is typically subject to a USACE permit, along with a strict State Water Quality Certification from the Florida Department of Environmental Protection. Given that mining projects would not be located directly in the Suwannee River and would be subject to state and EPA water quality protections, such as preserved wetland buffer zones, FWS does not expect phosphate mining to harm the sturgeon or its habitat.[51]

- *State or local water supply projects*. USACE issues section 404 permits for state, county, and municipal water supply and dam projects. The Okaloosa County Commission in Florida is considering constructing a dam on the Yellow River in Unit 4, which would require a permit. This dam would serve the primary purposes of water supply and recreation on the resulting man-made lake. Dam construction has the potential to affect several of the primary constituent elements for the sturgeon, including natural flow regimes, access to spawning sites, water quality, and safe and unobstructed migratory passage.[52] This analysis predicts that the proposed Yellow River dam project will lead to one formal consultation in Unit 4 to consider impacts to the sturgeon and its habitat.[53]

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[49] U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002.

[50] Personal communication with U.S. Fish and Wildlife Service, Jackson, Mississippi Field Office, November 12, 2002.

[51] Personal communication with U.S. Fish and Wildlife Service, Jacksonville Field Office, November 13, 2002.

[52] Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, June 21, 2002.

[53] U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002.

Minerals Management Service

95. The Minerals Management Service (MMS) regulates private oil and gas activities in Federal waters, beyond the state-Federal boundary three miles from shore. Although the proposed critical habitat for the sturgeon does not include Federal waters, risk of oil spills that could spread into adjacent state waters provides the basis for MMS to engage in section 7 consultation with the Service regarding potential impacts to the sturgeon and its habitat.[54] In the areas proposed as critical habitat, private oil and gas exploration and transport activities regulated by MMS have the potential to affect Unit 8, offshore of Louisiana, Mississippi, and Alabama.

96. MMS typically conducts formal consultations with NOAA Fisheries on risk of oil spills when offering leases for oil and gas sites in the Gulf of Mexico to private companies. Measures to protect the sturgeon are usually included as nondiscretionary requirements that private companies must follow when they buy an oil and gas lease block. Lease sales require oil spill contingency plans, regardless of the Act, but NOAA Fisheries may request that the plans address ways to mitigate any harmful impacts to sturgeon or its habitat that may result from oil spills. NOAA Fisheries expects MMS to reinitiate previous consultations on lease sales and conduct new formal consultations. MMS may also consult on other miscellaneous mining-related projects that require Environmental Impacts Statements (EISs) or environmental assessments (EAs) under the National Environmental Policy Act (NEPA), such as explosives removal and construction of new waste disposal facilities.[55]

Environmental Protection Agency

97. EPA engages in section 7 consultation with the Services regarding water quality standards, to ensure that they are protective of endangered and threatened species. EPA expects to consult with the Services once every three years on changes resulting from the triennial review and modification of state delegated water quality standards for Alabama, Florida, Louisiana, and Mississippi under section 303 (c) of the Clean Water Act; these consultations will consider, in part, the impacts on the sturgeon. EPA also consults every two years on listings of impaired water bodies under section 303 (d) of the Clean Water Act, considering both direct effects in impaired water bodies and downstream effects on water bodies from upstream impaired water bodies. Finally, EPA predicts additional consultations related to total maximum daily load (TMDL) levels under section 303 (d) of the Clean Water Act. Consultations on TMDLs arise when the combination of point and non-point source pollutants causes a noncompliance in a body of water, which is then listed in the state's section 303d list of impaired waters. If the noncompliance has the potential to affect the

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[54] MMS-related lease sale modifications may exclude near-shore blocks from the lease process. Oil spills would then have to travel and weather for a longer time before, if ever, reaching near-shore Gulf of Mexico areas proposed for critical habitat. Minerals Management Service, Gulf of Mexico OCS Region, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 11, 2002.

[55] Personal communication with Minerals Management Service, Gulf of Mexico OCS Region, April 30, 2002.

sturgeon, then EPA is likely to informally consult with the Services when determining how much load will be allowed to bring the water body back into compliance.[56]

98. EPA predicts varying numbers of consultations in each critical habitat unit depending on the existing number of water bodies listed as impaired water bodies and the likelihood of TMDL exceedances (see Appendix B). EPA is also in the process of a national programmatic consultation on water quality criteria, which provide the basis for state delegated water quality programs. This programmatic consultation will consider all 551 listed species that are aquatic or aquatically dependent, including the sturgeon, and EPA will revise criteria if they are not protective of endangered and threatened species.[57]

Federal Highway Administration

99. The Federal Highway Administration (FHWA) provides partial funding, typically an 80 percent reimbursement, to state Departments of Transportation (DOTs) for road and bridge construction projects. Bridge construction, maintenance, and removal projects in rivers and bays proposed for critical habitat are likely to require section 7 consultation. Bridge projects crossing navigable waterways also require navigation and/or wetlands fill permits from USACE and location and clearance permits from the Coast Guard. For the purposes of this analysis, section 7 consultations and project modifications associated with bridge projects are attributed to the FHWA nexus.

100. State DOTs predict several bridge construction and replacement projects crossing rivers and estuarine areas in the proposed critical habitat units.[58] These projects are identified in Appendix B. The primary risk to the sturgeon and its habitat from bridge replacement activities are the use of underwater explosives to remove old bridge structures; the potential for heightened turbidity from equipment used in underwater construction, such

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[56] In addition to these consultations, the Services expect to engage in technical assistance to projects that apply for state NPDES permits. Pursuant to a national Memorandum of Agreement (MOA) between EPA and FWS, FWS reviews each permit application to confirm that listed species are not adversely affected by water quality impacts. If the proposed permit does not appear to meet state water quality standards, FWS may object to issuance of the permit, and the state may ask the applicant to alter the permit to meet the standards. Because states ultimately issue NPDES permits, a Federal nexus does not exist. Therefore, efforts by the Services are considered technical assistance and are not quantified in this report.

[57] Personal communication with U.S. Environmental Protection Agency, Atlanta Regional Office, June 7, 2002.

[58] Personal communication with Alabama Department of Transportation, June 12, 2002; Florida Department of Transportation, June 17, 2002; Personal communication with U.S. Fish and Wildlife Service, Lafayette Ecological Services Office, June 21, 2002; Florida Department of Transportation Statewide Transportation Improvement Program (STIP): FY 2/03-06/07, http://www11.myflorida.com/financialplanning/stip.htm, accessed November 13, 2002; Mississippi Department of Transportation Statewide Transportation Improvement Program (STIP): FY 2001-03, http://www.mdot.state.ms.us/business/stip/default.htm, accessed November 13, 2002.

as pile jetting, causing sediment to settle on sturgeon feeding and spawning areas; and the potential for blocking migratory movements by in-water construction and demolition activities.

Federal Energy Regulatory Commission

101. The Federal Energy Regulatory Commission (FERC) consults with the Services on relicensing of private, municipal, and state hydroelectric projects and the interstate transmission of electricity, oil, and natural gas by pipeline.[59] FERC issues licenses of varying duration to hydroelectric projects, and typically engages in section 7 consultation only when the projects are up for relicensing. Only one hydroelectric project, located on the Conecuh River in Unit 3, is expected to undergo relicensing during the ten-year time frame considered in this analysis.[60]

102. FERC also regulates the transmission of natural gas, oil, and electricity in interstate commerce, and consults with the Services regarding the construction of new pipelines and transmission lines. FERC may also consult regarding issuance of blanket approval certificates for minor structures related to the pipeline transport of oil and gas. FERC expects that approximately 20 informal consultations on oil and gas pipelines and related construction under blanket approval certificates may occur over the next ten years, but is unable to predict consultations in particular critical habitat units. Moreover, many pipeline projects may cross numerous water bodies and therefore may affect multiple units.[61]

National Marine Fisheries Services - Fisheries Management

103. NOAA Fisheries' Office of Sustainable Fisheries develops Fisheries Management Plans (FMPs) to manage fish stocks under the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996. FMPs contain conservation and management measures designed to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of each fishery.

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[59] FERC may also consult on minor power projects (less than five megawatts) that are granted "exemptions" from licensing, and on amendments to existing licenses. However, FERC cannot predict the incidence of consultations on these activities, and expects that impacts will be minor, so this analysis does not attempt to quantify them.

[60] Personal communication with Federal Energy Regulatory Commission, Atlanta Office, June 11, 2002.

[61] Personal communication with Federal Energy Regulatory Commission, Washington Office, June 18, 2002.

104. In the past, NOAA Fisheries has conducted informal internal consultations on red snapper and reef fish FMPs. NOAA Fisheries predicts that ten informal consultations and two formal consultations on various Gulf of Mexico fisheries will occur over ten years. In addition, NOAA Fisheries expects to reinitiate formal consultation on the shrimp FMP for the Gulf of Mexico in order to consider the sturgeon critical habitat designation.[62]

Federal Emergency Management Agency

105. The Federal Emergency Management Agency (FEMA) consults with the Services regarding emergency response projects, such as construction of drainage ditches and berms for beach nourishment and debris removal. For example, one past consultation with NOAA Fisheries addressed emergency trawling of Mississippi Sound. However, FEMA primarily plays a funding role in emergency response and conducts small interim projects, with major cleanup efforts carried out by other agencies such as USACE. Therefore, FEMA does not anticipate large impacts due to the designation of critical habitat for the sturgeon, and this analysis predicts only two informal consultations over the next ten years in all units.[63] Additional consultations with FEMA and/or its contractors could occur in the event of natural disaster.

Department of Defense

106. Several Department of Defense (DOD) facilities are located adjacent to proposed critical habitat for sturgeon. Certain military operations have the potential to affect sturgeon and may lead to section 7 consultation. Projects vary according to the mission of the DOD facility.

Eglin Air Force Base

107. Eglin Air Force Base (Eglin) encompasses 724 square miles of land ranges and facilities and over 86,500 square miles of water ranges in the Gulf of Mexico and adjacent bays, sounds, and streams. The Air Armament Center tests and evaluates non-nuclear munitions, electronic combat systems and navigation/guidance systems. The Eglin land and water ranges are also used extensively for critical military training by numerous Air Force, Army, Navy, and National Guard units.[64] Three airfields are currently active: Eglin Main, Duke Field and Hurlburt Field Main testing. The major airfield, administrative and living facilities are located in Main Eglin. The Eglin land reservation consists of 27 ranges and 10

[62] Personal communication with National Marine Fisheries Service, Southeast Regional Office, June 19, 2002.

[63] Personal communication with Federal Emergency Management Agency, June 18, 2002.

[64] Eglin Air Force Base, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, September 17, 2002.

auxiliary fields.[65] Eglin borders five of the proposed critical habitat units: Units 4, 9, 10, 11, and 12.

108. Eglin's mission planners project increased use of Eglin's littoral zone along Santa Rosa Island during the next ten years, as well as the Yellow River, Choctawhatchee Bay, East Bay River and Santa Rosa Sound. Testing and training activities are primarily conducted on the surface waters of the Gulf of Mexico and Santa Rosa Sound and are not expected to affect water quality parameters or the sturgeon's benthic habitat. However, infrequent underwater detonations of explosives in support of these and other missions could impact sturgeon (e.g., due to overpressure from explosions) and its benthic habitat.

109. The Navy may use Eglin's littoral zone for various tests, including line charges, underwater mine detection, and sonar testing. Navy littoral warfare exercises include small watercraft operations, beaching of tracked and air cushion vehicles on Santa Rosa Island, and transit to insert personnel and equipment into the Eglin Reservation at or near Wynnhaven Beach. The Navy's Explosive Ordinance Disposal School also conducts low level live detonations within Eglin water ranges as part of its curriculum. These testing and training activities are likely to lead to one or two formal consultations per year.[66] Activity levels on Santa Rosa Island may increase as more military mission activities are transferred to Eglin AFB. In addition, the Navy may use the Eglin Cape San Blas area, on the eastern edge of Unit 11, increasingly for exercises and testing in the future.

110. The Army Rangers infrequently use small amounts of explosives to remove log dams within the Yellow River in Eglin that obstruct watercraft navigation. Rangers and Special Operations use inflatable and rigid hull watercraft in shallow waters including beaching and insertion/extraction of ground troops; low altitude helicopter operations over water bodies; and blank and live fire and smoke/flares. Past explosives use on the Yellow River has occurred in the winter months when sturgeon are not normally in the river system. The Eglin Natural Resources Branch may informally consult with the Services during the winter months as well, depending on the nature and location of certain projects (i.e., explosions in spawning habitat).

111. Other activities that may lead to consultation are road maintenance on stream crossings along tributaries of the Yellow River, and dredging of East Pass at Destin by USACE (attributed to USACE in Appendix B).[67] The Services also expect to consult on revisions to Eglin's Integrated Natural Resources Management Plan (INRMP) once in ten years.

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[65] Eglin Air Force Base, "Eglin Air Force Base History," http://www.eglin.af.mil/history.htm, accessed June 13, 2002.

[66] These activities are expected to primarily affect the nearshore Gulf of Mexico (Unit 11). Although there may be minor impacts to Santa Rosa Sound and Choctawhatchee Bay as well, Appendix B attributes consultations regarding these mission activities to Unit 11.

[67] Personal communication with Eglin Air Force Base, June 19, 2002. Written communication from Eglin Air Force Base received June 17, 2002.

Tyndall Air Force Base

112. Tyndall Air Force Base (Tyndall) is an active Air Force installation in Bay County, Florida, just southeast of Panama City in Unit 11. The base covers 28,800 acres on an 18-mile long peninsula. While Tyndall was originally activated as a flexible gunnery school for the Army Air Corps in 1941, it is currently being used by the U.S. Air Force Air Education and Training Command for training of air defense crews, and testing of new weapons systems and air defense tactics.[68]

113. Tyndall's Natural Resources Division does not believe that any of its activities in the next ten years will impact the proposed critical habitat. Consequently, consultation on the revision of its INRMP will be concluded informally.[69] Likewise, the Weapons Evaluation Group (WEG) at Tyndall does not believe that its activities will affect the sturgeon or its habitat. WEG launches full-scale and sub-scale drones on a regular basis, and occasionally the launches fail. Usually the drone will fall to the land, but it is possible that a drone could fall offshore into the Gulf of Mexico, within an area designated as critical habitat.[70] It is highly unlikely that Tyndall would initiate consultation over this possibility.

114. The Navy conducts limited operations onshore at Tyndall, such as the testing of mines and mine avoidance. The Navy has not initiated consultation on this activity in the past, but increased awareness of critical habitat could lead the Navy to initiate new consultations.[71]

John C. Stennis Space Center

115. John C. Stennis Space Center, located within Unit 1 in south Mississippi, is responsible for the National Aeronautics and Space Administration (NASA) rocket propulsion testing in Mississippi, Alabama, Ohio, and New Mexico, as well as test services for government and commercial customers.[72]

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[68] Environmental Protection Agency, "Public Health Assessment, Tyndall Air Force Base," http://www.atsdr.cdc.gov/HAC/PHA/tyndall/tyn_toc.html, accessed June 13, 2002.

[69] Personal communication with Biologist, Natural Resources, Tyndall Air Force Base, June 4, 2002.

[70] Personal communication with Operations, Weapons Evaluation Group, Tyndall Air Force Base, June 10, 2002.

[71] Personal communication with Fish and Wildlife Service, Panama City Ecological Services Office, June 17, 2002.

[72] Stennis Space Center, "Stennis Space Center Fact Sheets," http://www.ssc.nasa.gov/, accessed June 13, 2002.

116. According to personnel at the Stennis Space Center, the testing of rockets has solely terrestrial and no aquatic impacts. Because the Space Center primarily tests rockets, the emissions from the rocket launches are limited to the rocket launch site. The Space Center uses Pearl River as a navigational channel, and has a contract with USACE to dredge the river. USACE may dredge the river once in the next ten years (attributed to USACE in Appendix B). Other than the dredging, Stennis Space Center does not anticipate that any other activities in the next ten years will affect the sturgeon or its habitat.

Pensacola Naval Air Station

117. Pensacola Naval Air Station (Pensacola NAS) plays a major role in the United States' naval aviation and naval flight training. It is an 8,400-acre installation located in Escambia and Santa Rosa Counties, Florida in Units 9 and 11. Pensacola NAS currently maintains several training centers, and provides living accommodations for military and civilian personnel.[73]

118. The Natural Resources Division at Pensacola NAS anticipates informal consultations over the following activities in the next ten years: exotic species control for plants, beach renourishment (bringing in sand to establish sand dunes), and the establishment of shoreline vegetation (planting sea oats and other plants).[74] In addition, USACE will dredge the surrounding waters every three years under contract to the NAS (attributed to USACE in Appendix B). Pensacola NAS will also likely consult over the revision of Pensacola NAS' INRMP in 2010.

119. A small potential exists for informal consultations regarding riverine training activities by small boat units, and ship-to-shore operations with small boats and landing crafts. Such informal consultations would involve minimal impact and are not quantified in this analysis.

Naval Station Pascagoula

120. Naval Station (NAVSTA) Pascagoula occupies 187 acres of Singing River Island, which is located in Mississippi Sound at the mouth of the Pascagoula River. Singing River Island is man-made, having been created when dredged materials from the Pascagoula Federal channel and nearby Ingalls Shipbuilding were deposited in the area. NAVSTA Pascagoula is an active naval station and currently supports approximately 2,000 active duty military, including those assigned to ships and tenant commands on the station.

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[73] Pensacola Area Chamber of Commerce, "NAS Pensacola," http://www.pensacolachamber.com/, accessed June 13, 2002.

[74] Personal communication with Natural Resources Division, Pensacola Naval Air Station, June 4, 2002.

121. Although NAVSTA Pascagoula has consulted informally with FWS on other endangered species, no consultations are predicted related to sturgeon.[75] USACE will likely dredge surrounding water to preserve vessel access to the station; resulting consultations are attributed to USACE in Appendix B.

Coast Guard

122. The Coast Guard is a military, multi-mission, maritime service tasked with six main responsibilities: (1) maritime safety; (2) maritime law enforcement; (3) protection of natural resources; (4) maritime mobility; (5) national defense; and (6) homeland security. Within these six main responsibilities, the Coast Guard carries out the following missions that occur in the Gulf of Mexico: maritime search and rescue; bridge administration; aids to navigation; recreational boating safety; vessel traffic management; at-sea enforcement of living marine resource laws and treaty obligations; at-sea drug and illegal migrant interdiction; and port security and safety.

123. Activities that may potentially be impacted by the need to consult under section 7 include aids to navigation, bridge administration, dredging, and marine events (e.g., races).[76] Typical aid to navigation activities involve the maintenance and replacement of channel lights, buoys, and permanent pilings. The Coast Guard does not predict consultations on these activities. Buoy or piling replacements or new placement activities may be affected if they occur in critical habitat areas. Specifically, the Coast Guard anticipates some added cost to this activity if time windows are requested by the Services.

124. Impacts associated with dredging and bridge replacement activities are attributed to USACE and FHWA, as discussed above.

Forest Service

125. Lands owned by the Forest Service border the Conecuh and Yellow Rivers in units 3 and 4, and the Apalachicola River in unit 6, and encompass three National Forests: Apalachicola National Forest in Florida, Conecuh National Forest in Alabama, and DeSoto National Forest in Mississippi. All three forests are managed for multiple uses, including wildlife, water quality, wilderness, recreation, and timber harvest. Conecuh National Forest also has resource extraction activities, including oil and gas, coal, sand and gravel, and building stone mining. DeSoto National Forest has a tree nursery and provides a training area for the Mississippi National Guard.

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[75] Personal communication with U.S. Fish and Wildlife Service, Jackson, Mississippi Field Office, November 12, 2002.

[76] Personal Communications with Petty Officers in the Marine Events Branch, Bridge Administration Branch, and Operations Branch, United States Coast Guard, June 19, 2002; Background information on Coast Guard Missions and Activities, http://www.uscg.mil/overview.htm.

126. The Forest Service has not initiated consultations with the Services under the listing of the sturgeon and does not anticipate the need to initiate consultations over the next ten years under either the listing or designation of critical habitat for the sturgeon.[77] Although the Forest Service designates buffer zones along the riverbanks bordering National Forest land, these buffer zones are adopted as best management practices in the forests, not solely to protect listed species and their habitat. The width of the buffer required varies by the forest, soil type, and species of concern.[78]

3.2.2 Minimally Impacted Activities

127. One national seashore and nine national wildlife refuges (NWR), along with one estuarine research facility, are located in or adjacent to proposed critical habitat for the sturgeon. These are:

- Gulf Islands National Seashore (Units 8, 9, 10, and 11);
- MS Sandhill Crane NWR (Unit 2);
- Lower Suwannee NWR (Unit 7);
- Bogue Chitto NWR (Unit 8);
- Big Branch Marsh NWR (Unit 8);
- Bayou Sauvage NWR (Unit 8);
- Bon Secour NWR (Unit 8);
- Grand Bay NWR (Unit 8);
- St. Vincent NWR (Unit 11);
- Cedar Keys NWR (Unit 14); and
- Apalachicola National Estuarine Research Reserve (Units 3 and 6).

128. Although some construction and maintenance projects in these parks and refuges may lead to informal section 7 consultation with the Service regarding the sturgeon, this analysis does not attempt to quantify the impacts. These Federal agencies function generally to promote conservation and protect lands, and are not likely to experience major economic impacts due to section 7 implementation for the sturgeon.

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[77] Personal Communication with Forest Service personnel, United States Forest Service, June 19, 2002; Background information on Apalachicola, Conecuh, and DeSoto National Forests, http://www.southernregion.fs.fed.us/florida/forests.htm, http://www.r8web.com/alabama/forest/forests.htm, http://www.fs.fed.us/r8/miss/, accessed June 2002.

[78] The Services do not typically consult with private forestry operators due to the lack of a Federal nexus. However, the Florida Forestry Association notes that many private entities engaged in commercial silviculture also use best management practices, such as identifying streamside management zones and maintaining forested riverine corridors, to protect surface water quality. Florida Forestry Association, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, September 30, 2002.

3.2.3 Summary of Impacted Activities

129. Detailed information on consultations likely to arise for activities in each unit is provided in Appendix B. Exhibit 3-1 summarizes the predicted number of formal and informal consultations by activity. USACE activities are expected to lead to the largest number of section 7 consultations.

Exhibit 3-1

ESTIMATED NUMBER OF FUTURE SECTION 7 CONSULTATIONS ON THE GULF STURGEON BY ACTIVITY (TEN YEARS)

Federal Nexus/Activity	Potentially affected activities	Informal Consultations	Formal Consultations
U.S. Army Corps of Engineers - O&M Navigation Projects	Dredging and sediment disposal.	23	37
U.S. Army Corps of Engineers - Other Operations Projects	Beach nourishment, flood control/bank stabilization, clearing and snagging, reservoir operations.	53	49
U.S. Army Corps of Engineers - Regulated Projects	Construction in water bodies (e.g., docks and piers), private dredging projects, shoreline stabilization, aquaculture, and permitting of oil and gas pipelines.	787	11
Coast Guard	Aids to navigation, bridge administration, dredging.	Included with USACE/FHWA consultations	Included with USACE/ FHWA consultations
Department of Defense	Eglin and Tyndall Air Force Bases, Stennis Space Center, Pensacola Naval Air Station.	51	26
Environmental Protection Agency	Triennial review of state water quality standards, listings of impaired water bodies, and TMDLs.	359	4
Federal Emergency Management Agency	Emergency response projects.	2	0
Federal Energy Regulatory Commission	Relicensing of hydroelectric projects, permitting of interstate oil and gas pipelines.	21	0
Federal Highway Administration/Department of Transportation	Funding of road and bridge construction, removal, and maintenance.	5	17
Fish and Wildlife Service	Management of National Wildlife Refuges.	Minimally impacted	Minimally impacted
Forest Service	Forest land ownership and management.	None	None
Minerals Management Service	Oil and gas leases in Federal waters	3	15
NOAA-National Marine Fisheries Service	Fisheries management.	10	3
Total [a]		**1,314**	**162**

[a] Total does not include potential programmatic consultations on O&M navigation project activities. Total number of consultations is likely to be lower if the programmatic consultations are implemented.

130. Exhibit 3-2 summarizes the predicted number of formal and informal consultations by unit. Activities in Units 8, 9, and 11 are predicted to lead to the largest number of section 7 formal consultations.

Exhibit 3-2

ESTIMATED NUMBER OF FUTURE SECTION 7 CONSULTATIONS ON THE GULF STURGEON BY UNIT (TEN YEARS)

Unit	Informal Consultations	Formal Consultations
Unit 1	156	1
Unit 2	75	10
Unit 3	45	8
Unit 4	79	5
Unit 5	22	9
Unit 6	62	14
Unit 7	66	1
Unit 8	127	39
Unit 9	71	16
Unit 10	217	7
Unit 11	47	25
Unit 12	234	7
Unit 13	49	10
Unit 14	23	0
Multiple Units	41	10
Total [a]	**1,314**	**162**

[a] Total does not include potential programmatic consultations on O&M navigation project activities. Total number of consultations is likely to be lower if the programmatic consultations are implemented.

3.3 Project Modifications Arising from Section 7 Consultation

131. This section summarizes project modifications associated with activities likely to require section 7 consultation. Project modifications are agreed upon by the Services, the Action agency, and, if applicable, the applicant as a result of the informal or formal consultation process. This analysis attributes the cost of project modifications to section 7 implementation, even in cases where parties implement conservation measures as a result of the Services' recommendations during the informal consultation process rather than as reasonable and prudent measures (RPMs) required in a formal consultation. Moreover, project modifications described below would likely have been adopted to implement terms and conditions in the incidental take statement and/or under the jeopardy provision of section 7, even in the absence of critical habitat protection for the sturgeon. No additional future modifications are expected to be adopted solely to prevent adverse modification of critical habitat.

132. This section describes typical project modifications by Action agency. Appendix B identifies the potential modifications that may result from section 7 consultation on specific projects in each proposed critical habitat unit, according to information provided by the Services regarding the modifications they are likely to request for future projects.[79] Per effort costs associated with modifications described below are summarized in Section 4.2.

3.3.1 Modifications to USACE Projects

133. USACE may implement or recommend to permit applicants a variety of project modifications to protect the sturgeon and its habitat. O&M navigation project activities (i.e., dredging and disposal) are most likely to require modification. In addition, USACE is likely to fund additional studies to expand knowledge about sturgeon behavior and migratory patterns as a condition of formal consultations.[80]

Modifications to O&M Navigation Projects

134. USACE O&M navigation projects (i.e., dredging and disposal) are likely to be modified as a result of potential impacts to sturgeon and, in certain cases, its critical habitat. The adoption of various modifications may depend, in part, on the development of a regional biological assessment with site-specific project impact information by USACE, Mobile District, as well as follow-up programmatic consultations with the Services. Potential project modifications specific to navigation project activities include:

- *Minimize extent of dredging activity.* In past consultations, FWS has requested that proposed dredging projects be limited to proposed depths only. Less likely, USACE could avoid dredging in deeper portions of the channel for riverine dredging projects, limit dredging of navigation channels to the minimum dimensions necessary, avoid performing advanced maintenance activities, or use silt curtains to enclose dredging sites when dredging in shallow water.[81] For hydraulic dredging,

[79] Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, January 6, 2002; Personal communication with National Marine Fisheries Service, Southeast Regional Office, January 3, 2002.

[80] Information on USACE project modifications was provided in written communication from U.S. Army Corps of Engineers, June 19, 2002 and through personal communication with U.S. Fish and Wildlife Service, Lafayette and Panama City Ecological Services Offices, numerous occasions.

[81] Silt curtains are strung on floats and suspended around project sites. The curtains confine sediment stirred up by dredging and pile jetting activities, and help sediment to settle more quickly. The extent to which turbidity and sediment settling in sturgeon habitat areas is a concern depends, in part, on natural turbidity levels in affected water bodies. Turbidity is a greater concern in Florida and Alabama than in Louisiana, because Louisiana's waters tend to be more turbid and naturally carry more sediment load.

USACE may raise the cutter head above the bottom during pipeline clearing and keep it as close to the surface as practicable while water is being pumped from the pipeline.[82]

- *Minimize extent of disposal activity.* In potential estuarine feeding areas, USACE may limit the depth of dredged material placed in disposal areas in order to allow benthic organisms to recolonize more quickly. FWS suggests that one way to reduce the amount of dredged material requiring disposal is to generate less sediment by reducing overdepth dredging (i.e., "advanced maintenance" dredging beyond the depth required for navigation).

- *Adapt disposal areas.* For example, in certain situations, USACE may use confined rather than open water disposal areas, alter the location of disposal areas, or avoid disposal in deep areas of river channels to limit impacts to the benthos (see Appendix B).

- *Sequence dredging.* For example, if a dredging project includes both a river mouth and a channel into a bay, USACE may arrange the project to dredge the estuary first and dredge the river second so that areas more sensitive to turbidity and hypoxia are dredged during a cooler time frame.

- *Dredging windows*. USACE has expressed concern about the effect of dredging windows on its operations. In past informal consultations, dredging windows have been recommended to avoid entrainment in the dredge or the preclusion of movement past the dredge during migratory periods, since avoiding work during times when sturgeon are known to be in the direct vicinity of the project is the most effective way to avoid harm to the species.[83] If USACE cannot avoid dredging within the time frames suggested in an informal consultation, USACE will likely need to initiate a formal consultation with the Services during which modifications to the project other than dredging windows would be considered. Dredging windows are a means to avoid and minimize take of the species, rather than to avoid adverse modification of habitat. Therefore, this analysis focuses on the cost impacts of implementing the other categories of modifications to O&M navigation projects (listed above) that are associated with avoiding and/or minimizing co-extensive impacts to species and habitat.

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[82] Personal communication with National Marine Fisheries Service, Southeast Regional Office, July 8, 2002.

[83] Even if dredging windows are agreed upon in the context of an informal consultation, other modifications may also be required to avoid impact to the sturgeon and its habitat. U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002.

Potential Modifications to Dam Projects

135. The construction, maintenance, and operation of dams and reservoirs can affect the sturgeon and its habitat. Certain modifications to these activities may be reasonable and prudent to protect sturgeon, and USACE is currently preparing a biological assessment of the effects of its ACF reservoir project operations on the sturgeon. Jim Woodruff Lock and Dam, the furthest downstream ACF reservoir project, marks the upstream limit of Unit 6. The operations of the ACF projects may be modified following adoption of an interstate water allocation formula, currently under negotiation by the states of Alabama, Florida, and Georgia. The USACE may also investigate the possibility of fish passage at Jim Woodruff and of scheduling dam maintenance and construction to avoid spring spawning months.

136. Protecting the sturgeon and its habitat is one of many responsibilities that USACE must consider in operating the ACF projects, which are variously authorized for the purposes of flood control, navigation, hydropower, water supply, recreation, water quality, and fish and wildlife. Under normal flow conditions, current flow regimes provide adequate flow in sturgeon spawning areas on the Apalachicola during spring spawning months. However, some concern exists that future modifications to flow regimes at Jim Woodruff Dam may be attributable to the sturgeon and its habitat.[84] Section 3.4 discusses flow at Jim Woodruff Dam in greater detail and outlines the parameters governing whether sturgeon spawning areas are sufficiently submerged during spring spawning months in drought years.

137. Additional modifications may apply to new dam construction, such as the proposed dam on the Yellow River in Unit 4, to ensure that the dam is designed and constructed in a manner that provides for migratory passage, minimizes harm to spawning habitat, and maintains existing water quality.[85]

Potential Modifications to Other Projects

138. The Services have recommended or required additional modifications to certain past projects that may also apply to some USACE-operated or USACE-permitted projects, other than dredging, disposal, and dams. These modifications, which may include screening intake structures for water withdrawal, limiting tow times for trawl nets (e.g., during hurricane debris cleanup), and restricting the use of underwater explosives during

[84] In the event that sturgeon-related concerns result in changes to flow regimes at Jim Woodruff Dam, Federal hydropower providers (specifically, the Department of Energy's Southeastern Power Administration) could experience direct economic effects. Possible effects to hydropower are discussed in greater detail in Section 3.4.

[85] Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, June 21, 2002. As previously noted, the Yellow River dam project is sponsored by Okaloosa County, Florida and is likely to require a USACE permit.

construction, are primarily related to avoiding or minimizing take of the species, rather than reducing destruction or adverse modification of habitat.[86]

3.3.2 Modifications to FHWA Bridge Projects

139. Bridge construction and replacement activities are likely to involve modifications to avoid and minimize harm to the sturgeon and its habitat.[87] Detonating explosives to remove old bridge structures is the activity most likely to require measures to protect sturgeon. The Services may recommend the use of airbubble curtains to limit the extent of blast pressures, combined with scare charges to warn sturgeon from entering or remaining in the work area. In addition, time windows are often suggested to avoid conducting major construction and removal activities (e.g., pile jetting, explosives detonation) while sturgeon are using the same area, to address take issues and avoid injury to the fish. Silt curtains are sometimes used to control turbidity related to pile jetting, dredging, and other underwater construction. Alternatively, the Services may suggest that bridge builders monitor turbidity levels and delay construction until suspended sediment levels decrease.

3.3.3 Modifications to FERC Pipeline Projects

140. FERC-licensed interstate pipeline projects may adopt the following modifications: modifying pipeline routes to avoid habitat impacts; restricting timing of construction to protect areas more sensitive to turbidity and hypoxia; implementing best management practices to reduce turbidity during construction; and modifying construction methods (e.g., use directional drilling rather than open cut construction to place pipeline underground in sensitive areas).[88] Since pipelines are likely to extend over large areas and cross multiple water bodies, modifying the timing and/or route of projects, as well as adopting best management practices, are usually more viable alternatives than using directional drilling, which can be very costly. Moreover, past consultations on pipeline construction suggest that directional drilling is primarily implemented to avoid impacts to wetlands, with secondary benefits to sturgeon.[89]

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[86] Airbubble curtains may be used to limit the extent of blast pressures. To create airbubble curtains, operators lay PVC pipe around the perimeter of detonation areas. The pipes are lined with small holes. When air is pumped into the pipes, bubbles rise to the surface, creating a curtain-like enclosure of bubbles. When explosives are detonated, the bubble curtain absorbs much of the pressure, reducing the extent of high pressure blasts that can harm sturgeon. Personal communication with U.S. Fish and Wildlife Service, Lafayette Ecological Services Office, June 21, 2002.

[87] Personal communication with U.S. Fish and Wildlife Service, Lafayette Ecological Services Office, June 21, 2002.

[88] Personal communication with Federal Energy Regulatory Commission, June 18, 2002.

[89] Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, June 28, 2002.

3.3.4 Modifications to Projects at Eglin Air Force Base

141. Eglin AFB may adapt explosives tests and undertake monitoring and research to protect sturgeon. Eglin operators may ramp up explosives tests by employing smaller detonations first as a scare tactic, and, less likely, biologists could also conduct aerial helicopter surveys to monitor for sturgeon prior to conducting test detonations. In addition, Eglin sets aside a portion of its annual budget to sponsor sturgeon monitoring studies in Choctawhatchee Bay, Santa Rosa Sound, and the Yellow River. All of these potential project modifications are primarily related to take and jeopardy considerations.

3.3.5 Research and Monitoring

142. The Services may recommend that projects carried out and permitted by various Action agencies, including USACE navigation projects, FHWA bridge construction projects, and MMS lease sales, adopt standard monitoring and research measures in order to expand knowledge of sturgeon behavior and migratory habits. Such measures may include:

- Monitoring and reporting of "take" events during project construction;
- Monitoring of post-project habitat conditions, particularly in likely feeding and spawning habitats;
- Monitoring of project-area sturgeon subpopulations; and
- Funding of research useful for sturgeon conservation. Information provided by the New Orleans District of the USACE indicates that study costs could range up to $300,000 to $400,000 for a one season tracking study and $150,000 to $200,000 for other types of studies, depending on the specifics of the proposed study.[90] Eglin AFB has set aside $40,000 per year to fund sturgeon studies, and MMS may have additional funds available through its Environmental Studies Program (ESP) to help fund a large, multi-year tracking study to enhance knowledge of sturgeon migrations in marine areas.[91]

3.3.6 Activities Unlikely to Involve Modification

143. Many activities expected to lead to section 7 consultation are unlikely to involve project modifications. For example, small-scale USACE-operated and permitted construction and maintenance projects will tend to involve minimal changes. In general,

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[90] Personal communications with U.S. Army Corps of Engineers, New Orleans District, April 29, 2002. The Services believe the estimate of $400,000 is high for a one-season study, as this figure exceeds all past research and monitoring studies.

[91] Personal communication with Eglin Air Force Base, June 19, 2002; personal communication with Minerals Management Service, April 30, 2002; written communication with Minerals Management Service, November 15, 2002.

clearing and snagging projects are also unlikely to involve modifications. However, some project modifications may be adopted if activities such as construction or clearing and snagging are scheduled to occur in particularly sensitive areas or at particularly sensitive times, such as in known spawning areas during spawning months.

144. Extensive modifications to projects involving the following Federal nexuses are unlikely: MMS, FEMA, Coast Guard, NOAA Fisheries (fisheries management activities), and Forest Service. However, these Action agencies may occasionally offer funding to support sturgeon research and monitoring studies.

3.4 Secondary Impacts on the Regional Economy

145. In addition to the *direct* costs to undertake consultations and project modifications outlined above, physical changes to habitat areas that may be associated with project modifications (e.g., altering the depth of navigation channels) may have other *secondary* economic impacts on local industries and enterprises in the future. Concerns have been raised, in particular, about secondary impacts to (1) the navigation industry and associated ports; (2) industries dependent on the Jim Woodruff Dam and associated upstream reservoirs for recreation, tourism, water supply, and hydropower; (3) commercial fisheries, and (4) various counties in Mississippi. The past consultation records indicate that protecting the sturgeon and its habitat has not resulted in project changes that have affected the regional economy, and no public commenter provided specific examples of how reasonable and prudent measures to protect sturgeon would result in broader regional economic effects. The available evidence also indicates, however, that in the unlikely event that certain activities (e.g., USACE O&M navigation projects) were materially constrained by critical habitat concerns, significant economic impacts could occur (e.g., shipping channel closures). This section summarizes the issues surrounding each category of potential secondary effect.

3.4.1 Secondary Effects on Waterborne Commerce

146. As described in Section 2.1.3, the Gulf Coast is a major center for waterborne commerce. Five major ports are located adjacent to waters proposed as nearshore marine critical habitat for the sturgeon, and rivers such as the Escambia, Conecuh, and Apalachicola support additional vessel transport of goods. Various parties have raised concern that modifications to O&M navigation projects adopted to protect sturgeon could prevent USACE from dredging shipping channels in a timely and reliable manner, causing

industries dependent on use of navigation channels (e.g., shippers, ports, local industries dependent on shipped goods) to suffer economic impacts.[92,93]

147. Dredging windows, for example, have been adopted in the informal consultation process as a modification to O&M activities on some navigation projects in order to ensure that the activities are not likely to adversely affect sturgeon, which precludes the necessity of formal consultation. In formal consultation, however, when an action does not constitute jeopardy to the species or adverse modification to critical habitat, the Services' regulations prohibit the adoption of measures to avoid and minimize take of listed species that "alter the basic design, location, scope, duration or *timing* of the action" (CFR §402.14 (i)(2); italics added). Discussions with navigation stakeholders make it clear that dredging windows are often not an acceptable solution, because delays to USACE's dredging projects could hamper availability of navigation channels for vessel traffic and shipping. Therefore, the Services and USACE are improving their coordination to ensure that any modifications adopted will allow O&M navigation projects to proceed on schedule. In particular, USACE, Mobile District is likely to (1) initiate regional biological assessments on O&M navigation projects, (2) notify the Services of upcoming projects sooner, and (3) undertake formal, rather than informal, consultations on dredging projects.[94] These steps should ensure that the USACE and the Services can agree upon reasonable and prudent alternatives or reasonable and prudent measures that protect the sturgeon and its habitat while accomplishing project purposes.

148. Moreover, while major shipping channels are located within proposed critical habitat, they likely do not contain the primary constituent elements (PCEs) for sturgeon. For example, the Gulf Intracoastal Waterway (GIWW) is located within nearshore marine units proposed for critical habitat, but most frequently maintained portions of the GIWW have been altered such that they do not contain the PCEs for the sturgeon.[95]

149. Since the regularly maintained portions of navigation channels are unlikely to provide significant foraging or spawning habitat and therefore probably do not contain the PCEs for sturgeon, a jeopardy or adverse modification call would be highly unlikely. When an action does not constitute jeopardy to the species or adverse modification to critical habitat, the Services' regulations prohibit formulating measures to limit take of listed species that alter the basic design, location, scope, duration or timing of Federal actions.

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[92] Costs associated with shipping delays may be high. For example, even short shipping delays or light loading requirements can quickly yield cost impacts in excess of $200,000, based on one instance unrelated to the sturgeon designation noted by USACE, New Orleans District.

[93] Public comments from U.S. Army Corps of Engineers, Mobile District, October 9, 2002; Alabama-Tombigbee Rivers Coalition, October 4, 2002; American Waterways Operators, August 21, 2002.

[94] U.S. Army Corps of Engineers, Mobile District, May 1, 2002 and August 21, 2002.

[95] Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, May 3, 2002.

Therefore, this analysis concludes that secondary effects on waterborne commerce are unlikely.

3.4.2 Effects of Flow Regime Alterations at Jim Woodruff Dam

150. Public concern has recently emerged regarding whether the need to keep sturgeon spawning areas submerged during spring spawning months could lead to additional flow requirements over the Jim Woodruff Dam on the Apalachicola River. Several public commenters focused on (1) the possibility that increased flow demand due to sturgeon could reduce water resources upstream, and (2) the possibility that changes in flow due to sturgeon could have an adverse effect on regional energy costs and supply.[96] Changing reservoir operations to protect sturgeon could affect the degree to which USACE is able to fulfill other project purposes, such as navigation, hydropower, water supply, and recreation, which could result in both direct and secondary economic effects.

151. Water supply allocation in the region is the subject of considerable public interest. The states of Alabama, Florida, and Georgia are currently negotiating a water allocation formula for the shared Apalachicola-Chattahoochee-Flint (ACF) river basin under the ACF Compact. Under recent proposals by the states of Florida and Georgia, minimum flows for the Apalachicola River (Unit 6) at Chattahoochee, Florida are specified. The proposed minimum flows vary by month and are highest in the spring months. If the negotiated flow requirements are adopted by all three states and adequately protect critical habitat for the sturgeon, then critical habitat designation imposes no incremental impact on the ACF flow regime in Unit 6. USACE and FWS are presently engaged in informal consultation on the effects of ACF reservoir operations on listed species, and are investigating the relationship between flow and sturgeon spawning habitat availability in the Apalachicola River.

152. USACE, Mobile District completed a Draft Environmental Impact Statement (DEIS) in anticipation of proposed ACF Water Allocation rules and policies.[97] Because the draft statement was completed prior to final formulation and approval of the actual water allocation rules, the statement provides environmental and socioeconomic assessment of *hypothetical* allocation scenarios. In the baseline or "no action" case, consumptive demand corresponds with 1995 levels and flow regimes are based on operating conditions as of 1995. Simulating increased consumptive demand, the baseline modeling approach constrains flow management and rates to those 1995 norms. In three alternative scenarios, USACE allows flow regimes and corresponding reservoir levels to vary. In the lowest flow scenario, reservoir levels remain near full capacity and low river flows balance the water budget. In the highest flow scenario, flow rates are higher throughout the year and reservoir

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[96] Public comments from the Cumming/Forsyth County Chamber of Commerce, October 7, 2002; Senator Zell Miller, October 3, 2002; Representative John Linder, October 4, 2002; Southeastern Federal Power Customers, Inc., September 20, 2002; and Department of Energy, Southeastern Power Administration, September 30, 2002.

[97] "Water Allocation for the Apalachicola-Chattahoochee-Flint (ACF) River Basin: Alabama, Florida, and Georgia," Draft Environmental Impact Statement, U.S. Army Corps of Engineers, Mobile District, September 1998.

levels must accommodate the higher river flow. A third alternative assumes intermediate flow rates and reservoir levels.[98] The scenarios were designed to illustrate the full range of scenarios possible under any ACF water allocation formula. None of the scenarios correspond exactly with an idealized flow regime based exclusively on sturgeon habitat optimization.

153. Because USACE operates flow-regulating dams, any changes in flow regimes (whether driven by sturgeon needs or other factors) are likely to require consultation. However, economic effects associated specifically with sturgeon protections are likely to be modest, based on the following factors:

1. Flow-related threats to surgeon habitat are most likely to occur under severe drought conditions. Because severe drought is a relatively rare occurrence, flow-related threats and economic impacts will be correspondingly rare.

2. In the relatively infrequent event of a drought, economic effects on hydropower and upstream water resources from sturgeon-related flow regime changes are likely to be limited. FWS intends only to suggest minor operations adjustments to minimize the impact of an unavoidably adverse situation, since water is too limited in a drought to do otherwise without violating the "reasonable" criterion for reasonable and prudent measures and alternatives.

3. Secondary effects on the regional economy are predicted to be small (less than 0.1 percent), based on scenarios predicted in USACE's DEIS on the proposed water allocation for the ACF river basin.

154. In the worst case scenario, hydropower, upstream water supply, and water-dependent recreation and tourism could experience secondary effects.[99] However, secondary effects have not been quantified in this analysis due to several key uncertainties:

- The ACF water allocation formula has not been finalized. As a result, changes with positive or negative implications for sturgeon habitat cannot be compared at this time with a reasonable level of confidence.

- Future climatological trends are uncertain. Given current drought frequencies, sturgeon-related flow requirements are unlikely to be imposed under section 7. However, if drought frequencies increase in future years, providing adequate flow for sturgeon during spring spawning months could become a greater concern.

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[98] The high flow scenario is not directly comparable with the other two because the high flow scenario assumes more aggressive water conservation measures and removes seasonal reservoir "drawdowns" for flood control.

[99] For example, water-based recreation and tourism is affected by reservoir levels. One study estimated the recreational value of Lake Lanier, an upstream storage reservoir within the ACF basin, at $5.5 billion. Hughes, E.D. *Lake Sidney C. Lanier: A Study of the Economic Impact of Recreation*. Marine Trade Association of Metropolitan Atlanta, September 2001.

- Subject to completion of a biological assessment, minimum flow requirements to protect sturgeon spawning habitat during spring months have not been established.

155. The following sections address in greater detail (1) historical frequencies of spring droughts, (2) effects on hydropower, (3) effects on upstream water resources, and (4) effects on the regional economy.

3.4.2.1 Historical Drought Frequency

156. During average to high precipitation years, natural flows are likely to support sturgeon spawning in Unit 6. However, during periodic drought years, even naturally occurring flow may affect spawning year classes. In such cases, regulated minimum flows could improve sturgeon habitat independently of section 7 protections for the sturgeon.

157. Since 1929 and before the most recent drought period, drought years were recorded in 1941, 1954, 1968, 1981, 1986, and 1988. Average monthly flows at the Apalachicola River Gage at Chattahoochee (#02358000) have been recorded at historic lows during the past several years. Exhibit 3-3 summarizes the historical occurrences of monthly average extreme low flow conditions. However, daily average flow is a better measure than monthly average flow to evaluate sturgeon spawning habitat conditions, since one day of low flow in an otherwise high flow month can destroy sturgeon eggs and larvae and disrupt spawning. In fact, the current consultation between FWS and USACE focuses on avoiding such daily low flow occurrences. Impacts to sturgeon are less avoidable in drought years, since reservoirs cannot augment flow sufficiently to ensure successful spawning or doing so would unreasonably compromise other project purposes.[100]

[100] Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, January 9, 2003.

Exhibit 3-3

SUMMARY OF SPRING EXTREME LOW-FLOW CONDITIONS, APALACHICOLA RIVER GAGE AT CHATTAHOOCHEE #02358000: YEARS WITH MARCH, APRIL, OR MAY MONTHLY AVERAGE FLOW LESS THAN 11,000 CFS (1929-2002)

	Monthly Average Flow Rate in cfs		
Year	**March**	**April**	**May**
1941	19,969	16,750	9,840
1981	16,030	23,920	10,410
1986	29,459	13,980	9,530
1999	17,280	10,890	8,807
2000	14,570	17,330	8,413
2001	n/a	n/a	n/a
2002	n/a	n/a	8326

Source: U.S. Geological Survey, Water Resources Data, accessed November 13, 2002.

3.4.2.2 Effects on Hydropower

158. Hydropower represents a small percentage of energy supplied throughout the Southeast (including Alabama, Florida, and Mississippi) and Gulf (including Louisiana) regions. As a result, regional economic impacts of any flow regime modifications resulting from the proposed critical habitat designation are likely to be limited. However, customers deriving electricity from the Southeastern Power Administration and private hydropower producers could be affected if flow changes increase the cost of hydropower produced and those higher costs result in higher prices to consumers.

159. The ACF Compact may affect hydropower generation, notwithstanding the sturgeon. Therefore, modifications to the flow regime adopted to protect sturgeon would be incremental to modifications imposed by an allocation agreement. If sturgeon considerations result in seasonal shifts in generation, then economic impacts on hydropower operations would constitute a direct project modification cost. However, preliminary data suggest that normal and wet years have flows adequate to protect sturgeon habitat. In infrequent dry years, major flow regime changes are not likely to be feasible due to limited reservoir storage capacity and the likelihood of unreasonably compromising other ACF project purposes, including hydropower. Minor flow regime changes are unlikely to result in large impacts to the seasonal generation of hydropower.[101] Existing USACE estimates

[101] Pursuant to Executive Order No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions." The criterion relevant for this analysis is whether a reduction in electricity production in excess of 1 billion kilowatts per year or in excess of 500 megawatts of installed capacity will occur. Even in the worst-case scenario, in which implementation of section 7 results in significant operational

of direct hydropower costs associated with hypothetical flow regimes under the ACF framework cannot be applied in this case because the relevant cost comparison would be the value of hydropower under the ACF formula and under an alternative flow regime protecting threatened sturgeon in Unit 6.[102]

3.4.2.3 Effects on Upstream Water Resources

160. In addition to direct impacts on hydropower, public commenters recognize the link between downstream flow and reservoir levels throughout the ACF Basin. Water stored in several upstream reservoirs serves as public water supply and supports recreational uses. If downstream flow releases reduce reservoir levels, the possibility exists that less water would be available for water supply and water-based recreational activities. If increased flow requirements for sturgeon lead to such reductions in water supply or recreational uses, increased costs to water suppliers and the recreation and tourism industry would represent secondary economic effects of section 7.

161. However, given that ensuring adequate water supply is a core ACF project purpose for which USACE manages reservoir storage, FWS does not plan to suggest flow regime changes to protect sturgeon that would compromise USACE's ability to fulfill contractual water supply obligations under existing contracts.[103] Under normal conditions, water flows are sufficient to inundate sturgeon habitat. In the event of a drought, FWS intends only to suggest minor operations adjustments to minimize impacts of an unavoidably adverse situation, since water is too limited in a drought to do otherwise without violating the "reasonable" criterion for reasonable and prudent measures and alternatives.

3.4.2.4 Effects of Flow Regime Changes on the Regional Economy

162. Based on their regional economic impact model, the USACE scenarios generate little aggregate secondary (multiplier) effect on the regional economy. Several economic measures including business volume, personal income, and employment varied by less than

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changes to hydropower production throughout the ACF system, the total installed capacity of the four USACE-operated generation facilities (Buford, Walter F. George, West Point, and Jim Woodruff dams) is only 319.4 MW (319,375 KW) of hydroelectricity. Therefore, the potential impact on the ACF system of critical habitat designation on the Apalachicola River, even in the worst-case scenario, does not exceed the 500 MW (500,000 KW) threshold. "Operation and Maintenance, Southeastern Power Admistration," FY2001 Congressional Budget, http://www.cfo.doe.gov/budget/01budget/pmas/sepa/sepabudg.pdf, accessed January 21, 2003.

[102] "Water Allocation for the Apalachicola-Chattahoochee-Flint (ACF) River Basin: Alabama, Florida, and Georgia," Draft Environmental Impact Statement, U.S. Army Corps of Engineers, Mobile District, September 1998.

[103] Personal communication with U.S. Fish and Wildlife Service, Panama City Ecological Services Office, January 9, 2003.

0.1 percent across the range of alternatives.[104] Results of comparable magnitude would result from any marginal flow changes due to sturgeon protection under section 7. Based on the modest regional economic impacts estimated by the USACE, regional economic impacts resulting from preserving spring flow in the Apalachicola River to support sturgeon habitat are unlikely to have a significant impact on the regional economy.[105]

3.4.3 Secondary Effects on Commercial Fishing

163. Certain public commenters expressed concern that measures to protect the sturgeon and its habitat under section 7 could result in certain areas being closed to commercial fishing, in particular the fertile shrimp fishing areas in Louisiana.[106] As noted in Section 2.1.3, commercial fishing is a major industry on the Gulf coast. However, no evidence from past consultation records or conversations with the Services indicates that commercial fishing will be affected by section 7 implementation for the sturgeon. Individual commercial fishing operators do not normally require a Federal permit for their activities; therefore, a nexus for section 7 consultation does not exist. Because no limitations to commercial fishing activities are expected under section 7, secondary effects on the commercial fishing industry are highly unlikely.

3.4.4 Secondary Effects on Mississippi Counties

164. Several public commenters expressed concern that measures to protect the sturgeon and its habitat under section 7 could result in limitations on the counties' ability to attract a "viable and sustainable industrial and commercial base," for example by limiting expansion of community wastewater facilities.[107] They noted that many Mississippi counties adjacent to proposed critical habitat for sturgeon are economically depressed and suffer high unemployment. However, no evidence from past consultation records or conversations with the Services indicates that section 7 implementation for the sturgeon will hamper these counties' economic growth. For example, construction of wastewater

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[104] "Water Allocation for the Apalachicola-Chattahoochee-Flint (ACF) River Basin: Alabama, Florida, and Georgia," Draft Environmental Impact Statement, U.S. Army Corps of Engineers, Mobile District, September 1998.

[105] A separate regional economic impact analysis conducted for the purposes of this analysis would be unable to provide more accurate estimates, due to the ongoing nature of ACF water allocation negotiations and the uncertainty regarding sturgeon flow requirements.

[106] For example, public comment from East Bank Commercial Fisherman's Association, August 22, 2002.

[107] Public comment from Pat Harrison Waterway District, August 26, 2002; Office of Board of Supervisors, Stone County, Mississippi, September 16, 2002; and Hancock County Port and Harbor Commission; August 21, 2002.

treatment facilities would be regulated under EPA NPDES permits, which are protective of water quality for sturgeon.

3.5 Summary of Section 7 Impacts

165. Appendix B summarizes the potential for future section 7 consultations and project modifications for activities affecting the sturgeon and its proposed critical habitat in each unit. Importantly, these estimates reflect the consultation profiles associated with the geographic areas proposed for designation having a Federal nexus, regardless of whether these actions can be attributed co-extensively to the listing. As a result, these estimates are an upper-bound measure of the impacts potentially associated with the proposed designation.

166. Section 4 provides estimates of the expected economic costs of the consultations on the activities described in this section, as well as summaries of the total section 7 cost of the listing and proposed critical habitat designation for the sturgeon.

ESTIMATED SECTION 7 COSTS SECTION 4

167. This section presents the expected total economic cost of actions taken under section 7 of the Act associated with the geographic area proposed as critical habitat for the sturgeon, and thus reflects those costs attributable co-extensively to the listing of the sturgeon as threatened.[108] It provides per effort administrative costs of section 7 consultation, and derives total cost estimates of the consultations and modifications associated with the activities described in Section 3. This section also evaluates the costs attributable solely to the proposed designation of critical habitat.

168. It is important to note that the listing of the sturgeon as threatened under the Act may result in impacts on land use activities that are not associated with section 7. For example, section 9 of the Act prohibits take of listed species, and section 10 outlines permitting procedures for entities whose activities do not involve a Federal nexus. Economic costs associated with these impacts are not included in this analysis because they are not associated with critical habitat.

4.1 Estimated Costs of Section 7 Consultation

169. Estimates of the cost of an individual consultation were developed from a review and analysis of historical section 7 files from a number of FWS Ecological Services offices around the country, augmented by specific level of effort information provided by USACE, Mobile District.[109] These files addressed consultations conducted for both listings and critical habitat designations. Cost figures are based on an average level of effort for consultations of low, medium, or high complexity, multiplied by the appropriate labor rates for staff from the Services and other Federal agencies.

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[108] This approach is employed to recognize the difficulty of distinguishing activities that would trigger jeopardy consultations without also triggering destruction or adverse modification consultations for this designation.

[109] U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002. USACE, Mobile District also comments that formal consultation costs could range higher for Action agencies because of additional study and data collection efforts. Such costs are considered "research and monitoring" and are discussed as project modifications in Section 4.2.

170. Estimates take into consideration the level of effort of the Services, the Action agency, and the applicant during both formal and informal consultations, as well as the varying complexity of consultations. Informal consultations are assumed to involve a low to medium level of complexity. Formal consultations are assumed to involve a medium to high level of complexity. Costs associated with these consultations include the administrative costs associated with conducting the consultation, such as the cost of time spent in meetings, preparing letters, and in some cases, developing a biological assessment and biological opinion.

171. Per effort costs associated with formal consultations and informal consultations are presented in Exhibit 4-1. The low and the high scenarios represent a range of costs for each type of interaction. For example, when FWS engages in informal consultation regarding a particular activity, the cost of FWS's effort is expected to be approximately $1,000 to $3,100. The cost of the Action agency's effort is expected to be $2,000 to $9,600, and the cost of a third party's effort (if applicable) is expected to be approximately $1,200 to $2,900. The Action agency or the third party may bear the costs of biological assessment, depending on the specifics of the consultation.

Exhibit 4-1

ESTIMATED ADMINISTRATIVE COSTS OF SECTION 7 CONSULTATION FOR THE GULF STURGEON (PER EFFORT)

Critical Habitat Impact	Scenario	FWS or NOAA Fisheries	Action Agency	Third Party	Total Cost
Informal Consultation	*Low*	$1,000	$2,000	$1,200	$4,200
	High	$3,100	$9,600	$2,900	$15,600
Formal/ Reinitiated Consultation	*Low*	$3,100	$9,600	$2,900	$15,600
	High	$6,100	$20,600	$4,100	$30,800

Notes: Low and high estimates primarily reflect variations in staff wages and time involvement by staff. Third parties are defined as state agencies, local municipalities, and private parties. Action agency costs include the cost of conducting a biological assessment. Programmatic consultations are assumed to be formal. Costs are presented in 2002 dollars.

Sources: IEc analysis based on data from the Federal Government General Schedule Rates, 2002, Office of Personnel Management, and level of effort information from U.S. Fish and Wildlife Service and NOAA Fisheries biologists and USACE, Mobile District.

172. Exhibit 4-2 reports estimates of total consultation costs associated with activities with the potential to affect the sturgeon and/or its proposed critical habitat. Exhibit 4-3 reports consultation costs by critical habitat unit. These estimates were generated by multiplying the number of expected consultations (shown in Appendix B) by the per effort cost of these actions.

Exhibit 4-2

TOTAL ADMINISTRATIVE COSTS OF SECTION 7 CONSULTATION FOR THE GULF STURGEON (TEN YEARS, 2002$)

Action	Range	Costs to the Services	Costs to Other Federal Agencies	Costs to Third Parties	Total Costs
Informal Consultation	*Low*	$1,314,000	$2,628,000	$976,000	$4,918,000
	High	$4,073,000	$12,614,000	$2,358,000	$19,046,000
Formal/ Reinitiated Consultation	*Low*	$502,000	$1,555,000	$81,000	$2,139,000
	High	$988,000	$3,337,000	$115,000	$4,440,000
Total [a]	***Low***	**$1,816,000**	**$4,183,000**	**$1,057,000**	**$7,056,000**
	High	**$5,062,000**	**$15,952,000**	**$2,473,000**	**$23,486,000**

Notes: Third parties are defined as state agencies, local municipalities, and private parties. This analysis assumes that consultations involving USACE permits, FERC permits, and FHWA bridge replacement will involve third parties; all other consultations will involve only FWS or NOAA Fisheries and the affected Action agency. Costs may not sum due to rounding.

[a] Total does not include cost reductions from future potential programmatic consultations on O&M navigation project activities. Total consultation costs are likely to be lower if the programmatic consultations are implemented.

Sources: IEc analysis based on data from the Federal Government General Schedule Rates, 2002, Office of Personnel Management, and information from affected agencies.

Exhibit 4-3

TOTAL ADMINISTRATIVE COSTS OF SECTION 7 CONSULTATION FOR THE GULF STURGEON BY UNIT (TEN YEARS, 2002$)

Unit	Informal Consultations	Formal/Reinitiated Consultations	Total Section 7 Costs
Unit 1	$606,000 to $2,315,000	$13,000 to $27,000	$619,000 to $2,341,000
Unit 2	$243,000 to $996,000	$147,000 to $296,000	$390,000 to $1,292,000
Unit 3	$148,000 to $603,000	$113,000 to $230,000	$261,000 to $833,000
Unit 4	$249,000 to $1,032,000	$75,000 to $150,000	$324,000 to $1,182,000
Unit 5	$72,000 to $294,000	$126,000 to $257,000	$198,000 to $551,000
Unit 6	$198,000 to $816,000	$189,000 to $390,000	$387,000 to $1,207,000
Unit 7	$246,000 to $954,000	$16,000 to $31,000	$262,000 to $985,000
Unit 8	$441,000 to $1,758,000	$501,000 to $1,050,000	$942,000 to $2,807,000
Unit 9	$273,000 to $1,047,000	$209,000 to $435,000	$482,000 to $1,322,000
Unit 10	$891,000 to $3,336,000	$89,000 to $187,000	$980,000 to $3,523,000
Unit 11	$165,000 to $655,000	$318,000 to $668,000	$483,000 to $1,030,000
Unit 12	$972,000 to $3,624,000	$89,000 to $187,000	$1,061,000 to $3,811,000
Unit 13	$195,000 to $738,000	$127,000 to $267,000	$322,000 to $1,005,000
Unit 14	$71,000 to $298,000	$0	$71,000 to $298,000
Multiple Units	$147,000 to $579,000	$127,000 to $267,000	$274,000 to $846,000
Total [a]	**$4,918,000 to $19,046,000**	**$2,139,000 to $4,440,000**	**$7,056,000 to $23,486,000**

Note: Costs may not sum due to rounding.

[a] Total does not include cost reductions from future potential programmatic consultations on O&M navigation project activities. Total consultation costs are likely to be lower if the programmatic consultations are implemented.

173. Based on this analysis, the upper-bound total nominal cost of consultations over the next ten years will range from $7.1 million to $23.5 million.[112] Most of these costs will be borne by Federal agencies other than the Services. In addition, most consultation activity (and related costs) will occur in units 1, 8, 10 and 12.

174. As noted in Section 1.3, the analysis estimates impacts of listing and critical habitat designation on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans

[112] As previously noted, if a consultation is triggered for any listed species, the consultation process will also take into account all other listed species known or thought to occupy areas on or near the project lands. However, due to the difficulty in apportioning the costs of consultations between various species as well as awareness that a consultation for the sturgeon would need to be conducted absent consultations for or involving other species, this analysis does not attempt to apportion the consultations and related costs reported by Action agencies between the sturgeon and other listed species.

are currently available to the public. Accordingly, the total nominal consultation costs are based on a ten-year time horizon. It is difficult to predict the cost estimates for the consultations beyond a ten year window. Costs for section 7 consultations may increase or decrease dependent on factors other than in(de)flation. For example, changes in requirements for development of a biological assessment may occur, or fluctuations in the cost of biologists and consultants. In order to maintain reasonable confidence in the estimated total section 7 costs, this analysis quantifies costs occurring within a ten year time frame.

175. These consultation costs represent the upper-bound without-programmatic consultation scenario. As previously noted in Section 3.2.1, the development of programmatic consultations by USACE, Mobile District on its O&M navigation project activities has the potential to significantly reduce the administrative costs associated with consultations on navigation projects. After engaging in as many as three programmatic consultations, with an estimated level of effort equivalent to three high-end formal consultations, USACE could engage in streamlined consultations thereafter on individual navigation projects. Exhibit 4-4 illustrates the consultation cost savings associated with the with-programmatic consultation scenario. Additional modification cost savings may be realized as well, but cannot be quantified due to lack of information on the frequency and type of modifications likely to be implemented under the programmatic consultations.

Exhibit 4-4

COST SAVINGS ASSOCIATED WITH DEVELOPMENT OF PROGRAMMATIC CONSULTATION ON O&M NAVIGATION PROJECT ACTIVITIES IN U.S. ARMY CORPS OF ENGINEERS, MOBILE DISTRICT (TEN YEARS, 2002$)

Activity	Number of Consultations (Ten Years)	Per Effort Cost	Total Cost
Without-Programmatic Scenario			
O&M navigation projects	37 formal consultations	$13,000 to $27,000	$481,000 to $999,000
With-Programmatic Scenario			
O&M navigation projects	37 informal consultations	$3,000 to $13,000	$111,000 to $481,000
Programmatic consultation	3 formal consultations	$13,000 to $27,000	$39,000 to $81,000
Total: With-Programmatic Scenario			$150,000 to $562,000
Consultation Cost Savings Potentially Associated with Programmatic Consultations (Ten Years)			**$331,000 to $437,000**

4.2 Estimated Costs of Project Modifications

176. Estimated per effort costs associated with certain categories of the project modifications described in Section 3.3 are summarized in Exhibit 4-5. Per effort cost data were not available for all potential project modifications; only activities for which cost data were available are included in the table.

177. Considerable uncertainty exists regarding the extent to which specific future projects will experience the per effort modification costs outlined in Exhibit 4-5. For example, for a given O&M navigation project, it is difficult to predict which dredging and disposal modifications (e.g., minimize extent of dredging, sequence dredging) will be adopted. This uncertainty exists for the following reasons:

- New information about sturgeon behavior and migratory patterns as a result of recent and upcoming research studies is influencing the type of project modifications recommended by the Services. The Services are unable to predict how the availability of new data may affect recommended modifications on specific projects.

- The relationship between the Services and USACE, the most-affected Action agency, is currently in flux due to potential development of programmatic consultations on O&M navigation project activities. These programmatic consultations would likely streamline the consultation process and, potentially, could enable USACE to adopt project modifications in a manner that would cost less overall than adopting project modifications individually for each project.

- Specific project modifications cannot be predicted with certainty for future projects, since future project modifications would only be agreed upon as a result of a negotiated process between the Services, the affected Action agency, and, if applicable, a third party.

178. Given this uncertainty regarding the implementation of project modifications for predicted future projects, it is not possible to develop an exhaustive range of total modification costs associated with section 7 implementation for the sturgeon. Therefore, Exhibit 4-5 develops one scenario of potential modifications to illustrate the potential magnitude of project modification costs. The scenario is based on several key assumptions:

- *O&M navigation project modifications.* Given 60 authorized USACE O&M navigation projects that are predicted to lead to formal and informal consultation on dredging and disposal activities over the next ten years, this scenario assumes that projects will adopt certain modifications (e.g., minimize extent of dredging and disposal, sequence dredging) based primarily on the rate at which such modifications were recommended based on take and jeopardy determinations in

past consultations on O&M navigation activities carried out under the listing of the species.[113]

- *Bridge project modifications.* This scenario assumes that 17 FHWA–funded bridge projects will use silt curtains at a per effort cost of $220,000. Some bridge projects may also implement bubble curtains, but this analysis does not project bubble curtain costs because the technology is still in the testing phase.[114]

- *Interstate pipeline project modifications.* This scenario assumes that half of the 20 predicted informal consultations with FERC on pipeline construction will involve one day of changing project designs and implementing best management practices to reduce turbidity. It assumes that any use of directional drilling is associated with baseline regulations protecting wetlands, rather than section 7 implementation for the sturgeon.

- *Research and monitoring.* This scenario assumes that two Action agencies will fund sturgeon studies over the next ten years: USACE and Eglin AFB. As noted in Section 3.3.5, these agencies may fund studies at the following levels: USACE: up to $400,000 for a one season tracking study; and Eglin AFB: $40,000 per year to fund sturgeon studies.[115] In addition, MMS may have additional funds available through its Environmental Studies Program (ESP) to help fund a large, multi-year tracking study to enhance knowledge of sturgeon migrations and foraging in marine areas.

- *No additional activities leading to project modifications*. This scenario assumes that no other Federal nexuses and activities requiring consultation will involve project modifications.

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[113] As noted in Section 3.3.1, dredging windows are not expected to be adopted as modifications in typical formal consultations, and are not associated with habitat considerations. However, in the unlikely event that dredging windows are adopted, USACE, Mobile District notes that the cost impacts of dredging windows on major deep draft harbors may be significant. For example, if dredging windows lead to dredge unavailability, USACE could be forced to purchase additional hopper and/or pipeline dredges at significant cost ($25 to $35 million per dredge plus additional operating costs). In a more likely scenario, dredging windows may be adopted in certain informal consultations on O&M navigation, but costs may be less than $240,000 per project because USACE will only agree to windows that coincide with their previously planned dredging schedule.

[114] Personal communication with U.S. Fish and Wildlife Service, June 9, 2002.

[115] Personal communications with U.S. Army Corps of Engineers, New Orleans District, April 29, 2002. The Services believe the estimate of $400,000 is high for a one-season study, as this figure exceeds all past research and monitoring studies.

Exhibit 4-5

ESTIMATED CO-EXTENSIVE COSTS OF MODIFICATIONS ON PROJECTS AFFECTING GULF STURGEON (TEN YEARS, 2002$)

Modification	Party Bearing Cost	Description	Basis[a]	Per Effort Cost Estimate [1]	Probability of Adoption[b] [2]	Assumed Number of Affected Projects[c] [3]	Total Cost Estimate [1] x [2] x [3]
Minimize extent of dredging	USACE	Inability to perform advanced maintenance dredging could increase costs by doubling dredging frequency, causing inefficient use of pumping capabilities and increased mobilization costs.	Take, jeopardy, adverse modification	$1,000,000/event	0.25	60	$15,000,000
Limit extent of dredging and disposal to proposed depths	USACE	Reducing impacts to the benthos by ensuring that dredging and disposal is limited to depths originally proposed in project, requiring diligence by dredge operators.	Take, jeopardy, adverse modification	Negligible	0.60	60	$0
Sequence dredging	USACE	Sequencing dredging projects so that areas more sensitive to turbidity and hypoxia are dredged during a cooler time frame, potentially causing double mobilizations and up to three months of standby dredge time.	Take, jeopardy, adverse modification in some cases	$500,000/project	0.20	60	$6,000,000
Silt curtains	FHWA	Increase in labor and equipment costs combined with loss of productivity due to handling, placing, and relocating curtain.	Take, jeopardy, adverse modification	$220,000/project	1.00	17	$3,740,000
Pipeline construction measures	Oil and gas pipeline companies	Altering installation of pipelines to reduce turbidity and siltation, through use of directional drilling to bury pipeline, use of best management practices, and/or construction of temporary enclosures.	Take, jeopardy, adverse modification	$50,000/day for equipment for design changes; $1,000 to $1,500 per foot for directional drilling	0.5 for design changes; 0.00 for directional drilling	20	$500,000

Exhibit 4-5

ESTIMATED CO-EXTENSIVE COSTS OF MODIFICATIONS ON PROJECTS AFFECTING GULF STURGEON (TEN YEARS, 2002$)

Modification	Party Bearing Cost	Description	Basis[a]	Per Effort Cost Estimate [1]	Probability of Adoption[b] [2]	Assumed Number of Affected Projects[c] [3]	Total Cost Estimate [1] x [2] x [3]
Research and monitoring	USACE, Eglin AFB	Monitoring sturgeon to assess project effects. Funding research studies to gain knowledge about sturgeon behavior, foraging, migratory patterns, and recolonization of benthic community after dredging. Assumes that USACE and Eglin AFB will each fund one major study.	Take, jeopardy, adverse modification	$1,500/effort for one-time aerial survey; up to $400,000 for major multi-year study	1.00	2	$800,000
Total Ten-Year Estimated Project Modifications							**$26,040,000**

Sources: Personal communications with USACE, FERC, Eglin AFB, and the Services on multiple occasions.

[a] Basis indicates the basis of concern for the sturgeon and/or its habitat that is expected to lead to the imposition of the modification. A basis of "take, jeopardy, adverse modification" indicates that concern for both the sturgeon (under the jeopardy provision) and its habitat (under the adverse modification provision) are expected to drive adoption of the modification. No project modifications are expected to be adopted only to protect habitat under the adverse modification provision.

[b] Probability of adoption is based on the rate that the Services recommended various modifications based on take and jeopardy determinations in past formal and informal consultations carried out under the listing of the species, and the rate at which they expect to recommend future project modifications.

[c] Assumed number of affected projects is based on the project modification scenario described above and information on future projects summarized in Appendix B.

Note: Modification estimates are not presented by unit due to the uncertainty regarding implementation of project modifications on future projects.

179. Based on this scenario, Exhibit 4-5 derives a total nominal cost estimate of $26.0 million for project modifications associated with section 7 implementation for the sturgeon and its habitat over the next ten years. Actual modification costs may be higher, since the assumed scenario is not inclusive of all potential activities that could lead to modifications to protect the sturgeon and its habitat. For example, as discussed in Section 3.4, consultations with USACE, Mobile District on operations of Jim Woodruff Dam in Unit 6 could lead to alterations in water release patterns in order to provide minimum flows for the sturgeon. In addition, costs may be lower if Action agencies streamline coordination with the Services through a programmatic or similar consultation process.

180. The project modifications described in Exhibit 4-5 are adopted to protect the sturgeon as well as its habitat, and therefore would likely have been adopted to implement terms and conditions in the incidental take statement and/or under the jeopardy provision of section 7, even in the absence of critical habitat protection for the sturgeon. None of the modifications are expected to be adopted solely to prevent adverse modification of critical habitat.

4.3 Total Section 7 Costs

181. This section summarizes the costs associated with section 7 implementation for the sturgeon. The vast majority of these costs are likely to be co-extensive with the listing of the sturgeon. However, a subset of costs may be attributable solely to the critical habitat designation. This section first discusses this subset of costs, then summarizes the total co-extensive costs associated with both listing and critical designation for the sturgeon. Exhibit 4-6 presents both total section 7 costs and the subset of costs associated solely with the critical habitat designation. Exhibit 4-7 gives present values and annualized values for the total section 7 costs.

4.3.1 Costs Associated Solely with the Designation of Critical Habitat

182. While many costs are co-extensive with the listing of the sturgeon and would likely be incurred even in the absence of critical habitat designation, a subset of impacts may be attributable solely to the critical habitat designation. For example, activities that required informal consultations in the past may require formal consultation under the designation due to increased concerns about habitat impacts. Other past formal consultations may need to be reinitiated to address habitat-related concerns. In addition, the Services anticipate that a subset of the total predicted consultation costs will be attributable to the extra administrative effort required to address critical habitat issues during the formal and informal consultation process.

183. Establishing an explicit distinction between listing and designation impacts is difficult, due to a variety of factors that reasonably could be linked to either category. For example, USACE asserts that the development of the proposed critical habitat designation has caused FWS to adopt a more stringent approach during consultations, resulting in more costly project modifications and an increased number of formal consultations. USACE believes that the designation of critical habitat has raised awareness of the sturgeon and spurred additional research, causing greater section 7 impacts than had been occurring

since the listing of the sturgeon as threatened in 1991.[116] FWS acknowledges that awareness of sturgeon behavior and migratory patterns has increased in recent years, but believes that this change is due to improved research and monitoring studies that have been conducted independently of the proposed designation of critical habitat. Other Action agencies, including MMS and FHWA, concur that the designation of critical habitat will not significantly change their process for consulting with the Services.

184. Another example is the potential development of up to three programmatic consultations on O&M navigation project activities. These programmatic consultations, while intensive to develop, have the potential to reduce consultation and project modification costs on these activities. Such initiatives, and their related cost effects, could conceivably be attributed to critical habitat designation; however, FWS believes that its development arises co-extensively with the listing and the critical habitat designation.

185. In sum, this analysis recognizes that the consultation process between the Services and certain Action agencies is likely to become more intensive, and may be altered through a programmatic approach, over the next ten years. The analysis further assumes, however, that the changes stem primarily from better supporting data about the sturgeon's behavior and migrations and are best attributed co-extensively to listing and critical habitat designation. An extensive past record of formal and informal consultation exists, and FWS asserts that the designation of critical habitat will not alter its consultation process except to add an increment of administrative effort to each consultation.

186. This analysis identifies the subset of consultation costs attributable solely to the critical habitat designation based on time estimates from the FWS, Panama City, FL Ecological Services Office and hourly rate estimates provided by USACE, Mobile District. The Services estimate that pinpointing activity locations, considering the potential for adverse effects, and incorporating language specific to critical habitat issues will result in up to $35 per effort cost to FWS or NOAA Fisheries and $200 to the Action agency for each informal consultation, and $160 per effort cost to FWS or NOAA Fisheries and $800 to the Action agency for each formal consultation.[117]

187. NOAA Fisheries also anticipates a small increase in section 7 costs associated with individual consultations due to the designation of critical habitat. Specifically, NOAA Fisheries believes it will have to reinitiate certain past consultations to more systematically address habitat impacts.[118] Specifically, NOAA Fisheries expects Action agencies to reinitiate the following formal consultations:

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[116] Personal communication with U.S. Army Corps of Engineers, New Orleans District, April 29, 2002 and Mobile District, May 1, 2002.

[117] Based on time estimates provided by U.S. Fish and Wildlife Service, Panama City, FL Ecological Services Office, June 9, 2002; hourly rate estimates provided by U.S. Army Corps of Engineers, Mobile District, Comments on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002; and data from the Federal Government General Schedule Rates, 2002, Office of Personnel Management.

[118] NOAA Fisheries focused its past consultations regarding the sturgeon on direct impacts to the fish itself, and focused less on habitat impacts.

- Five formal consultations with MMS on lease sales in Unit 8;
- One programmatic consultation with USACE on regionwide hopper dredging; and
- One formal consultation with NOAA Fisheries on the Gulf of Mexico shrimp Fishery Management Plan.

188. NOAA Fisheries also believes that certain consultations on natural resource management activities at Pensacola NAS and beach nourishment/habitat creation activities in some estuarine and marine units might have remained informal, but for the designation of critical habitat. This analysis quantifies the difference in administrative costs if consultations on the following affected projects had remained informal:

- Pensacola NAS: 4 informal consultations in Unit 9; and
- Beach nourishment/habitat creation: 10 informals in Unit 8; 6 informals in Unit 9; 6 informals in Unit 10; 4 informals in Unit 12; and 4 informals in Unit 13.

189. The costs of the reinitiated consultations, along with the cost of conducting formal rather than informal consultations on beach nourishment and Pensacola NAS activities, constitute the universe of costs attributable solely to the critical habitat provision of section 7. Exhibit 4-6 presents the costs attributable to critical habitat by unit. Based on this analysis, the total cost attributable exclusively to the critical habitat provision of section 7 is approximately $877,000 to $1,084,000 over ten years.

4.3.2 Total Costs Associated with Both Listing and Critical Habitat Designation

190. The cost estimates presented in Exhibit 4-6 are an indication of the total costs that may be associated co-extensively with future section 7 consultations on the sturgeon and its designated critical habitat over the next ten years. They are a function of the number of consultations as detailed in Appendix B, plus the project modification scenario outlined in Section 4.2. They represent costs likely to be incurred by the Services, Action agencies, and third parties for activities having a Federal nexus, which would require consultation under section 7 of the Act.

191. Based on this analysis, the total upper-bound estimate of section 7 costs associated with the proposed critical habitat designation for the sturgeon ranges from $33.1 million to $49.5 million over ten years. Approximately 47 percent of these costs are administrative in nature, while 53 percent represent direct costs of modifying projects, given the project modification scenario described in Section 4.2. As discussed in Section 3.4, certain project modifications have the potential to lead to regional economic impacts, but such costs are not quantified due to the low probability that O&M navigation projects will lead to secondary effects on waterborne commerce, the high level of uncertainty regarding changes in flow regimes at Jim Woodruff Dam, and the likelihood that any sturgeon-related flow regime modifications that do occur will have limited impacts on the regional economy.

192. The majority of section 7 direct costs will be borne by Federal agencies. In particular, based on upper-bound cost estimates, approximately 76 percent will be

administrative and operational costs borne by Federal agencies carrying out projects (primarily USACE), and approximately ten percent will be administrative costs to the Services of engaging in section 7 consultation.

193. As noted above, Exhibit 4-6 summarizes the estimated total co-extensive costs associated with section 7 implementation for the sturgeon, as well as the subset of costs attributable solely to the critical habitat designation, over a ten year time frame.

Exhibit 4-6

ESTIMATED TOTAL COSTS ASSOCIATED WITH SECTION 7 IMPLEMENTATION FOR THE GULF STURGEON BY UNIT (TEN YEARS, 2002$)

Unit	Total Co-Extensive Costs	Costs Attributable Solely to Critical Habitat
Unit 1	$619,000 to $2,341,000	$32,000 to $38,000
Unit 2	$390,000 to $1,292,000	$24,000 to $27,000
Unit 3	$261,000 to $833,000	$17,000 to $18,000
Unit 4	$324,000 to $1,182,000	$21,000 to $23,000
Unit 5	$198,000 to $551,000	$13,000 to $14,000
Unit 6	$387,000 to $1,207,000	$26,000 to $28,000
Unit 7	$262,000 to $985,000	$14,000 to $16,000
Unit 8	$942,000 to $2,807,000	$266,000 to $298,000
Unit 9	$482,000 to $1,482,000	$126,000 to $172,000
Unit 10	$980,000 to $3,523,000	$108,000 to $142,000
Unit 11	$483,000 to $1,322,000	$33,000 to $35,000
Unit 12	$1,061,000 to $3,811,000	$92,000 to $118,000
Unit 13	$322,000 to $1,005,000	$58,000 to $77,000
Unit 14	$71,000 to $298,000	$5,000
Multiple Units	$274,000 to $846,000	$43,000 to $73,000
Consultation Cost Sub-Total	**$7,056,000 to $23,486,000**	**$877,000 to $1,084,000**
Project Modification Cost (All Units)	**$26,040,000**	**$0**
Total [a]	**$33,096,000 to $49,526,000**	**$877,000 to $1,084,000**

Note: Costs may not sum due to rounding.

[a] Total does not include cost reductions from future potential programmatic consultations on O&M navigation project activities.

194. Exhibit 4-7 presents the present value of total costs summarized in Exhibit 4-6, as well as annualized costs associated with section 7 implementation for the sturgeon. Guidance provided by the Office of Management and Budget (OMB) specifies the use of a rate of seven percent, reflecting the social opportunity cost of capital (measured by the before-tax rate of return for private investment). In addition, OMB recommends sensitivity analysis using other discount rates. One commonly applied rate is three percent, reflecting a social rate of time preference (estimated using average rates on long-term Treasury bonds).[119] This analysis presents results using both of these rates.

[119] U.S. Office of Management and Budget, "Guidelines to Standardize Measures of Costs and Benefits and the Format of Accounting Statements," in *Appendix 4: Report to Congress on the Costs and Benefits of Federal Regulations*, March 22, 2000.

Exhibit 4-7

PRESENT AND ANNUALIZED VALUE OF SECTION 7 COSTS ASSOCIATED WITH THE LISTING AND DESIGNATION OF CRITICAL HABITAT FOR THE GULF STURGEON

	Total Co-Extensive Costs	Costs Attributed Solely to Critical Habitat Designation
Nominal value of total section 7 costs	$33,096,000 to $49,526,000	$877,000 to $1,084,000
Present Value (7% discount rate)	$23,245,000 to $34,785,000	$616,000 to $762,000
Annualized over ten years	$3,310,000 to $4,953,000	$88,000 to $108,000
Present Value (3% discount rate)	$28,232,000 to $42,246,000	$748,000 to $925,000
Annualized over ten years	$3,310,000 to $4,953,000	$88,000 to $108,000

Note: Present value and annualized cost estimates are based on an assumption that consultation and project modification costs will be distributed evenly over a ten year period.

4.4 Key Assumptions

195. Exhibit 4-8 presents the key assumptions of this economic analysis, as well as the potential direction and relative scale of bias introduced by the assumption.

Exhibit 4-8

CAVEATS TO THE ECONOMIC ANALYSIS

Key Assumption	Effect on Cost Estimate
Consultation rates will not change over time.	?
The presence of other species (i.e., Kemp's Ridley turtle, Inflated heelsplitter mussel, etc.) has no influence on consultation/project modification costs.	+
Action agencies will consult with FWS and NOAA Fisheries according to the jurisdictional responsibilities outlined in the proposed designation. They will not need to consult with both Services on a single project.	-
High-end estimates of future numbers of consultations are used.	+
Historical administrative consultation costs and project modification cost estimates are good predictors of future consultation behavior.	?
Total cost estimates assume that USACE will not engage in up to three programmatic consultations on O&M navigation projects, although doing so could streamline the consultation process.	+
Dredging windows will not be recommended as project modifications in formal consultations, unless they coincide with USACE's previously planned dredging schedule.	-
Regional economic impacts on waterborne commerce, commercial fishing, and Mississippi counties are unlikely.	-
To the extent that flow regime changes are implemented at Jim Woodruff Dam to protect sturgeon, secondary economic effects will be limited.	-
New information on sturgeon behavior and migratory patterns may become available.	?
The consultation process between the Services and USACE is in flux.	?
Modification cost scenario is based on upper-bound modification cost estimates for O&M navigation, bridge construction, interstate pipeline, and research and monitoring projects.	+
Modification costs for other activities are unlikely or cannot be predicted at this time (e.g., regulated modifications of surface water bodies, operations of Jim Woodruff Dam).	-
Designation of critical habitat will not alter the consultation process for FWS except to add an increment of administrative effort to each consultation.	-
Increases in section 7 costs associated solely with the critical habitat provision of section 7 will be administrative in nature. Project modifications are attributable co-extensively to the listing and designation of critical habitat for the sturgeon.	-
Consultation and project modification costs will be distributed evenly over a ten year period.	?

- : This assumption may result in an underestimate of real costs.
+ : This assumption may result in an overestimate of real costs.
? : This assumption has an unknown effect on estimates.

4.5 Potential Impacts on Small Entities

196. Under the Regulatory Flexibility Act (as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever a Federal agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).[120] However, no regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.[121] SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. Accordingly, Appendix C provides a screening level analysis of the potential effects of critical habitat designation on small entities to assist the Secretary in making this certification.

197. The analysis determines whether this critical habitat designation potentially affects a "substantial number" of small entities in counties supporting critical habitat areas, and quantifies the probable number of small businesses likely to experience a "significant effect." Because the costs associated with section 7 implementation for the sturgeon are likely to be significant for six or fewer small businesses per year in the affected industries in the study area, a significant economic impact on a substantial number of small entities will not result from the designation of critical habitat for the sturgeon. This would be true even if all of the effects of section 7 consultation on these activities were attributed solely to the critical habitat designation.

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[120] Small businesses are defined by the Small Business Administration, most commonly in terms of the number of employees or annual receipts. A small organization is "any not-for-profit enterprise...which is independently owned and operated and is not dominant in its field." A small government is the government of a city, county, town, school district, or special district with a population of less than 50,000, not including tribal governments. Regulatory Flexibility Act, 5 U.S.C. 601 et. seq.

[121] Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for "significant impact" **and** a threshold for a "substantial number of small entities." See 5 U.S.C. 605 (b).

198. The published economics literature has documented that real social welfare benefits can result from the conservation and recovery of endangered and threatened species (Bishop (1978, 1980), Brookshire and Eubanks (1983), Boyle and Bishop (1987), Hageman (1985), Samples et al. (1986), Stoll and Johnson (1984). Such benefits have also been ascribed to preservation of open space and biodiversity (see examples in Pearce and Moran (1994) and Fausold and Lilieholm (1999)) both of which are associated with species conservation. Likewise, regional economies can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend.

199. The primary goal of the Act is to enhance the potential for species recovery. Thus, the benefits of actions taken under the Act are primarily measured in terms of the value the public places on species preservation (e.g., avoidance of extinction, and/or an increase in a species' population). Such social welfare values may reflect both use and commercial or non-use (i.e., existence) values. For example, use values might include the potential for recreational use of a species, should recovery be achieved. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist.

200. In addition, as a result of actions taken to preserve endangered and threatened species, various other benefits may accrue to the public. Such benefits may be a direct result of modifications to projects made following section 7 consultation, or may be collateral to such actions. For example, a section 7 consultation may result in the requirement for buffer strips along streams, in order to reduce sedimentation due to construction activities. A reduction in sediment load may directly benefit water quality, while the presence of buffer strips may provide the collateral benefits of preserving habitat for terrestrial species and enhancing nearby residential property values (e.g., preservation of open space).

201. This chapter describes the benefits resulting from implementation of section 7 of the Act, in the context of areas affected by the proposed designation. First, it discusses whether these benefits can be defined on a unit-by-unit basis. Next, it discusses a number of secondary benefits associated with habitat protection measures for the sturgeon. Finally, it discusses the extent to which existing valuation studies can be used to monetize these benefits.

202. As discussed below, it is not feasible to fully describe and accurately quantify the benefits of this designation in the context of this economic analysis. The discussion presented in this report provides examples of potential benefits, which derive primarily from the listing of the species, based on information obtained in the course of developing the

economic analysis. It is not intended to provide a complete analysis of the benefits that could result from section 7 of the Act in general or critical habitat designation in particular. *Given these limitations, the Services believe that the benefits of critical habitat designation are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

5.1 Assigning Benefits on a Unit-by-Unit Basis and to the Critical Habitat Designation

203. Where possible, the benefits of critical habitat designation should be described on a unit-by-unit basis in order to provide the Service with best available information to finalize critical habitat designations. For example, useful information for policy makers might include whether the benefits of excluding one (or more) critical habitat units outweigh the costs of including one (or more) units. As noted below, data are not always available to quantify or monetize the benefits of actions taken under section 7 on a unit-by-unit basis. This chapter describes the benefits qualitatively and describes why quantifying and monetizing the benefits associated with the existence value of this species is not possible given existing levels of information.

5.2 Categories of Benefits

204. Implementation of section 7 of the Act is expected to increase the probability of recovery for the species. Such implementation includes both the jeopardy provisions afforded by the listing, as well as the adverse modification provisions provided by the designation. Specifically, the section 7 consultations that address the sturgeon will assure that actions taken by Federal agencies do not jeopardize the continued existence of the sturgeon or adversely modify its habitat. Note that these measures are separate and distinct from the section 9 "take" provisions of the Act, which also provide protection to this species.

205. The benefits of critical habitat designation can therefore be placed into two broad categories: those associated with the primary goal of species recovery, and those that derive mainly from the habitat protection required to achieve this primary goal. As described below, the vast majority of these benefits are associated with improvements to sturgeon habitat. The sections below describe these two categories of benefits.

5.2.1 Benefits Associated with Species Recovery

Existence Value

206. The sturgeon has some intrinsic existence value that will be enhanced by its survival and recovery. Existence value reflects the utility the public derives from knowledge that a species continues to exist. Potential existence values are discussed below in Section 5.3.

Commercial Fishing

207. The sturgeon supported a commercial fishery in the early twentieth century, providing eggs for caviar, flesh for smoked fish, and swim bladders for isinglass, a gelatin used in food products and glues. As a result, full recovery of the population could eventually yield economic benefits in the form of allowable harvest. These benefits might include an increase in jobs and expenditures within the Gulf Coast regional economies, or, if considered within the welfare economics context, an increase in producer and consumer surplus.[122]

208. Historic fishery landing statistics indicate demand for Gulf sturgeon. Originating around 1886, sturgeon harvests steadily increased from 1,500 to 84,000 pounds in 1901. Between the years 1900 to 1903, the harvesting of sturgeon flesh and caviar eggs reached its peak. In 1902, annual sturgeon landings were as much as 478,496 pounds. The majority of the catches were recorded in West Florida and Alabama waters, with landings totaling 343,291 and 100,000 pounds, respectively. Over-fishing of the species at the turn of the century led to dwindling catches, with West Florida remaining the only source of viable fisheries. Annual catches on Apalachicola River, Florida in the 1920s were estimated at 20,000 to 60,000 pounds. Recorded catches fluctuated in subsequent decades and by 1964, gulf sturgeon catches had declined to 3,500 pounds.[123]

209. Due to the aperiodic record of sturgeon landings, placing a monetary value on the historical sturgeon catch is difficult. Huff (1975) compiled a sturgeon catch history on the Apalachicola River and Bay and Suwanee River in West Florida from 1897 to 1945. In a peak landing year of 1900, the total value of 169,270 pounds of sturgeon flesh and caviar eggs in West Florida alone was as high as $230,295.[124] In 1902, the value of all recorded landings in West Florida, Alabama, and Mississippi was $323,045. However, as sturgeon populations declined, the value of catches dropped dramatically. The total value of all recorded landings from 1950 to 1985 was $310,792, or an average of $8,862 per year.[125]

210. The exact timing and magnitude of potential commercial fishing benefits are uncertain. The Gulf Sturgeon Recovery/Management Plan sets forth the recovery objective of delisting the species from discrete management units by the year 2023. Subsequent to delisting, the goal is to establish sufficient self-sustaining populations to support directed

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[122] The economics literature has contemplated the potential changes in consumer and producer surplus that accrue from increased landings in commercial fisheries related to improved environmental amenities or habitat. See, for example, Crutchfield (1982) and Huppert (1990).

[123] Huff, J.A. 1975. Life History of the Gulf of Mexico Sturgeon, *Acipenser oxyrhynchus desotoi* in Suwannee River, Florida and U.S. Commissioner of Fish and Fisheries, Commissioner's Report,1903.

[124] All landing values are presented in 2002 dollars using estimated 2002 GDP (NASA. 2002. GDP Calculator).

[125] National Marine Fisheries Service, Fisheries Statistics & Economics Division, Annual Commercial Landing Statistics., http://www.st.nmfs.gov/st1/commercial/

fishing pressure within these discrete management units.[126] Under the best case scenario, a viable commercial fishery might develop in 20 to 30 years. Even within this time frame, however, the likelihood of the sturgeon population being sufficiently large to yield significant fishing-related benefits is low. The sturgeon, a long living and late maturing animal, may require numerous generations to achieve long-term population stability and conditions suitable for consumption. Nevertheless, recovery of the sturgeon to early nineteenth century levels presents the potential to provide direct economic benefits to the Gulf Coast region in the long term.

Sport Fishing

211. Full recovery of the sturgeon population may lead to the development of a recreational sport fishing industry. Associated benefits could include an increase in tourism and recreation-industry jobs and expenditures within the Gulf Coast regional economies. However, as with commercial fishing, the likelihood of the sturgeon population recovering sufficiently to yield a viable sport fishery within a ten year time frame is extremely low.

5.2.2 Benefits Associated with Habitat Protection

Ecosystem Health

212. Sturgeon are an integral part of the ecosystems in which they live. Protecting the primary constituent elements for the sturgeon, including preserving water quality and natural flow regimes, will benefit other organisms that cohabit these areas. Each one of these organisms may in turn provide some level of direct or secondary benefit to the public and local economies.

213. Understanding the change in aquatic ecosystem health resulting from this designation would entail significant effort to model the likely changes in water quality as well as the ecological benefits of modified flow regimes. While these benefits can be described qualitatively, existing data are not available to quantify the scale of these changes, such as required for monetization. For example, it is widely understood that reduced sedimentation in a river system can benefit various fish, shellfish, and aquatic plant communities. In addition, in some cases reductions in sedimentation may provide direct economic benefit (e.g., reducing the need for, or scale of, dredging operations). Quantifying these changes would, however, require additional information on the make-up of these aquatic communities and the baseline state of environmental quality. More importantly, such quantification would require detailed information on the nature and scope of project modifications resulting from section 7, including the locations of the activities requiring modification. Such information is not currently available due to the uncertainty about the modifications potentially associated with future projects.

[126] U.S. Fish and Wildlife Service, *Gulf Sturgeon Recovery/Management Plan*, Atlanta, GA, August 1995. Page iv.

Recreational Benefits

214. In addition to the long-term potential for restoration of a sport fishery for the sturgeon, protecting critical habitat for this species may result in preservation of river, estuarine, and marine habitat suitable for recreational uses such as boating, fishing, and swimming. Conservation of river, estuarine, and marine habitat for recreational use may lead to increased tourism and contribute to the expansion of a tourist economy in certain counties.[127] In addition, such activities are likely to generate social welfare benefits to recreators. Quantification of these benefits, however, is limited by the same information constraints are discussed above.

Flood Control

215. Preserving natural environments may also reduce FEMA and county expenditures on bank stabilization and other flood control programs, as well as reducing the impacts of floods that do occur. Modeling the expected change in these factors would require detailed understanding of the location and effects of expected project modifications, as well as models of the hydrology of the affected river systems.

Other Benefits

216. Measures undertaken to protect sturgeon habitat could lead to other benefits including: (1) protection of human and livestock drinking water supplies; (2) reduced cost of drinking water treatment and/or future stream restoration/maintenance; and (3) protection and enhancement of property values. Again, quantification and monetization of these categories of benefits would require additional, detailed information.

217. Additional benefits of designating critical habitat for the sturgeon may include educational/informational benefits (e.g., increased awareness by the public of the extent of sturgeon habitat), increased support for existing conservation efforts, and reduced uncertainty regarding the extent of sturgeon habitat. For example, critical habitat designation will provide a firm legal definition of the extent of sturgeon habitat, which may reduce regulatory uncertainty. At this time sufficient information does not exist to quantify or monetize the benefits of this designation, and thus it is not possible to present monetized benefits on a unit-by-unit basis.

5.3 Placing Monetary Values on the Benefits of Section 7 Implementation

218. As discussed above, sufficient information does not exist to allow for quantification of the secondary benefits of habitat protection (e.g., improved water quality, reductions in flood control costs). Thus, this report focuses on the primary benefit of implementation of section 7 of the Act, expressed in terms of the public's willingness to pay to protect the sturgeon (e.g., avoidance of extinction, and/or increase in population). This discussion focuses on the existing economics literature, as gathered in the course of this analysis.

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[127] Of course, if designation of critical habitat somehow constrains these activities, as contemplated in Chapter 3, these constraints will be manifest as a cost of the designation.

5.3.1 Contingent Valuation Method

219. Social welfare benefits arise from the value people place on the protection of threatened and endangered fish species and may be motivated by use (e.g., viewing opportunities) or non-use considerations. These values are frequently elicited using a stated preference method called contingent valuation.[128] As noted above, researchers have investigated individuals' willingness to pay to prevent extinction of threatened and endangered species, preserve habitat for one or more species, or for changes in environmental quality typically associated with habitat designation.[129] It is noted that while contingent valuation provides a useful method for estimating a full range of values (i.e., use value, non-use value, existence value, etc), the reliability and validity of this method has been the subject of some controversy.[130]

5.3.2 Benefits Transfer

220. Benefits transfer is the method used by economists to apply the results of existing valuation studies to a new policy question. For example, the economics literature provides a large number of studies that define the economic surplus associated with protecting threatened or endangered fish species or their habitat (see Exhibit 5-1). These studies are commonly used to predict the values associated with fish species or their habitat in areas that have not been studied, given various attributes of that site (e.g., species of fish, habitat type, common threats to the species, etc.).[131] Two core principals of defensible benefits transfer are (1) the use of studies that apply acceptable techniques to generate welfare values, and (2) similarity between the good being valued in the literature and the good being valued in the policy context to which the transfer is being made. Below we summarize the relevant literature and discuss the potential for transferring the benefits found in these studies to the case of the sturgeon.

221. Exhibit 5-1 summarizes several studies reported in the literature that attempt to estimate the non-use value the public holds for preservation of various threatened or endangered fish species or the conservation of their habitat. Non-use values represent the public's willingness to pay to preserve a species or enhance a species' population above and beyond any expected direct use. For example, Kotchen and Reiling (2000) surveyed residents of Maine to assess the nonuse value for protection of the endangered shortnose sturgeon. Respondents were asked to vote in a hypothetical future referendum to approve a statewide species protection fund that would finance a recovery plan for the species.

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[128] For more information on the protocols for robust contingent valuation surveys, see NOAA. 1993. Report of the NOAA Panel and Contingent Valuation.

[129] For example see Bishop (1978, 1980), Brookshire and Eubanks (1983), Boyle and Bishop (1986), Hageman (1985), Samples *et al*. (1986), Stoll and Johnson (1984).

[130] For discussion on the topic of contingent value surveys see Diamond and Hausman 1994, "Contingent Valuation: Is Some Number Better than No Number?"

[131] For more discussion of benefits transfer, see Environmental Protection Agency, *Guidelines for Preparing Economic Analyses* (EPA 240-R-00-003), September 2000.

Respondents voted yes or no to hypothetical dollar amounts that represented a one-time tax increase designed to underwrite the fund. Respondents indicated a willingness to pay of approximately $29 annually.[132] The willingness to pay values summarized in Exhibit 5-1 likely represent general estimates for the value the public might express in response to a contingent valuation survey that focuses on species preservation measures for the sturgeon.

[132] Value is presented in 2002 dollars using estimated 2002 GDP (NASA. 2002. GDP Calculator).

Exhibit 5-1

SUMMARY OF ECONOMIC VALUATION LITERATURE RELATED TO THREATENED OR ENDANGERED FISH SPECIES

Author	Species and Geographic Area	Key Issues Addressed in Survey	Survey Administration[a]	Range of Values
Kotchen and Reiling (2000)	*Species*: Shortnose sturgeon (Listed as Federally endangered, 1967) *Geographic Area*: Maine	Nonuse value for protection of the endangered Shortnose sturgeon. Respondents were asked to vote in a hypothetical future referendum to approve a statewide species protection fund to finance a recovery plan for the species. Respondents voted yes/no to dollar amounts associated with a hypothetical one-time tax increase designed to underwrite the fund.	*Sample Frame*: Maine residents over the age of 18 (licensed drivers) *No. of Survey Participants:* 326 (for Sturgeon) *Response Rate*: 54% *Survey Mode*: Mail survey *Payment Vehicle*: One-time tax to underwrite a trust fund	$26.63 (1997 dollars) Estimated mean willingness to pay for one-time payment through increased taxes
Cummings et al. (1994)	*Species*: Squawfish (Federally listed as endangered in 1967) *Geographic Area*: New Mexico	Existence value of a Federally-listed fish species. Survey participants were told about a hypothetical government program that could purchase water rights to reverse the decline in habitat and improve survival rates for the squawfish. Respondents were asked to state the maximum amount they would be willing to pay in higher annual state taxes to see the program implemented.	*Sample Frame*: Households in New Mexico *No. of Survey Participants*: 411 *Response Rate*: 33% (mailed); 42% (delivered) *Survey Mode*: Mail and delivered survey *Payment Vehicle*: Increase in state taxes	$3.42 (1992 dollars) Annual mean willingness to pay

Exhibit 5-1

SUMMARY OF ECONOMIC VALUATION LITERATURE RELATED TO THREATENED OR ENDANGERED FISH SPECIES

Author	Species and Geographic Area	Key Issues Addressed in Survey	Survey Administration[a]	Range of Values
Ekstrand and Loomis (1998).	*Species*: Bonytail chub Colorado squawfish humpback chub razorback sucker Virgin River chub woundfin loach minnow spikedace silvery minnow (All Federally-listed threatened or endangered species) *Geographic area*: Four Corners Region (Colorado, San Juan, Green, Virgin, Gila, and Rio Grande Rivers)	Economic value for maintaining critical habitat units by timing water releases from Federally operated damns to ensure protection of nine threatened and endangered fish species. Households were told that government officials were considering proposals to eliminate CHUs based on opportunity costs of hydropower. A hypothetical funding mechanism would be established that would rely on the contribution of all US taxpayers annually. Respondents voted yes/no to dollar amounts that would establish a Trust Fund that would preserve critical habitat units and aid in delisting the species.	*Sample Frame*: Random sample of (1) United States households and (2) Four Corner Region households *No. of Survey Participants*: ~718 *Response Rate*: 54% *Survey Mode*: Mail survey *Payment Vehicle*: Annual Federal tax for establishment of a trust fund	$268 (1996 dollars) Estimated annual mean willingness to pay to protect nine fish species in six different river systems
Berrens at al. (1996); Berrens et al. (2000)	*Species*: Silvery minnow (Listed as Federally endangered in 1994) *Geographic Area*: New Mexico	Nonmarket benefits of improved instream flow protection, with a focus on the protection of critical habitat for the Federally endangered Silvery minnow. Respondents were told that the Silvery minnow is one of 11 endangered fish that require a minimum amount of water in streams and rivers. Respondents were asked if they would be willing to allow a NM state agency to buy or lease water to maintain minimum instream flows and, if so, were asked to state their willingness to contribute annually (for five years) to a fund for that purpose (Note that the study's conclusions draw from two separate datasets that were proven to be statistically similar: a February 1995 and February 1996 telephone survey).	*Sample Frame*: New Mexico households *No. of Survey Participants*: 656 *Response Rate*: 64% (successful interviews) *Survey Mode*: Telephone survey *Payment Vehicle*: Contribution to a trust fund that buys or leases water for instream flow	$28.73 -$26.42 (1995 & 1996 dollars., respectively) Estimated annual mean willingness to pay per household over a five year period for protection of minimum instream flows for silvery minnow on the Middle Rio Grande River

Exhibit 5-1

SUMMARY OF ECONOMIC VALUATION LITERATURE RELATED TO THREATENED OR ENDANGERED FISH SPECIES

Author	Species and Geographic Area	Key Issues Addressed in Survey	Survey Administration[a]	Range of Values
Boyle and Bishop (1987)	*Species*: Striped shiner (Listed as Endangered by State of Wisconsin, 1979) *Geographic Area*: Wisconsin	The total economic value (i.e., non-consumptive use and non-use values) Wisconsin residents place on the preservation of a relatively obscure state-endangered fish species. Respondents were first asked to assume that all existing funding to preserve the shiner is terminated and that without funding no organized effort to preserve the species would exist, thereby leading to species extinction. Respondents voted yes/no to donate a randomly selected amount to become a member in a private foundation that would (1) actively maintain and restore shiner habitat and (2) would effectively prevent extinction.	*Sample Frame*: 1984 Wisconsin taxpayers (contributors and noncontributors to WI's existing Endangered Resources Donation Program) *No. of Survey Participants*: 790 *Response Rate*: 81% *Survey Mode*: Mail surveys *Payment Vehicle*: Donation to a private foundation	$4.16 - $5.66 (1985 dollars) Low range indicates annual mean willingness to pay per taxpayer who had not previously contributed to the State's actual Endangered Resources Donation Program (ERD); high end indicates those that had previously contributed.
Loomis (1996)	Species: Steelhead (Federally listed as threatened in 1999) Salmon (Federally listed: Chum (1999), Coho (1996), Sockeye (1992), and Chinook (1999)) Geographic Area: Olympic Penninsula	Assessment of nonmarket economic value of dam removal and river restoration to benefit salmon and steelhead populations. Respondents were asked to value the removal of two dams on the Elwha River, restoration of the river to its natural predam state-- including an additional 70 miles of fish habitat --and a tripling of the salmon population as a result of removing existing fish ladders. Respondents were told that removing dams would restore the ecosystem and anadromous fishery. The contingent valuation survey asked respondents to vote yes/no to increase their Federal taxes over the next 10 years by a randomly selected dollar amount to ensure the continued existence of non-threatened anadromous fish species.	*Sample Frame*: Households in Clallam Co. (location of Elwha River), Washington State, and United States *No. of Survey Participants:* 462 (Clallam Co.); 612 (Washington State); 550 (United States) *Response Rate*: 77% (Clallam Co.); 68% (Washington State); 55% (United States) *Survey Mode*: Mail survey *Payment Vehicle*: Increase in Federal taxes for a 10 year period	$59 - $73 - $68 (1994 dollars) Annual mean willingness to pay per household for 10 year period for Clallam Co, Washington State, and United States, respectively

Exhibit 5-1

SUMMARY OF ECONOMIC VALUATION LITERATURE RELATED TO THREATENED OR ENDANGERED FISH SPECIES

Author	Species and Geographic Area	Key Issues Addressed in Survey	Survey Administration[a]	Range of Values
Carson et al. (1994)	*Species*: Kelp Bass White Croaker *Geographic Area*: California	Interim lost use value (a measure of the compensation due to the public) as a result of PCB and DDT contamination. Respondents were told that injury had occurred to two non-threatened fish species (kelp bass and white croaker) as a result of contamination. Respondents were told in the baseline the natural recovery of the species would require 50 years. Respondents were given the opportunity to vote for or against a government program financed by a one-time income tax surcharge per household that would guarantee a reduction in the natural recovery time from 50 to 5 years. Respondents were told the program would reduce the level of future injuries occurring during the 50 years of natural recovery to the lesser level occurring in the five years of accelerated recovery.	*Sample Frame*: English-speaking California households *No. of Survey Participants:* 2,810 (interviews completed) *Response Rate*: 72.6% *Survey Mode*: Telephone interviews *Payment Vehicle*: A one-time state tax payment	$55.61 (1994 dollars) Estimated mean one-time willingness to pay per household (lower bound); (Note this figure also includes the public's willingness to pay to enhance the recovery of two bird species: bald eagle and peregrine falcon)
Duffield and Patterson (1992)	*Species*: Arctic grayling (Federally listed as candidate species) Yellowstone cutthroat trout (MT species of special concern) *Geographic area*: Two Montana streams (tributaries of the Yellowstone and Big Hole Rivers)	To measure the non-use value associated with improved stream flows on select spawning tributaries that were recently severely dewatered. Using two different payment vehicles-- including actual cash donation (where participants mail an actual contribution) and a future hypothetical donation to an organization that manages a trust fund that oversees stream flows --respondents were asked how much they would be willing to contribute (or, *actually contribute*) to maintain summer flows on tributaries that support the arctic grayling and cutthroat trout.	*Sample Frame*: Montana residents and nonresident fishing license holders *No. of Survey Participants*: 1,787 *Response Rate*: 23% *Survey Mode*: Mail survey *Payment Vehicle*: (1) one-time actual cash donation to a trust fund; and (2) one-time hypothetical donation to a trust fund	$2.24 - $17.36 (1990 dollars) Estimated mean one-time contribution per respondent (i.e., the universe of survey participants) $14.92 to $31.85 Estimated mean one-time contribution per contributor (i.e, those participants that expressed a willingness to contribute) (35 % of respondents are considered contributors)

Exhibit 5-1

SUMMARY OF ECONOMIC VALUATION LITERATURE RELATED TO THREATENED OR ENDANGERED FISH SPECIES

Author	Species and Geographic Area	Key Issues Addressed in Survey	Survey Administration[a]	Range of Values
Olsen et al. (1991)	*Species*: Steelhead (Federally listed as threatened in 1999) Salmon (Federally listed: Chum (1999), Coho (1996), Sockeye (1992), and Chinook (1999)) *Geographic area*: Columbia River Basin	The existence value to both resources users and nonusers of existing salmon and steelhead runs. Telephone interview defined existence value and described size of fish runs prior to industrial development of Columbia River. Respondents were asked to value a guaranteed doubling of existing fish runs. Non-resource users expressed their willingness to pay by identifying the maximum amount they would pay above their average monthly (or last) power bill to know that future runs would be altered to a more stable and diverse condition. Resource users were asked to estimate (1) the value above and beyond the cost associated with their last fishing experience (assuming no change or improvement to catch level) and (2) the value to achieve an incremental change in the number of fish caught (i.e., a doubling).	*Sample Frame*: Residents of WA, OR, ID, Western MT, including non-resource and resource users (e.g., licensed sport fisherman) *No. of Survey Participants:* 1622 (nonusers) and 1285 (resource users) *Response Rate*: 72% successfully answered a complete questionnaire during phone interview *Survey Mode*: Telephone interviews *Payment Vehicle*: Increased monthly electric bill	$2.21 - $4.88 (1989 dollars) Estimated monthly willingness to pay (on a re-occurring annual basis) by non-resource users $6.18 Estimated monthly willingness to pay (on a re-occurring annual basis) by resource users
Stevens et al. (1991)	*Species*: Atlantic salmon (Federally Endangered in portions of Maine - 2000) *Geographic Area*: Massachusetts	Estimates the existence value of Atlantic salmon by valuing a Massachusetts' restoration program. Respondents received introductory information about the species and were told that budget cuts had eliminated a program designed to restore salmon habitat in New England rivers. Respondents were also told about a hypothetical private trust fund to preserve and protect the species. Without the fund the species would no longer exist in New England, though the creation of the fund did not guarantee survival of the species. Individuals were asked whether they would contribute a certain amount per year over the next five years to underwrite the fund.	*Sample Frame*: Massachusetts households *No. of Survey Participants*: ~169 *Response Rate*: ~17 percent *Survey Mode*: Mail Survey *Payment Vehicle*: Annual contribution for five years to a private trust fund for management of the species	$7.93 (1988 dollars) Annual mean willingness to pay for five year period

Exhibit 5-1

SUMMARY OF ECONOMIC VALUATION LITERATURE RELATED TO THREATENED OR ENDANGERED FISH SPECIES

Author	Species and Geographic Area	Key Issues Addressed in Survey	Survey Administration[a]	Range of Values
Kay et al. (1987)	*Species*: Atlantic salmon *Geographic Area*: New England states (CT, RI, MA, VT, NH, ME)	Value to New England households of ensuring that Atlantic Salmon would be found in the fourteen New England rivers targeted by the Atlantic Salmon Restoration Program. Survey participants who anticipated fishing for salmon in the future were asked how much they would be wiling to pay for a fishing license if the economic value of finding salmon in these rivers exceeded the maximum amount they were willing to pay for a fishing license. Non recreational users were asked the maximum amount they would be willing to pay for restoration though increased taxes.	*Sample Frame*: New England households with telephones *No. of Survey Participants:* 630 *Response Rate*: 42 percent *Survey Mode*: Mail/telephone follow-up *Payment Vehicle*: Increase in taxes for nonusers; increase in fish license prices for recreational users	$23.40 - $27.23 (1986 dollars) Estimated one-time willingness to pay for increase in taxes or increase in fishing license cost, respectively

[a] Information provided under "Survey Administration" (e.g., sample size, response rate) are reported in the author's published article and may not be comparable across surveys.

222. Across studies, some estimated values are similar in magnitude. For example, Cummings et al (1994) provides an annual willingness to pay to protect the Colorado squawfish of between $4 and $10, while Boyle and Bishop estimate that the public is willing to pay between $6 and $8 annually to protect the striped shiner.[133] In general, however, there is a great deal of variation. This variation arises largely from differences in: (1) the good being valued (e.g., dam removal and fish habitat restoration, reduction of future fish injuries resulting from toxic contamination, maintenance of sufficient instream water levels); (2) how the question was asked (e.g., dichotomous choice versus payment card approach); (3) the sample frame used for the survey (e.g., Montana recreational fishing license holders, all English speaking California households), and (4) the mechanism through which the respondent would actually pay the bid amount (i.e., increase in annual taxes, a one-time fee, an increase in monthly electric bill), as well as other factors. Importantly, in some cases the reported values reflect actions to preserve a number of fish species.

223. As noted above, a core principle of defensible benefits transfer is demonstrated similarity between the good being valued in the literature and the good being valued in the policy context to which the transfer is being made. Based on a review of the existing literature related to the valuation of enhancing threatened and endangered fish species recovery, there does not appear to be a study(ies) that addresses the value the public places on a sufficiently similar good to justify a transfer in the case of the sturgeon. For example, many of the threatened and endangered fish valued in the literature are only found in freshwater, while others are found only in unique geographic areas (e.g., Atlantic salmon, Arctic grayling, etc.). The vast majority of studies in Exhibit 5-1 attempt to estimate the total value of the species (i.e., existence value), rather than the benefits associated with improved species recovery (i.e., protections afforded the sturgeon under section 7).[134] For these reasons, this analyses does not specifically monetize the benefits associated with section 7 protection for the sturgeon. Nonetheless, taken as a whole, the studies summarized above generally support the notion that preservation of threatened and endangered fish species and their habitat is likely to generate benefits to the public.

[133] Values are presented in 2002 dollars using estimated 2002 GDP (NASA. 2002. GDP Calculator).

[134] Three studies (Ekstrand and Loomis (1998) and Berrens et al. (1996 and 2000)) estimate the public's willingness to pay for critical habitat units for threatened and endangered fish species. However, since the studies focus exclusively on freshwater fish species in four rivers in the southwestern United States, they do not provide a sufficiently similar good to the care of sturgeon.

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- Eglin Air Force Base, June 19, 2002.
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Information is also based on written communication from:

- U.S. Army Corps of Engineers, Mobile District, May 29 and June 19, 2002.
- Eglin Air Force Base, June 17, 2002.

Information is also based on comments received from the following on *Draft Economic Analysis of Critical Habitat Designation for the Gulf Sturgeon*, October 7, 2002:

- Alabama-Tombigbee Rivers Coalition, October 4, 2002.
- American Waterways Operators, August 21, 2002.
- Cumming/Forsyth County Chamber of Commerce, October 7, 2002.
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- East Bank Commercial Fisherman's Association, August 22, 2002.
- Florida Forestry Association, September 30, 2002.
- Hancock County Port and Harbor Commission, August 21, 2002.
- Office of Board of Supervisors, Stone County, Mississippi, September 16, 2002.
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- Representative John Linder, October 4, 2002.
- Ronald Allen, private citizen, September 17, 2002.
- Senator Zell Miller, October 3, 2002.
- Southeastern Federal Power Customers, Inc., September 20, 2002.
- U.S. Army Corps of Engineers, Mobile District, October 7 and 9, 2002.

APPENDIX A
RELEVANT BASELINE REGULATIONS

TABLE 1

FEDERAL REGULATIONS

Regulation	Description	Units Potentially Affected
Anadromous Fish Conservation Act	This Act authorizes the Secretary of the Interior to enter into cooperative agreements with states and other non-federal interests to "conserve, develop, and enhance the anadromous fish resources of the U.S." The cooperative agreements must be in writing and describe: the actions to be taken by each party; the benefits anticipated to be derived by each party; the estimated costs to each party; the agreement term; the terms for disposing of property acquired by the Secretary under this agreement; and any other terms the Secretary deems appropriate. http://ipl.unm.edu/cwl/fedbook/anadfish.html	All
Coastal Barriers Resources Act	The Act prohibits direct or indirect Federal funding of any projects in undeveloped coastal barrier areas. The purpose of the act is to "minimize the loss of human life, wasteful expenditure of federal funds, and damage to fish, wildlife and other natural resources of the coastal barriers. This act also establishes a Coastal Barrier Resources System. http://ipl.unm.edu/cwl/fedbook/cbra.html	Units 8-14
Coastal Wetlands Planning, Protection, and Restoration Act	This act authorizes the U.S. Environmental Protection Agency Administrator to engage in any technically feasible activity to create, restore, protect or enhance coastal wetlands through sediment and freshwater diversion, water management or other measures, and places particular emphasis on wetlands restoration projects in the State of Louisiana. http://ipl.unm.edu/cwl/fedbook/coastwet.html	Units 8-14
Coastal Zone Management Act of 1972	This act established a Federal grant program managed by the Department of Commerce to "encourage and assist the states with development and implementation of management programs for coastal areas." Among other measures, these programs should include the "protection of natural resources, including wetlands, flood plains, estuaries, beaches, dunes, barrier islands, and fish and wildlife and their habitat." http://ipl.unm.edu/cwl/fedbook/czma.html	Units 8-14

TABLE 1

FEDERAL REGULATIONS

Regulation	Description	Units Potentially Affected
Marine Protection, Research, and Sanctuaries Act	This act prohibits the dumping, or transport of for the purpose of dumping, of any material, including dredge material, into ocean waters, except pursuant to an authorized permit. Additionally, the act authorizes the Secretary of Commerce to designate areas as national marine sanctuaries to promote comprehensive management of their conservation, recreation, ecological, historical, research, educational, or aesthetic resources. http://ipl.unm.edu/cwl/fedbook/marinedu.html	Units 8-14
Federal Power Act	Section 10(j) of the FPA requires FERC to consider both power and non-power resources during the licensing process and instructs FERC to actively solicit input regarding "adequate and equitable" fish and wildlife measures from Federal and State resource agencies." FERC must consider these recommendations during the licensing process but does not have to incorporate the recommendations into the license if they "may be inconsistent with the purposes and requirements of the FPA" or if the recommendations are not supported by substantial evidence. Section 18 of the FPA provides that FERC require facility owners/operators to construct, maintain, and operate, at their own expense, fishways if operation of the facility will impact the passage of fish species in the project area or planned for introduction in the area.	Units 2-7, 9-14 Unit 1 - Mississippi portions only Unit 8 - Mississippi and Alabama portions only
Clean Water Act	The purpose of the CWA is to restore the physical, biological, and chemical integrity of the waters of the United States. Under section 401 of the CWA, all applicants for a Federal license or permit to conduct activity that may result in discharge to navigable waters are required to submit a state certification to the licensing or permitting agency. The state certification must state that the discharge complies with the requirements of sections 301, 302, 303, 306, and 307 of the CWA. http://www.epa.gov/owow/wetlands/facts/fact10.html Section 404 of the CWA prescribes a permit program for the discharge of dredged or fill material into navigable waters. Specifically, pursuant to section 404, permit applicants are required to show that they have "taken steps to avoid wetland impacts, where practicable, minimized potential impacts to wetlands, and provided compensation for any remaining, unavoidable impacts through activities to restore or recreate wetlands." The Army Corps of Engineers issues section 404 permits. Under the CWA, waterbodies should also provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water ("fishable/swimmable"). When the Corps of Engineers issues permits for the discharge of material into navigable waters, EPA is authorized to prohibit the use of a site as a disposal site based on a determination that discharges would have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational uses.	All

TABLE 1

FEDERAL REGULATIONS

Regulation	Description	Units Potentially Affected
Response Plans for Onshore Oil Pipelines	Pursuant to these regulations, each owner or operator of an onshore pipeline "may not handle, store, or transport oil in that pipeline unless the operator has submitted a response plan." The response plan must: "plan for resources for responding to a worst case discharge, as determined by the owner or operator, and to a substantial threat of such discharge; be consistent with the National Contingency Plan (NCP); and include a core plan consisting of an information summary, immediate notification procedures, spill detection and mitigation procedures, and other measures.	All
Water Resources Development Act of 1992	Section 204 "authorizes projects for the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging an authorized Federal navigation project." http://www.senate.gov/~epw/wrda92.pdf, http://laws.fws.gov/lawsdigest/wat1992.html	All
Fish and Wildlife Coordination Act	The purpose of this act is to ensure that fish and wildlife resources are equally considered with other resources during the planning of water resources development projects by: 1) authorizing the Secretaries of Agriculture and Commerce to provide assistance with Federal and State agencies in protecting game species and studying the effects of pollution on wildlife; 2) requiring consultation with the Bureau of Fisheries prior to constructing any new dams to provide for fish migration; and 3) requiring consultation with the Fish and Wildlife Service for water impoundment or diversion projects with a Federal nexus. 16 U.S.C. §§1-667e. http://www4.law.cornell.edu/uscode/16/661.html	All
Magnuson-Stevens Fishery Conservation and Management Act	The purposes of this act include the conservation and management of U.S. anadromous species and off-coast fishery resources; the use of sound conservation and management principles for commercial and recreational fishing; and the implementation of fishery management plans to optimize fishery yields. All fishery management plans and regulations must be based on the best available scientific information and meet certain standards, including: conservation and management measures; and prevention of overfishing. 16 U.S.C. §§1801-1882. http://ipl.unm.edu/cwl/fedbook/magfish.html	All

TABLE 2

STATE REGULATIONS

Regulation	Description	Units Potentially Affected
Alabama Environmental Management Act Alabama Coastal Area Management Program	Prohibits the use of coastal areas without a permit. In determining whether to grant a permit, the Department of Management will consider whether the use: provides a regional benefit or is necessary to protect/maintain an existing beneficial use; is within/consistent with a designated special management area; and, for dredge/fill activities impacting wetlands, whether the use is water dependent. Additionally, all permit holders are required to mitigate for unavoidable impacts to coastal resources.	Units 3, 4, 5, 8
Alabama Rules and Regulations of the State Oil and Gas Board	The rules governing onshore land operations provide the Alabama Oil and Gas Board with the authority to govern onshore oil and gas operations. Governs the development and plugging of oil and gas wells and requires a permit for all onshore oil and gas drilling activities. Additionally, operators must conduct oil and gas operations in a manner so as to prevent pollution of freshwater resources. http://www.ogb.state.al.us/HTMLS/OGBRULES/4001.htm	Units 3, 4, 5, 8
Alabama Conservation and Natural Resources	This statute prescribes fishing methods for game and non-game fish. Ala. Code §§9-11-1 through 9-11-457. http://www.legislature.state.al.us/CodeofAlabama/1975	Units 3, 4, 5, 8
Florida Endangered and Threatened Species Act	This statute provides for research and management to conserve and protect endangered and threatened species as a natural resource. The Act requires the Fish and Wildlife Commission to submit a plan for the management and conservation of endangered and threatened species that includes criteria for research and management priorities and identifies statewide policies to protect endangered and threatened species. Additionally, the act prohibits the killing or wounding of any species designated as endangered or threatened. Fla. Stat. Ann. §372.072. http://www.leg.state.fl.us/Statutes/index	Units 3-7, 9-14
Florida Aquatic Preserve Act	Prescribes a standard set of management criteria for the Aquatic Preserve Program. http://www.leg.state.fl.us/statutes/index	Units 3-7, 9-14

TABLE 2

STATE REGULATIONS

Regulation	Description	Units Potentially Affected
Florida Beach and Shore Preservation Act	• Coastal Construction Control Line Program - governs construction near state beaches to reduce the effects of construction on dune stability, erosion, and pubic beach access. Establishes coastal construction control lines that designate areas "in which special siting and design criteria are applied for construction activities." http://www.dep.state.fl.us/beaches/programs/ccclprog.htm • Beach Erosion Control Program - works with local, state, and Federal government entities "to achieve the protection, preservation and restoration of the coastal sandy beach resources of the state." Funding is available for eligible beach restoration and preservation activities, including: project design and engineering studies, environmental studies and monitoring, inlet management planning, inlet sand transfer, and dune restoration. http://www.dep.state.fl.us/beaches/programs/bcherosn.htm • Coastal Construction Program - "protects the shoreline from activities which could contribute to erosion." Florida has developed a joint coastal permit (JCP) governing coastal construction, environmental resource, and wetland resource permits, and sovereign submerged lands authorizations. The following activities require a JCP: beach restoration and other erosion control projects, maintenance of inlets and inlet-related structures, and dredging of navigation channels with beach disposal of dredged material. In order to obtain a JCP, activities must meet certain requirements (see Chapter 62B-49 Florida Administrative Code). http://www.dep.state.fl.us/beaches/programs/envpermt.htm	Units 3-7, 9-14
Louisiana Threatened and Endangered Species Conservation	This statute prohibits the taking, possession, transportation, exportation, processing, sale, or shipment of endangered species and regulates exceptions to these prohibitions to enhance the conservation of species. The Act also allows the Louisiana Wildlife and Fisheries Commission to issue regulations deemed necessary for the conservation of listed threatened or endangered species. La. Civ. Code Ann. Art. 56 §§1901-1907. http://www.legis.state.la.us/tsrs/RS/56/RS_56_1901.htm	Units 1, 8

TABLE 2

STATE REGULATIONS

Regulation	Description	Units Potentially Affected
Louisiana Title 33 Environmental Quality Department of Environmental Quality	Oil Spill Prevention and Cleanup - requires owners or operators of oil production, transport, and storage facilities to prepare a Spill Prevention and Control Plan that must provide, as well as other information, an indication of the nearest potential receiving waters to the facility; the identity, amount, and location of substances stored at the facility; facility capability and corrective action procedures and countermeasures when a spill event occurs; a prediction of the direction, rate of flow and total quantity of substances which could be spilled; and appropriate containment and/or diversionary structures or equipment to prevent a spilled substance from reaching waters of the State. Disposal of Waste Oil and Other Materials Resulting from Drilling, Production, and Transportation of Oil, Gas or Sulfur - requires all waste oil to be gathered and burned on the lease; prohibits the discharge of oily fluids into any stream, lake, or other water body, requires all producing wells and pumps to be surrounded by a gathering ditch to prevent the escape of oily wastes; requires all oil pipelines to be regularly inspected and all leaks immediately repaired; and prohibits the discharge of saltwater from a lease until all oily waste has been completely separated from the saltwater.	Units 1, 8
Louisiana Environmental Quality Act (Title 30) Department of Environmental Quality	Water Control Law - regulates the discharge of waste materials, pollutants, and other substances into state waters and proscribes permits for all activities that result in a discharge of any substances into state waters. Oil Spill Prevention and Response Act - provides the Oil Spill Coordinator with authority to develop a statewide oil spill prevention and response plan pursuant to the Federal Oil Pollution Act of 1990; coordinate the implementation and maintenance of the oil spill prevention program; and adopt, amend, repeal, and enforce regulations relating to discharge prevention programs. The coordinator is also responsible for developing an oil spill contingency plan that provides detailed emergency operating procedures for initiating actions in response to an unauthorized discharge, procedures for disposal of removed oil or hazardous substances, and procedures established in cooperation with the Department of Environmental Quality, Department of Wildlife and Fisheries, and Department of Natural Resources for assessment of natural resources damages and plans for mitigation of damage to and restoration, protection, rehabilitation, or replacement of damaged natural resources. http://www.wlf.state.la.us/apps/netgear/index.asp?cn=lawlf&pid=866	Units 1, 8
Coastal Zone Management Program	State-Federal partnership authorized by the Coastal Zone Management Act of 1972 and "responsible for advancing national coastal management objectives and maintaining and strengthening state and territorial coastal management capabilities." Provides Federal funding, mediation, and technical assistance to states. State coastal management programs must be approved by the Coastal Programs Division (CPD) within the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management (OCRM). http://www.ocrm.nos.noaa.gov/czm/welcome.html	All

TABLE 2

STATE REGULATIONS

Regulation	Description	Units Potentially Affected
Mississippi Nongame and Endangered Species Conservation Act	This Act prohibits the taking, possession, transportation, exportation, processing, sale, or shipment within the State of endangered species. Pursuant to this Act, the Mississippi Commission on Wildlife, Fisheries and Parks shall issue regulations establishing limitations related to taking, possession, transportation, and sale of species as necessary to protect the species. Miss. Code. Ann. §§49-5-101 through 49-5-119. http://198.187.128.12/mississippi/lpext.dll/Infobase	Units 1, 2, 8
Mississippi Dam Safety Regulations	These regulations provide the Dam Safety Office with the authority to "regulate the design and construction of dams," "assure that appropriate safety considerations are incorporated into the planning, design, and construction of all dams," and monitor dam operation to "assure that proper maintenance and repairs are performed in a timely manner." http://www.deq.ms.us/newweb/olwrhome.nsf/pages/DamSafety/$file/DamSafety.html	Unit 1

TABLE 3

VOLUNTARY MEASURES AND OTHER PROTECTIONS

Program	Description	Units Potentially Affected
Gulf Ecological Management Sites Program	The GEMS Program coordinates and utilizes existing federal, state, local and private programs and resources to identify ecologically important Gulf habitats in the five Gulf of Mexico states, build an informational database, and foster cooperative conservation of GEMS. In 1996, the five Gulf of Mexico states identified 105 special ecological areas as GEMS. http://www.epa.gov/gmpo/gem2.html National Estuarine Reserve System - program established under the Coastal Zone Management Act of 1972 to improve the nation's understanding and stewardship of estuaries. The reserve system is a network of 25 protected areas representing different biogeographic regions of the U.S. http://www.ocrm.nos.noaa.gov/nerr/ Mississippi - Pascagoula River Marsh Coastal Preserve: Preserve consisting of 11,150 acres of primarily unspoiled marshland at the mouth of the Pascagoula River. However, the preserve is threatened by industrial and residential developments that involve dredging, fill, and byproduct pollution. The Gulf sturgeon is listed as a rare/threatened species found within the preserve. http://www.dmr.state.ms.us/Coastal%20Ecology/Gems/Pascagoula%20River.htm Florida - Apalachicola National Estuarine Research Preserve: One of the 25 sites designated under the National Estuarine Reserve System. Current uses of the preserve include: outdoor recreation (hunting, fishing, boating, hiking); commercial fishing, water-borne navigation, outreach education on estuarine habitats, and research of coastal management issues. http://www.dep.state.fl.us/coastal/sites/apalachicola/anerr/info.htm	All
Florida State Buffer Preserves Program	This is an extension of the Florida Aquatic Preserve Program designed to purchase the natural lands surrounding the aquatic preserves to provide a protective upland buffer to the aquatic preserves. The buffer preserves are managed as State Parks, Wildlife Management Areas, or State Forests. http://www.dep.state.fl.us/coastal/programs/buffer.htm	Units 3-7, 9-14
Apalachicola River Wildlife and Environmental Area Conceptual Management Plan	Maintain area for multiple uses. Specifically, area will be managed to "protect and promote old growth flora and fauna in floodplain forests, enhance water quality by restoring natural hydroperiods, promote a diversity of wildlife habitats, including restoration of disturbed areas to more natural vegetative communities, and to provide quality natural-resource-based recreational opportunities." http://wld.fwc.state.fl.us/planning/CMP/Apalachicola%20River%20WEA/Apalachicola%20River%20GOPS.pdf	Unit 6

TABLE 3

VOLUNTARY MEASURES AND OTHER PROTECTIONS

Program	Description	Units Potentially Affected
Louisiana Wildlife Management Areas	Areas designated and managed for multiple uses, including: hunting, fishing, and other outdoor recreation; forestry; and the preservation of wildlife habitat. Louisiana has also established a Forest Stewardship Program. Under this program, State officials assist private forest landowners in efforts to manage forests for multiple resources (timber, wildlife, recreation, aesthetics, and environmental enhancement). Private forests of at least ten acres of land with a Forest Stewardship Management Plan that show management for at least two resources are eligible for certification as a Stewardship Forest. http://www.wlf.state.la.us/apps/netgear/index.asp?cn=lawlf&pid=866	Units 1, 8
Mississippi Interstate Cooperative Resource Agreement Paddlefish/Sturgeon Strategic Plan Paddlefish/Sturgeon Committee	Promotes interjurisdictional management of paddlefish and sturgeon among the 28 states of the Mississippi River Basin. The Paddlefish/Sturgeon Committee developed a strategic plan to achieve the following goals: identify and prioritize issues and concerns affecting paddlefish and sturgeon resources; facilitate communication among entities responsible for resource management; develop a basin-wide information management program; identify and coordinate paddlefish and sturgeon research; facilitate basin-wide conservation, protection, and restoration of paddlefish and sturgeon habitats; and increase public awareness of the existence of paddlefish and sturgeon species and understanding of the environmental and human-related impacts that threaten their welfare and continued existence. http://wwwaux.cerc.cr.usgs.gov/MICRA/pscomm.htm	Units 1, 2, 8

APPENDIX B

ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 1 - Pearl and Bogue Chitto Rivers in Louisiana and Mississippi					
USACE	FWS	Dredging and disposal	USACE is in process of deauthorizing one old navigation project with sills.	n/a	n/a
USACE	FWS	Flood control and navigation	Multimillion dollar study of Pearl River watershed.	1 formal	Unknown.
USACE	FWS	Ross Barnett Dam (state-operated)	No flow issues anticipated. Ross Barnett has had the same operating procedures for 20 years and is unlikely to change due to sturgeon critical habitat.	n/a	n/a
USACE	FWS	Gravel mining	Issuance of permits for gravel mining operations near Pearl River (not in-stream).	10 informal	n/a
USACE	FWS	Regulated modifications of surface water bodies	Issuance of permits for docks, fishing piers, and small dredging projects.	100 informal	Modifications unlikely.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	36 informal	n/a
FHWA	FWS	Bridge construction	County bridge construction and replacement projects.	5 informal	Limit construction to months when sturgeon migration is not occurring; apply measures to reduce turbidity and siltation.

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 2 - Pascagoula, Leaf, Bowie, Big Black Creek and Chickasawhay Rivers in Mississippi					
USACE	FWS	Dredging and disposal	One authorized Federal navigation project on Pascagoula involving infrequent maintenance dredging and disposal.	2 formal[d]	Minimize extent of dredging and disposal; sequence dredging; adopt standard monitoring measures; fund research studies.
USACE	FWS	Wetland habitat creation	Restoring habitat via placement of dredged material (beneficial reuse).	15 informal	Sequence work to minimize impacts to sturgeon migrations.
USACE	FWS	Water supply	Water withdrawn on the East Pascagoula River.	1 formal	Sequence work to minimize impacts to sturgeon migrations; alter dam release patterns.
USACE	FWS	Regulated modifications of surface water bodies	Issuance of permits for docks, fishing piers, mining, and wetlands fill.	15 informal, 4 formal (19 total)	Modifications unlikely.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	40 informal	n/a
FHWA	FWS	Bridge construction	Bridge construction and replacement projects.	3 formal	Limit construction to months when sturgeon migration is not occurring: apply measures to reduce turbidity and siltation.

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Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 3 - Escambia, Conecuh, and Sepulga Rivers in Alabama and Florida					
USACE	FWS	Dredging and disposal	One authorized Federal navigation project on Escambia River involving maintenance dredging.	2 formal[d]	Minimize extent of dredging and disposal; sequence dredging; adopt standard monitoring measures; fund research studies.
USACE	FWS	Wetland/ habitat creation	Restoring habitat via placement of dredged material (beneficial reuse).	5 informal	Sequence work to minimize impacts to sturgeon migrations.
USACE	FWS	Flood control	Construction of flood protection in Brewton/East Brewton.	2 formal	Sequence work to minimize impacts to sturgeon migrations.
USACE	FWS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities.	10 informal, 1 formal (11 total)	Modifications unlikely.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	24 informal	n/a
FERC	FWS	Hydroelectric plant relicensing	Relicensing of Alabama Electric Cooperative plant on Conecuh River upon permit expiration in 2005.	1 informal	Unknown.
FHWA	FWS	Bridge construction	County bridge construction and replacement project on the Conecuh River; other bridge construction and replacement projects.	3 formal	Limit construction to months when sturgeon migration is not occurring; apply measures to reduce turbidity and siltation.

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Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 4 - Yellow, Blackwater, and Shoal Rivers in Alabama and Florida					
USACE	FWS	Dredging and disposal	Authorized Federal navigation project on Blackwater River involving maintenance channel dredging.	1 formal[d]	Minimize extent of dredging and disposal; sequence dredging; adopt standard monitoring measures; fund research studies.
USACE	FWS	Wetland habitat creation	Restoring habitat via placement of dredged material (beneficial reuse).	2 informal	Sequence work to minimize impacts to sturgeon migrations.
USACE	FWS	Water supply	Construction of dam in Okaloosa County, FL on Yellow River for purposes of water supply and recreation. Likely to require a USACE permit.	1 formal	Sequence work to minimize impacts to sturgeon migrations; alter dam release patterns; adopt standard monitoring measures; fund research studies.
USACE	FWS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities.	10 informal, 1 formal (11 total)	Modifications unlikely.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	12 informal	n/a
DOD	FWS	Eglin AFB	Army Ranger activities on the Yellow River, including explosives detonation to remove logjams, road maintenance projects, and other miscellaneous projects.	50 informal	n/a
FHWA	FWS	Bridge construction	Bridge construction and replacement projects.	2 formal	Limit construction to months when sturgeon migration is not occurring: apply measures to reduce turbidity and siltation.

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Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 5 - Choctawhatchee and Pea Rivers in Florida and Alabama					
USACE	FWS	Dredging and disposal	Within-banks and open water dredging projects, plus channel dredging.	1 formal[d]	Minimize extent of dredging and disposal; sequence dredging; adopt standard monitoring measures; fund research studies.
USACE	FWS	Clearing and snagging	Removal of debris from navigation channels.	1 formal	Clearing and snagging windows; minimize extent and length of time of clearing and snagging; sequence activity according to sturgeon migrations; adopt standard monitoring measures; fund research studies.
USACE	FWS	Wetland habitat creation	Restoring habitat via placement of dredged material (beneficial reuse).	4 informal	Sequence work to minimize impacts to sturgeon migrations.
USACE	FWS	Flood control	Rehabilitation of levees for flood control.	2 formal	Sequence work to minimize impacts to sturgeon migrations.
USACE	FWS	Water supply	Water supply for southeast Alabama.	1 formal	Sequence work to minimize impacts to sturgeon migrations; adopt standard monitoring measures; fund research studies.
USACE	FWS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities.	5 informal, 2 formal (7 total)	Modifications unlikely.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	8 informal	n/a

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Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
FHWA	FWS	Bridge construction	Bridge construction and replacement projects.	2 formal	Limit construction to months when sturgeon migration is not occurring: apply measures to reduce turbidity and siltation.
Unit 6 - Apalachicola and Brothers Rivers in Florida					
USACE	FWS	Dredging and disposal	Major navigation project on Apalachicola-Chattahoochee-Flint (ACF) river systems involving hydraulic dredging and dredged material disposal.	1 formal[d]	Avoid dredging and disposal activities during spring staging, migration and spawning activities (dredging deferred until after May 15). Confer with FWS to reduce impact to staging/spawning locations if dredging occurs between March 15 and May 15. Modify dredging locations to avoid or minimize impact to spawning areas and gravel beds.
USACE	FWS	Maintenance of navigation channel	Routine operations and maintenance of navigation channel.	20 informal	Avoid dredging and disposal activities during spring staging, migration and spawning activities (dredging deferred until after May 15). Confer with FWS to reduce impact to staging/spawning locations if dredging occurs between March 15 and May 15. Modify dredging locations to avoid or minimize impact to spawning areas, resting areas, and gravel beds.

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Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
USACE	FWS	Expand within-bank disposal area	Expand existing site or designate new site for disposal of dredged sediment.	1 informal	Avoid disposal activities during spring staging, migration and spawning activities (dredging deferred until after May 15). Confer with FWS to reduce impact to staging/spawning locations if dredging occurs between March 15 and May 15. Modify disposal locations to avoid or minimize impact to spawning areas, staging areas, and resting areas.
USACE	FWS	Water allocation formula	Changes in river flow regime to implement ACF water allocation formula.	1 formal	Provide for minimum flows during spring spawning periods; provide for minimum flows during periods when sturgeon are in thermal refuge/resting areas; assure that fluctuations in flow will not prevent access to spawning areas or adherence of eggs to substrate; assure that release patterns do not significantly change temperature regime in spawning and resting areas during spawning and resting times.
USACE	FWS	Water control plans	Updates and revisions to water control plans for reservoirs.	1 informal, 4 formal (5 total)	Provide for minimum flows during spring spawning periods; provide for minimum flows during periods when sturgeon are in thermal refuge/resting areas; assure that fluctuations in flow will not prevent access to spawning areas or adherence of eggs to substrate; assure that release patterns do not significantly change temperature regime in spawning and resting areas during spawning and resting times.

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Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
USACE	FWS	Maintenance of Jim Woodruff Dam	Routine dam maintenance activities.	2 informal	Schedule work in Jim Woodruff Dam tailwater below the dam between November 1 and March 15; assure that spawning habitat below dam is not altered.
USACE	FWS	Special releases from Jim Woodruff Dam	Increased release of water to the river to facilitate barge traffic.	1 informal, 2 formal (3 total)	Schedule work in Jim Woodruff Dam tailwater below the dam between November 1 and March 15; if releases occur during this time, provide for minimum flows to assure inundation of spawning habitat and thermal refuge/resting areas; assure that fluctuations in flow will not prevent access to spawning areas or adherence of eggs to substrate; assure that release patterns do not significantly change temperature regime in spawning and resting areas during spawning and resting times.
USACE	FWS	Spot dredging to correct cross-current below Jim Woodruff Dam	Removal of gravel bar that is an obstacle to barge traffic.	1 formal	Schedule work in Jim Woodruff Dam tailwater below the dam between November 1 and March 15; assure that spawning habitat below dam is not altered.

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Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
USACE	FWS	Modified dam release pattern	Changes in release pattern to accommodate hydropower generation schedules.	1 formal	Provide for minimum flows during spring spawning periods; provide for minimum flows during periods when sturgeon are in thermal refuge/resting areas; assure that fluctuations in flow will not prevent access to spawning areas or adherence of eggs to substrate; assure that release patterns do not significantly change temperature regime in spawning and resting areas during spawning and resting times.
USACE	FWS	Fish passage modifications to Jim Woodruff Dam	Investigation of possibilities for fish passage, including modifying lock structure or operations, or construction of a bypass.	1 informal	Schedule work in Jim Woodruff Dam tailwater below the dam between November 1 and March 15; assure that spawning habitat below dam is not altered.
USACE	FWS	Slough restoration	Dragline removal of sand and snags to restore access by fish to spring areas.	10 informal	Time slough/spring restoration to avoid work when sturgeon are using areas for thermal refuge; avoid material disposal/placement that restricts access to thermal refuges; assure opening of areas for other fish access does not alter temperature regime in thermal refuges.
USACE	FWS	Site rejuvenation	Removal of sand within disposal area by conveyor or dragline dredge; construction of new containment dikes onshore; construction of bank protection.	3 informal	Mobilize and stage equipment such that sturgeon movements are not interrupted during spring and fall migrations.

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
USACE	FWS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities.	10 informal, 2 formal (12 total)	Modifications unlikely.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	8 informal	n/a
FHWA	FWS	Bridge construction	Bridge construction and replacement projects.	2 formal	Limit construction to months when sturgeon migration is not occurring: apply measures to reduce turbidity and siltation.
Unit 7 - Suwannee and Withlacoochee River in Florida					
USACE	FWS	Dredging and disposal	One small dredging project near the mouth of the Suwannee River. Not well-maintained because no good disposal areas.	1 informal	n/a
USACE	FWS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities.	40 informal	Modifications unlikely.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	20 informal	n/a
FHWA	FWS	Bridge construction	Construction of small bridge on the Withlacoochie River at the border of Florida and Georgia. Located upstream of critical habitat.	1 formal	Adopt time windows, use silt curtains, use bubble curtains and scare charges when detonating explosives, monitor turbidity.

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Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 8 - Lake Ponchartrain (east of causeway), Lake Catherine, Little Lake, the Rigolets, Lake Borgne, Pascagoula Bay and Mississippi Sound Systems in Louisiana and Mississippi					
USACE	FWS	Dredging and disposal	Authorized projects include maintenance of Gulf Intercoastal Waterway (GIWW) across Lake Borgne and Mississippi Sound. Federal navigation authorized for Bayou Cadet, Pass Christian, Gulfport Harbor, Biloxi Harbor, and Pascagoula Harbor in Mississippi. Disposal of dredged material at ocean disposal sites at Gulfport (two sites) and Pascagoula (one site south of Horn Island).	12 formal[d]	Minimize extent of dredging and disposal; adapt disposal areas; fund research studies.
USACE	NMFS	Wetland habitat creation	Restoring coastal habitat via placement of dredged material at Deer Island (Biloxi), Belle Fontaine, and other sites.	10 formal	Minimize extent of disposal; adapt disposal areas; fund research studies.
USACE	NMFS	Erosion control	Projects funded under the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA - Breaux Bill) around Lake Borgne will involve using bargeloads of rock to prevent erosion of the lakeshore.	4 informal	Sequence work to minimize impacts to sturgeon migrations.
USACE	NMFS	Clearing and snagging	Clearing of debris from Bayou Lacombe.	1 informal	Minimize impact to benthos.
USACE	NMFS	Regulated modifications of surface water bodies	Issuance of permits for marine construction, oil and gas pipelines, pumping stations, oyster harvesting, and private dredging.	50 informal	Minimize impact to benthos.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	64 informal	n/a

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
FHWA	FWS	Bridge construction	Highway 90 bridge replacement in Rigolets Pass and Highway 11 bridge replacement over Lake Ponchartrain.	2 formal	Adopt time windows, use silt curtains, use bubble curtains and scare charges when detonating explosives, monitor turbidity.
MMS	NMFS	Oil and gas leases and related projects	Lease sales of offshore oil and gas exploration blocks to private companies in Central and Eastern Planning Areas; environmental assessments of waste disposal facilities, explosives removal, and other projects; reinitiation of consultation in Eastern and Central Planning Areas.	10 formal; 3 informal; 5 formal reinitiations	Include sturgeon impacts in oil and hazardous spill contingency plan. Fund one additional study.
Unit 9 - Pensacola Bay System in Florida					
USACE	NMFS	Dredging and disposal	Authorized projects include Pensacola Harbor Dredged Material Management Plan recertification and U.S. Navy permit for dredging. Also maintenance activities on GIWW, Bayou Chico, and Bayou Texar. Disposal of sediment may include beach placement, ocean disposal, and littoral zone disposal.	4 formal[d]	Minimize extent of dredging and disposal; adapt disposal areas; fund research studies.
USACE	NMFS	Wetland habitat creation	Restoring coastal habitat via placement of dredged material.	6 formal	Minimize extent of disposal; adapt disposal areas.
USACE	NMFS	Modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities, shoreline stabilization, reefs, and aquaculture.	50 informal	Minimize impact to benthos.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	16 informal	n/a

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
DOD	NMFS	Pensacola NAS	Natural resources management, including exotic plant species control, beach nourishment, establishment of shoreline vegetation, and revision of INRMP.	4 formal	Minimize impact to benthos.
FHWA	FWS	Bridge construction	Bridge construction and replacement projects.	2 formal	Apply measures to reduce turbidity and siltation.
Unit 10 - Santa Rosa Sound in Florida					
USACE	NMFS	Dredging and disposal	Recertification of maintenance on the GIWW.	1 formal[d]	Minimize extent of dredging and disposal; adapt disposal areas; fund research studies.
USACE	NMFS	Wetland/ habitat creation	Restoring coastal habitat via placement of dredged material (beneficial reuse).	6 formal	Adapt disposal sites; minimize impact to benthos.
USACE	NMFS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities, shoreline stabilization, reefs, and aquaculture.	200 informal	Modifications unlikely.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	12 informal	n/a

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 11 - Near shore Gulf of Mexico in Florida					
USACE	NMFS	Dredging and disposal	Maintenance of Pensacola Naval channel, dredged material management for Port St. Joe, recertification of navigation channels at East Pass at Destin and Panama City Harbor (St. Andrew Bay) using hydraulic pipeline dredge. Disposal of dredged sediment at downdrift beaches, and offshore ocean disposal at Pensacola and estuarine/littoral disposal at Perdido Key, St. Andrew State Park, St. Joe spit.	3 formal, 1 informal (4 total)[d]	Minimize extent of dredging and disposal; adapt disposal areas; fund research studies. Past modifications were time constraints on dredge operation and funding a fish monitoring study at East Pass, at a cost of approximately $25,000.
USACE	NMFS	Beach nourishment	Renourishment of Panama City and other beaches.	1 formal; 4 informal (5 total)	Reduce project scope and periodicity; minimize extent of disposal activity.
USACE	NMFS	Jetty rehabilitation	Rehabilitation for St. Andrew Bay/Panama City Harbor Project.	1 formal	Minimize impact to benthos; adapt disposal areas.
USACE	NMFS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including piers, beach nourishment, and artificial reefs.	20 informal	Minimize impact to benthos.
EPA	NMFS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	NMFS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	16 informal	n/a
DOD	NMFS	Tyndall AFB	Revision of Tyndall AFB's Integrated Natural Resources Management Plan.	1 informal	n/a
DOD	NMFS	Eglin AFB	Navy testing and training mission activities, including detonation of explosives.	20 formal	Sponsor sturgeon distribution and foraging studies in Choctawhatchee Bay, Santa Rosa Sound, and the Yellow River.

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 12 - Choctawhatchee Bay in Florida					
USACE	NMFS	Dredging and disposal	Maintenance of GIWW, hydraulic pipeline dredging of East Pass at Destin and LaGrange Bayou. East Pass and GIWW projects discussed under previous units. Resumption of maintenance dredging at La Grange Bayou is likely.	3 formal[d]	Minimize extent of dredging and disposal; adapt disposal areas; fund research studies.
USACE	NMFS	Wetland habitat creation	Restore coastal habitat.	4 formal	Minimize extent of disposal activity; adapt disposal sites; minimize impact to benthos.
USACE	NMFS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities, shoreline stabilization, reefs, and aquaculture.	225 informal	Minimize impact to benthos.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	4 informal	n/a

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
Unit 13 - Apalachicola Bay in Florida					
USACE	NMFS	Dredging and disposal	Shallow draft navigation projects including GIWW, Two-Mile, East Point, Carrabelle, Sikes (St. George Island) Cut, and Scipio Creek. Both hydraulic pipeline and mechanical dredging. Projects may involve upland, open water, and estuarine/littoral disposal of dredged sediment.	6 formal[d]	Minimize extent of dredging and disposal; adapt disposal areas; fund research studies.
USACE	NMFS	Wetland habitat creation	Restoring coastal habitat.	4 formal	Adapt disposal areas; minimize impact to benthos.
USACE	NMFS	Regulated modifications of surface water bodies	Issuance of permits for structures located in bodies of water, including docks and boat launch facilities, shoreline stabilization, reefs, and aquaculture.	40 informal	Minimize impact to benthos.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act.	5 informal	n/a
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies.	4 informal	n/a
Unit 14 - Suwannee Sound in Florida					
USACE	NMFS	Dredging and disposal	No new dredging projects or maintenance of existing navigation channels is anticipated	n/a	n/a
USACE	NMFS	Regulated modifications of surface water bodies	Issuance of permits for structure located in bodies of water, including docks and boat launch facilities, shoreline stabilization, reefs, and aquaculture.	2 informal	Minimize impact to benthos.
EPA	FWS	Impaired water body listings	Listing of impaired water bodies under section 303 (d) of the Clean Water Act	5 informal	n/a

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
EPA	FWS	TMDLs	Noncompliances with water quality standards on impaired water bodies	16 informal	n/a
Consultations Affecting Multiple Units					
USACE	FWS and NMFS	Programmatic consultation on dredging and disposal [e]	Programmatic consultations on O&M navigation project activities (e.g., dredging and disposal) between FWS (Panama City, FL; Daphne, AL; and Jackson, MS) and USACE, Mobile District. Potentially affected units: Units 2-6, 8-13.	3 formal	Minimize extent of dredging and disposal; adapt disposal areas; fund research studies.
USACE	NMFS	Region-wide hopper dredging	Reinitiation of programmatic consultation on hopper dredging covering all four USACE districts in the Gulf of Mexico. Potentially affected units: Units 8-14.	1 reinitiated programmatic	Unknown.
DOD	FWS and NMFS	Eglin AFB	Revision of Eglin AFB's Integrated Natural Resources Management Plan. Potentially affected units: Units 4, 9-12.	2 formal	n/a
EPA	FWS	Review of state water quality standards	Triennial review of water quality standards delegated to Alabama under section section 303 (c) of the Clean Water Act. Alabama consultations are historically more complex than other states and are expected to be formal. Potentially affected units: Units 4, 5, 8.	3 formal	n/a
EPA	FWS	Review of state water quality standards	Triennial review of water quality standards delegated to Florida under section section 303 (c) of the Clean Water Act. Potentially affected units: Units 4-7, 9-14.	3 informal	n/a

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
EPA	FWS	Review of state water quality standards	Triennial review of water quality standards delegated to Louisiana under section section 303 (c) of the Clean Water Act. Potentially affected units: Units 1, 8.	3 informal	n/a
EPA	FWS	Review of state water quality standards	Triennial review of water quality standards delegated to Mississippi under section section 303 (c) of the Clean Water Act. Potentially affected units: Units 1, 2, 8.	3 informal	n/a
EPA	FWS	National water quality criteria	Programmatic consultation on national water quality criteria, which provide basis for State standards. Potentially affected units: All.	1 formal	n/a
NMFS - Office of Sustainable Fisheries	NMFS	Fishery management plans	Developing and amending Fishery Management Plans (FMPs). Reinitiation of FMP for Gulf of Mexico shrimp fishery. Potentially affected units: Units 8-14.	2 formal; 10 informal; 1 formal reinitiation	n/a
FERC	NMFS	Interstate pipelines	Interstate oil and gas pipeline construction and related structures covered by blanket approval certificates. Potentially affected units: All.	20 informal	Use best management practices, change route of pipeline.

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ACTIVITIES LEADING TO SECTION 7 CONSULTATION ON THE GULF STURGEON

Action Agency	Consulting Service[a]	Activity	Activity Description	Number of Consultations (Ten Years)[b]	Potential Project Modification[c]
FEMA	FWS	Emergency response	Emergency cleanup activities, such as beach nourishment and debris removal. Potentially affected units: All.	2 informal	n/a

n/a = No consultations/modifications anticipated.

[a] We determine which Service will consult based on the jurisdictional responsibilities described in the proposed rule designating critical habitat. The Services propose that the FWS will be responsible for all consultations in riverine habitat and that NMFS will be responsible for all consultations in marine habitat. In estuarine units, the Services propose to divide responsibility based on the Action agency involved.

[b] For private projects regulated by the USACE, we project the number of permits based on the past record of permit applications received in each unit and the past proportion of total permits that were individual permits, standard permits, and letters of permission (LOPs). Based on the past permit history across units, approximately 20 percent of total permits are likely to lead to consultation. Permit data provided by Army Corps of Engineers, New Orleans District, May 28, 2002; Vicksburg District, May 31, 2002; Mobile District, June 21, 2002; and Jacksonville District, June 3 and 13, 2002.

[c] Potential project modifications indicate the range of modifications that could possibly occur on future projects. Due to the uncertainty regarding which specific modifications will be implemented, they are not intended to represent the future modifications and conservation recommendations associated with specific projects. Rather, they represent the range of potential modifications that tend to be associated with various activity types.

[d] Predicted consultations on dredging projects are based on a without-programmatic consultation scenario, in which USACE and the Services have not developed programmatic consultations on O&M navigation projects to streamline the consultation process. In a with-programmatic scenario, informal rather than formal consultations are predicted for these projects.

[e] These programmatic consultations are only predicted for the with-programmatic scenario. If it is developed, many of the consultations noted in footnote d are likely to be informal, rather than formal.

Sources: As cited by activity in Section 3. Personal communications with USACE, Jacksonville, Mobile, New Orleans, and Vicksburg Districts; MMS; EPA; AL DOT, FL DOT; FERC, Atlanta and Washington offices; FEMA; Eglin AFB; Tyndall AFB; Pensacola Naval Air Station; Coast Guard; Forest Service; USFWS; and NOAA Fisheries. Information on future bridge projects in Mississippi and western Florida based on Florida Department of Transportation Statewide Transportation Improvement Program (STIP): FY 2/03-06/07, http://www11.myflorida.com/financialplanning/stip.htm, accessed November 13, 2002; and Mississippi Department of Transportation Statewide Transportation Improvement Program (STIP): FY 2001-03, http://www.mdot.state.ms.us/business/stip/default.htm, accessed November 13, 2002.

APPENDIX C

POTENTIAL IMPACTS ON SMALL ENTITIES

1. Under the Regulatory Flexibility Act (as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever a Federal agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).[1] However, no regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.[2] SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. Accordingly, the following represents a screening level analysis of the potential effects of critical habitat designation on small entities to assist the Secretary in making this certification.

2. This analysis determines whether this critical habitat designation potentially affects a "substantial number" of small entities in counties supporting critical habitat areas. It also quantifies the probable number of small businesses likely to experience a "significant effect." While SBREFA does not explicitly define either "substantial number" or "significant effect,"[3] the Environmental Protection Agency and other Federal agencies have interpreted these terms to represent an impact on 20 percent or more of the small entities in any industry and an effect equal or greater than three percent or more of a business' annual revenues.[4] In both tests, this analysis examines the total estimated section 7 costs calculated in earlier sections of this report, including those impacts that may be "attributable co-extensively" with the listing of the species. This results in a conservative estimate (i.e., more likely to

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[1] Small businesses are defined by the Small Business Administration, most commonly in terms of the number of employees or annual receipts. A small organization is "any not-for-profit enterprise...which is independently owned and operated and is not dominant in its field." A small government is the government of a city, county, town, school district, or special district with a population of less than 50,000, not including tribal governments. Regulatory Flexibility Act, 5 U.S.C. 601 et. seq.

[2] Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for "significant impact" **and** a threshold for a "substantial number of small entities." See 5 U.S.C. 605 (b).

[3] Regulatory Flexibility Act, 5 U.S.C. 601 et. seq.

[4] See U.S. Environmental Protection Agency, *Revised Interim Guidance for EPA Rulewriters: Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act*, March 29, 1999.

overstate impacts than understate them), because it utilizes the upper bound impact estimate from the earlier analysis.

Identifying Activities That May Involve Small Entities

3. Section 3 of this report identifies activities that are within, or will otherwise be affected by, section 7 of the Act for the sturgeon. Exhibit C-1 presents the land and water use activities that were identified as being potentially impacted by section 7 implementation for the sturgeon under the "with section 7" scenario.

4. Of the projects that are potentially affected by section 7 implementation for the sturgeon, several occur exclusively on Federal lands *and* do not have third party involvement (i.e., only the Action agency and the Services are expected to be involved). Thus, small entities should not be affected by section 7 implementation for affected projects with the following agencies:

- Fish and Wildlife Service (activities associated with NWRs);
- Department of Defense (AFB, Space Center activities); and
- Forest Service (no consultations anticipated).

5. Of the projects that are potentially affected by section 7 implementation for the sturgeon that do not occur on exclusively on Federal lands, many are expected to involve no project modifications, or very minor ones (e.g., silt fencing during construction). The greatest share of the costs associated with the consultation process stem from project modifications (as opposed to the consultation itself). Indeed, costs associated with the consultation itself are relatively minor, with third party costs estimated to range from $1,200 to $4,100 per consultation.[5] Therefore, small entities are unlikely to be significantly affected by consultations that do not involve costly project modifications. Thus, this analysis indicates that small businesses involved in consultations with the following Action agencies should not be significantly affected as a result of section 7 implementation:[6]

- Minerals Management Service;
- Environmental Protection Agency;
- Federal Emergency Management Agency;
- Coast Guard;
- National Marine Fisheries Service; and

[5] This analysis assumes that Action agencies will bear the cost of preparing a Biological Assessment for activities affected by the sturgeon critical habitat.

[6] Potential regional impacts from these actions are discussed in Section 3.4 of this report, and are summarized in following paragraphs.

- U.S. Army Corps of Engineers (clearing and snagging projects, and regulated modifications to surface water bodies, such as dock construction and permitting of pipeline construction and maintenance projects).

Exhibit C-1

ESTIMATED NUMBER OF FUTURE SECTION 7 CONSULTATIONS ON THE GULF STURGEON BY ACTIVITY (TEN YEARS)

Federal Nexus/Activity	Potentially affected activities	Informal Consultations	Formal Consultations
U.S. Army Corps of Engineers - O&M Navigation Projects	Dredging and sediment disposal.	23	37
U.S. Army Corps of Engineers - Other Operations Projects	Beach nourishment, flood control/bank stabilization, clearing and snagging, reservoir operations.	53	49
U.S. Army Corps of Engineers - Regulated Projects	Construction in water bodies (e.g., docks and piers), private dredging projects, shoreline stabilization, aquaculture, and permitting of oil and gas pipelines.	787	11
Coast Guard	Aids to navigation, bridge administration, dredging.	Included with USACE/FHWA consultations	Included with USACE/FHWA consultations
Department of Defense	Eglin and Tyndall Air Force Bases, Stennis Space Center, Pensacola Naval Air Station.	51	26
Environmental Protection Agency	Triennial review of state water quality standards, listings of impaired water bodies, and TMDLs.	359	4
Federal Emergency Management Agency	Emergency response projects.	2	0
Federal Energy Regulatory Commission	Relicensing of hydroelectric projects, permitting of interstate oil and gas pipelines.	21	0
Federal Highway Administration/Department of Transportation	Funding of road and bridge construction, removal, and maintenance.	5	17
Fish and Wildlife Service	Management of National Wildlife Refuges.	Minimally impacted	Minimally impacted
Forest Service	Forest land ownership and management.	None	None
Minerals Management Service	Oil and gas leases in Federal waters	3	15
NOAA-National Marine Fisheries Service	Fisheries management.	10	3
Total [a]		**1,314**	**162**

[a] Total does not include potential programmatic consultations on O&M navigation project activities. Total number of consultations is likely to be lower if the programmatic consultations are implemented.

6. After excluding the two sets of Action agencies and consultations noted above from the total universe of impacts identified in the body of the analysis, the following Action agencies and consultations remain. This subset represents the group of Action agencies and consultations that *may* produce significant impacts on small entities. Specifically, these actions feature activities that do *not* occur exclusively on Federal lands and may involve relatively costly project modifications:

- U.S. Army Corps of Engineers (O&M navigation project projects);
- Federal Highway Administration (bridge projects); and
- Federal Energy Regulatory Commission (interstate oil and gas pipeline projects).

Description of Affected Small Entities

7. This section describes the industries most likely to be directly affected by section 7 implementation for the sturgeon. Federal courts and Congress have indicated that an RFA/SBREFA analysis should be limited to direct and indirect impacts on entities subject to the requirements of the regulation. As such, entities indirectly impacted by the sturgeon listing and critical habitat and, therefore, not directly regulated by the listing or critical habitat designation are not considered in this section of the analysis.[7] More information about affected projects can be found in Sections 3 and 4 and in Appendix B of this report.

- ***U.S. Army Corps of Engineers (O&M navigation projects).*** As detailed in Exhibit 4-5, USACE consultations on navigation projects could lead to project modifications such as minimizing the extent of dredging and disposal areas to reduce impacts on the benthos and funding research and monitoring studies. If they occur, most of these modification costs are likely to be borne by the Action agency (i.e., USACE) directly, though some may involve small contractors who own the dredges, or who otherwise carry out dredging activities. Estimating the costs on a per entity basis is difficult, particularly because many costs associated with project modifications are anticipated to be "through costs," i.e., any increase in costs to private contractors will be passed on to the Federal government, who will ultimately bear most of the costs of these modifications. The SBA set the size standards for businesses involved in "dredging and surface cleanup activities" at $17.0 million in average annual receipts (also referred to as sales or revenues).[8] There are approximately 816 heavy

[7] American Trucking Associations vs. U.S. Environmental Protection Agency, 175 F.3d 1027, 1045 (D.C. Cir. 1999); Mid-Tex Electric Cooperative vs. Federal Energy Regulatory Commission, 88 F.3d 1104, 1170 (D.C. Cir. 1996).

[8] "Heavy construction, NEC"; and "Heavy construction equipment rental" are identified by SIC codes #1629 and 7353. U.S. Small Business Administration, "Table of Small Business Size Standards," accessed at http://www.sba.gov/size/indextableofsize.html on June 26, 2002.

construction operators within the fifty counties included in sturgeon critical habitat areas, of which 767 are identified as small.[9]

- ***Federal Highway Administration bridge projects.*** As described in Exhibit 4-5, FHWA consultations on bridge projects could lead to project modifications that include providing silt curtains during construction. As with dredging projects, this analysis anticipates that most costs associated with project modification compliance will either be borne directly by or passed on to the Federal government, which therefore will ultimately bear most of the costs of these modifications. The SBA set the size standards for "highway and street construction" and "bridge, tunnel, and elevated highway construction" contractors at $28.5 million in average annual receipts.[10] There are approximately 490 heavy construction operators of these types within the fifty counties included in sturgeon critical habitat areas, of which 454 are identified as small.[11]

- ***Federal Energy Regulatory Commission pipeline projects***. As described in Exhibit 4-5, FERC consultations could lead to project modifications that include pipeline construction management measures, such as altering the project design and implementing best management practices. As with O&M navigation projects, this analysis anticipates that most costs associated with project modification compliance will either be borne directly by or passed on to the Federal government, which therefore will ultimately bear most of the costs of these modifications. The SBA set the size standards for construction operators involved with "water, sewer, pipeline, and communications and power line construction"at $28.5 million in average annual receipts.[12] There are approximately 454 of these contractors operating within the fifty counties included in sturgeon critical habitat areas, of which 365 are identified as small.[13]

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[9] Dun and Bradstreet provide national data on existing facilities by SIC code. Duns Market Identifiers, File 516: Dun and Bradstreet, May 2002.

[10] "Highway and street construction" and "bridge, tunnel, and elevated highway construction" are identified by SIC codes #1611 and 1622. U.S. Small Business Administration, "Table of Small Business Size Standards," accessed at http://www.sba.gov/size/indextableofsize.html on June 26, 2002.

[11] Duns Market Identifiers, File 516: Dun and Bradstreet, May 2002.

[12] "Water, sewer, and utility lines" construction and maintenance activities are identified by SIC codes #1623. U.S. Small Business Administration, "Table of Small Business Size Standards," accessed at http://www.sba.gov/size/indextableofsize.html on June 26, 2002.

[13] Duns Market Identifiers, File 516: Dun and Bradstreet, May 2002.

4.6.1 Estimated Number of Small Businesses Affected: The "Substantial Number" Test

8. To be conservative (i.e., more likely to overstate impacts than understate them), this analysis assumes that a unique entity will undertake each of the projected consultations in a given year, and so the number of businesses affected is equal to the total annual number of consultations (both formal and informal).[14] This analysis also limits the universe of potentially affected entities to include only those within the fifty counties in which critical habitat units lie; this interpretation produces far more conservative results than including all entities nationwide.

9. First, the *number* of small businesses affected is estimated. As shown in Exhibit C-2, the following calculations yield this estimate:[15]

- Estimate the number of businesses within the study area affected by section 7 implementation annually (assumed to be equal to the number of annual consultations);
- Calculate the *percent* of businesses in the affected industry that are likely to be small;
- Calculate the *number* of affected small businesses in the affected industry;
- Calculate the *percent* of small businesses likely to be affected by critical habitat.

[14] While it is possible that the same business could consult with the Services more than once, it is unlikely to do so during the one-year time frame addressed in this analysis. However, should such multiple consultations occur, they would concentrate effects of the designation on fewer entities. In such a case, the approach outlined here likely would overstate the number of affected businesses.

[15] Note that because these values represent the probability that small businesses will be affected during a one-year time period, calculations may result in fractions of businesses. This is an acceptable result, as these values represent the probability that small businesses will be affected by section 7 implementation of the Act.

Exhibit C-2

ESTIMATED ANNUAL NUMBER OF SMALL BUSINESSES AFFECTED BY CRITICAL HABITAT DESIGNATION: THE "SUBSTANTIAL NUMBER" TEST

Industry Name		**Heavy construction: Dredging SIC 1629, 7353**	**Heavy construction: Bridges SIC 1611, 1622**	**Pipeline construction SIC 1623**
Annual number of affected businesses in industry (Equal to number of annual consultations, from Exhibit C-1)	By formal consultation	3.7	1.7	0
	By informal consultation	2.3	0.5	2.1
Total number of *all* businesses in industry within study area		816	490	365
Number of *small* businesses in industry within study area		767	454	310
Percent of businesses that are small (Number of small businesses)/(Total Number of businesses)		94%	93%	85%
Annual number of small businesses affected (Number affected businesses)*(Percent of small businesses)		5.6	2.0	1.8
Annual percentage of small businesses affected (Number of small businesses affected)/(Total number of small businesses); >20 percent is substantial		0.7%	0.5%	0.6%

10. This calculation reflects conservative assumptions and nonetheless yields an estimate that is still far less than the 20 percent threshold that would be considered "substantial." As a result, this analysis concludes that a significant economic impact on a substantial number of small entities will not result from the designation of critical habitat for the sturgeon. Nevertheless, an estimate of the number of small businesses that will experience effects at a significant level is provided below.

Estimated Effects on Small Businesses: The "Significant Effect" Test

11. Costs of critical habitat designation to small businesses consist primarily of the cost of participating in section 7 consultations and the cost of project modifications. To calculate the likelihood that a small business will experience a significant effect from critical habitat designation for the sturgeon, the following calculations were made:

- Calculate the per-business cost. This consists of the unit cost to a third party of participating in a section 7 consultation (formal or informal) and the unit cost of associated project modifications. *To be conservative, this analysis uses the high-end estimate for each cost.*

- Determine the amount of annual sales that a company would need to have for this per-business cost to constitute a "significant effect." This is calculated by dividing the per-business cost by the three percent "significance" threshold value.

- Estimate the likelihood that small businesses in the study area will have annual sales equal to or less than the threshold amount calculated above. This is estimated using national statistics on the distribution of sales within industries.[16]

- Based on the probability that a single business may experience significant effects, calculate the expected value of the number of businesses likely to experience a significant effect.

- Calculate the percent of businesses in the study area within the affected industry that are likely to be affected significantly.

12. Calculations for costs associated with section 7 implementation for the sturgeon are provided in Exhibit C-3 below.

13. Because the costs associated with section 7 implementation for the sturgeon are likely to be significant for six or fewer small businesses per year in the affected industries in the study area, this analysis concludes that a significant economic impact on a substantial number of small entities will not result from the designation of critical habitat for the sturgeon. This would be true even if all of the effects of section 7 consultation on these activities were attributed solely to the critical habitat designation.

[16] This probability is calculated based on national industry statistics obtained from the Robert Morris Associated *Annual Statement of Studies: 2001-2002* and from comparison with the SBA definitions of small businesses.

Exhibit C-3

ESTIMATED ANNUAL EFFECTS ON SMALL BUSINESSES: THE "SIGNIFICANT EFFECT" TEST

Industry Name		**Heavy construction: Dredging SIC 1629, 7353**	**Heavy construction: Bridges SIC 1611, 1622**	**Pipeline construction SIC 1623**
Annual Number of Small Businesses Affected (from Exhibit C-1)	By formal consultation	3.7	1.7	0
	By informal consultation	2.3	0.5	2.1
Per-Business Cost[a]		$1,500,000	$220,000	$50,000
Level of Annual Sales Below which Effects Would Be Significant (Per-Business Cost / 3%)		$51 million	$7.3 million	$1.7 million
Probability that Per-Business Cost is Greater than 3% of Sales for Small Business[17]		100%	100%	100%
Probable Annual Number of Small Businesses Experiencing Significant Effects (Number Small Businesses)* (Probability of Significant Effect)		6.0	2.2	2.1
Total Annual Percentage of Small Businesses Bearing Significant Costs in Industry		0.8%	0.5%	0.7%

[a] See Exhibit 4-5.

[17] This probability is calculated based on national industry statistics obtained from the *RMA Annual Statement Studies: 2001-2002*, which provides data on the distribution of annual sales in an industry within the following ranges: $0-1 million, $1-3 million, $3-5 million, $5-10, $10-25 million, and $25+ million. This analysis uses the ranges that fall within the SBA definition of small businesses (i.e., for industries in which small businesses have sales of less than $5.0 million, it uses $0-1 million, $1-3 million, and $3-5 million) to estimate a distribution of sales for small businesses. It then calculates the probability that small businesses have sales below the threshold value using the following components: (1) all small businesses (expressed as a percentage of all small businesses) in ranges whose upper limits fall below the threshold value experience the costs as significant; (2) for the range in which the threshold value falls, the percentage of companies in the bin that fall below the threshold value is calculated as [(threshold value - range minimum)/(bin maximum - range minimum)] x percent of small businesses captured in range. This percentage is added to the percentage of small businesses captured in each of the lower ranges to reach the total probability that small businesses have sales below the threshold value. Note that in instances in which the threshold value exceeds the definition of small businesses (i.e., the threshold value is $10 million and the definition of small businesses is sales less than $5.0 million), all small businesses experience the effects as significant.