

## MEMORANDUM | July 13, 2020

**TO** U.S. Fish and Wildlife Service (Service)  
**FROM** Industrial Economics, Incorporated (IEc)  
**SUBJECT** Draft Screening Analysis of the Likely Economic Impacts of the Proposed Rule to Designate Critical Habitat for the Pearl Darter

---

The Service intends to publish a proposed rule to designate critical habitat for the pearl darter (*Percina aurora*). As part of the rulemaking process, the Service must consider the economic impacts, including costs and benefits, of the proposed rule in the context of three separate requirements:<sup>1</sup>

- **Executive Order (E.O.) 12866 Regulatory Planning and Review**, which directs Agencies to assess the costs and benefits of the regulatory action;<sup>2</sup>
- **Section 4(b)(2) of the Endangered Species Act (the Act)**, which requires the Secretary of the Interior to consider economic impacts prior to designating critical habitat; and
- **Regulatory Flexibility Act**, which requires Federal agencies to prepare and make available for public comment an initial regulatory flexibility analysis that describes the effect of a proposed rule on small entities. No initial regulatory flexibility analysis is required if the head of the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.<sup>3,4</sup>

This memorandum provides information to the Service on the potential costs and benefits of the proposed critical habitat designation to determine whether the rule meets the threshold for an economically significant rule.<sup>5</sup> This memorandum also identifies the geographic areas or specific activities that could experience the greatest impacts,

---

<sup>1</sup> Additional laws and executive orders require the consideration of the distribution of impacts on vulnerable subpopulations, such as state or local governments. These requirements for distributional analysis are beyond the scope of this memorandum.

<sup>2</sup> Published September 20, 1993. As affirmed by E.O. 13563 on January 18, 2011.

<sup>3</sup> 5 U.S.C. § 601 et seq.

<sup>4</sup> For a discussion of the Service's findings regarding the Regulatory Flexibility Act (RFA) and other relevant statutes, please refer to the preamble to the proposed rule published in the Federal Register.

<sup>5</sup> For the definition of "economically significant rule," please refer to section 3(f)(1) of E.O. 12866.

---

measured in terms of changes in social welfare, to inform the Secretary's decision under section 4(b)(2).<sup>6</sup>

To prepare this assessment, we rely on: (1) the draft proposed rule and associated geographic information systems (GIS) data layers; (2) the Service's incremental effects memorandum; (3) consultation history for the pearl darter and other species in watersheds surrounding the proposed units, compiled from the Service's Tracking And Integrated Logging System (TAILS) database; (4) previous biological opinions pertaining to the pearl darter; (5) outreach to Federal agencies conducted by the Service; and (6) other background information requested of the Service, identified throughout this memorandum.

---

<sup>6</sup> The discipline of welfare economics focuses on maximizing societal well-being (see Just et. al. 2005. *The Welfare Economics of Public Policy: A Practical Approach to Project and Policy Evaluation*. Edward Elgar Publishing, Cheltenham and Northampton). It measures costs and benefits in terms of the opportunity costs of employing resources for the conservation of the species and individual willingness to pay to conserve those species. Opportunity cost is the value of the benefit that could have been provided by devoting the resources to their best alternative uses. Opportunity costs differ from the measurement of accounting costs (e.g., actual expenses). Welfare economics is recognized by the U.S. Office of Management and Budget (OMB) as the appropriate tool for valuing the costs and benefits of proposed regulatory actions (OMB, "Circular A-4." September 17, 2003, available at [http://www.whitehouse.gov/omb/circulars\\_a004\\_a-4](http://www.whitehouse.gov/omb/circulars_a004_a-4)).

## FINDINGS OF THE SCREENING ANALYSIS

Critical habitat designation for the pearl darter is unlikely to generate costs exceeding \$100 million in a single year. Therefore, the rule is unlikely to meet the threshold for an economically significant rule, with regard to costs, under E.O. 12866.

### Section 7 Costs

The economic cost of implementing the rule through section 7 of the Act will most likely be limited to additional administrative effort to consider adverse modification of pearl darter habitat during section 7 consultations. This finding is based on the following:

- In Unit 1, which constitutes 94 percent of the proposed critical habitat area, the activities that may affect the critical habitat are already subject to section 7 consultation due to the presence of pearl darter. The Service has determined that the project modification recommendations made to avoid jeopardy to the pearl darter would also result in the avoidance of adverse modification. Thus, for projects and activities occurring in Unit 1, no additional project modification recommendations are likely to result from the proposed critical habitat rule and costs are limited to additional administrative effort.
- A relatively small fraction of the proposed critical habitat (6 percent), is in Unit 2, which is not currently occupied by the species. In these areas, activities that may affect the critical habitat for the pearl darter are also already subject to section 7 consultation due to the presence of other listed species with similar habitat requirements and designated critical habitat. Additionally, activities that may affect pearl darter critical habitat in Unit 2 generally implement project modification recommendations from a standardized set provided in the Mississippi Standard Local Operating Procedures for Endangered Species (SLOPES) agreement that are similar to recommendations established for overlapping species. Therefore, even absent critical habitat designation, these activities are likely to avoid adverse effects on the habitat.

Based on consultation history for the pearl darter as well other listed species in the watersheds adjacent to the proposed units, the number of future consultations, including technical assistances, is likely to be a high-end of 133 per year in Unit 1 and 55 per year in Unit 2. The additional administrative cost of addressing adverse modification in these consultations is likely to be less than \$710,000 in a given year.

### Other Costs

- The designation of critical habitat is not expected to trigger additional requirements under state or local regulations.
- As a riverine species, the pearl darter does not occur on private land, and the literature has not evaluated effects of riverine critical habitat on adjacent property values.

### Section 7 and Other Benefits

The primary intended benefit of the critical habitat designation is the biological benefit to the species of increased support for its conservation and recovery. As this economic screening analysis finds that the designation is not likely to result in additional or different project modifications, ancillary economic benefits are not anticipated.

### Distribution of Costs by Geography

Estimating the geographic distribution of section 7 costs is complicated by the geographic area included in the historical consultation data used in this analysis. While Unit 1 is significantly larger than Unit 2; the incremental costs per consultation or technical assistance unit in unoccupied Unit 2 are greater than the unit costs in occupied Unit 1.

### Distribution of Costs by Activity Type

Commercial or residential development activities are expected to result in the largest portion of consultations in the proposed units and therefore incur the highest costs.

SECTION 1. BACKGROUND<sup>7, 8, 9, 10</sup>

The pearl darter (*Percina aurora*) is a small percid fish of the subgenus *Cottogaster*. It is characterized by its blunt snout, horizontal mouth, large eyes situated high on the head, and a medial black caudal spot at the base of its caudal fin. The species is distinguished from the channel darter by its larger average body size, heaving pigmentation, high number of marginal spines on belly scales of breeding males, and fully scaled cheeks. The pearl darter ranges in size from 22 to 59 millimeters (mm) in length, with a majority of adults ranging from 30 to 41 mm long.

The species is historically known within the Pearl and Pascagoula River drainages in Louisiana and Mississippi, respectively. However, the current distribution of the pearl darter is limited to scattered sites within a 415-mile area of the Pascagoula drainage; the species is thought to be extirpated from the Pearl River drainage. The pearl darter occurs in low-gradient, coastal plain rivers and creeks consisting of a bottom substrate mixture of sand, silt, loose clay, gravel, organic material, and snags. Catch rates of the pearl darter at known occupied sites indicate that the species is rare, but the presence of different size classes suggests reproducing populations.

The main threats to this species include habitat destruction and degradation due to impoundments (e.g., dams); instability in channels; increased sedimentation from the removal of riparian vegetation and poor agriculture and silviculture practices; and non-point source pollution from stormwater, municipal discharges, and commercial and industrial development. Oil and gas development are also considered a threat to the species; a major oil refinery and subsequent components (e.g., pumping stations, gas lines) exist with the Pascagoula River drainage. Threats to the pearl darter are exacerbated by climate change, and the effects endured by the species are worsened by its small population numbers, localized distribution, and low genetic diversity.

In September 2017, pursuant to the Act, the Service listed the pearl darter as threatened. The Service now proposes critical habitat in two “units” for the species. These units contain physical or biological features (PBFs) the Service determines to be essential for the conservation of the pearl darter, including:

- Unobstructed stream and river channels, with connected sequences of channel runs and bends, and with pools and scour holes.

<sup>7</sup> U.S. Fish and Wildlife Service. (2017). Final Rule: Threatened Species Status for the Pearl Darter. *Federal Register* 82 (181) 43885. Available at: <https://www.govinfo.gov/content/pkg/FR-2017-09-20/pdf/2017-20069.pdf#page=1>

<sup>8</sup> U.S. Fish and Wildlife Service. Environmental Conservation Online System (ECOS). Pearl darter (*Percina aurora*). Available at: <https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E07A#lifeHistory>

<sup>9</sup> NatureServe Explorer. *Percina aurora* - Suttkus and Thompson, 1994. Available at: <http://explorer.natureserve.org/servlet/NatureServe?searchName=Percina%20aurora>

<sup>10</sup> U.S. Fish and Wildlife Service. (2020). “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Pearl Darter.” May 8, 2020 version.

- Stable stream and river channels, with bottom substrates of fine and coarse sand, gravel, bedrock, silt, clay, organic matter and woody debris.
- A natural flow regime necessary to maintain habitats and connectivity of stream and floodplain habitats.
- Water quality conditions necessary to maintain the species, including cool to warm water temperatures (17 – 30 C), high dissolved oxygen (5.8 – 9.3 ppm), slightly acid to basic pH (6.3 – 7.6), and low levels of pollutants and nutrients (not less than State criteria).
- The presence of a prey base of small aquatic macroinvertebrates, including midges, crustaceans, mayflies, caddisflies, and zooplankton.<sup>11</sup>

Proposed critical habitat for the pearl darter spans 517 miles (832 kilometers) of rivers and creek channels in Mississippi. As described in Exhibit 1, approximately 8.7 percent of the designated river and creek channels is adjacent to Federal lands, 14.7 percent to State lands, 0.1 to County lands, and 77.9 percent to private lands.<sup>12</sup> The Service proposes designating two units of critical habitat for the pearl darter:

- Unit 1 consists of 487 miles of connected river and stream channels within the Pascagoula River drainage that the Service has determined is occupied by the species. The riparian areas adjacent to the river and stream miles are 9.2 percent Federal land (managed by the U.S. Forest Service), 15.6 percent State land (7 miles of which are also shared with Federal entities, see Exhibit 1), and 76.6 percent private land (predominantly agricultural and silviculture lands with some conservation lands managed by The Nature Conservancy). Unit 1 overlaps with existing critical habitat for the Gulf sturgeon as well as watersheds occupied by listed species, including the Gulf sturgeon and yellow blotched map turtle.
- Unit 2 consists of 30 miles of the Strong River channel that the Service has determined is not presently occupied by the pearl darter. The riparian areas adjacent to the river miles are 1.3 percent County lands (Simpson County Park Commission) and 98.7 percent private land (predominantly agricultural and silviculture lands). Unit 2 overlaps with watersheds occupied by other listed species with similar habitat requirements, including the Gulf sturgeon and ringed map turtle. It also intersects with existing critical habitat for the Gulf sturgeon.

Exhibit 2 describes the full extent of proposed critical habitat for the pearl darter. The Appendix contains a more detailed map for each proposed unit.

---

<sup>11</sup> U.S. Fish and Wildlife Service. Draft proposed rule for the “Designation of Critical Habitat for Pearl Darter.” May 4, 2020 version.

<sup>12</sup> In Unit 1, 7 miles of proposed critical habitat is adjacent to land jointly owned by Federal and State entities. For this reason, these percentages do not sum to 100 percent. See Exhibit 1 for more details.

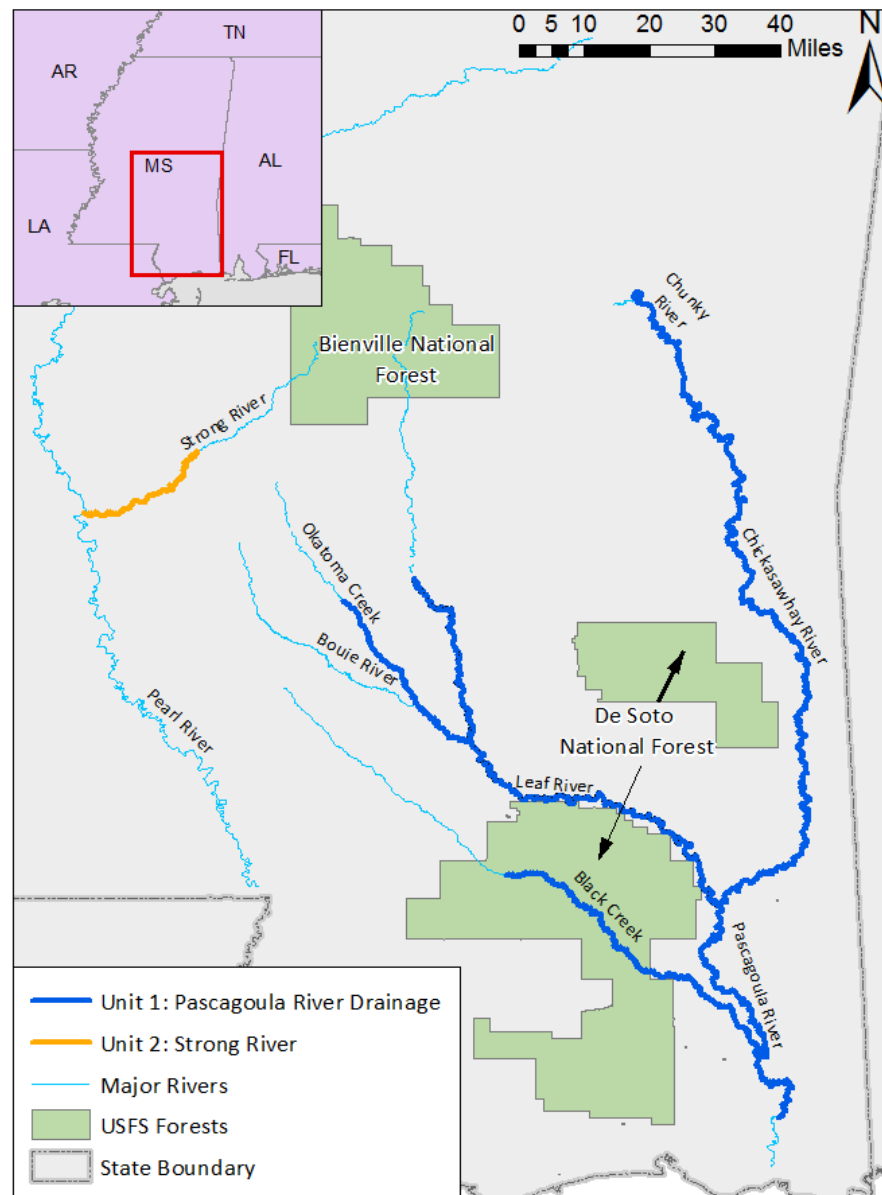
## EXHIBIT 1. SUMMARY OF PROPOSED CRITICAL HABITAT UNITS FOR THE PEARL DARTER

UNIT NUMBER	UNIT NAME	TOTAL SIZE (MILES)	PERCENT FEDERAL	PERCENT STATE	PERCENT COUNTY	PERCENT PRIVATE	OCCUPIED OR UNOCCUPIED	OVERLAPS WITH EXISTING CRITICAL HABITAT FOR OTHER AQUATIC OR RIPARIAN LISTED SPECIES
1	Pascagoula River Drainage	487	9.2%	15.6%		76.6%	Occupied	Yes
2	Strong River	30			1.3%	98.7%	Unoccupied	Yes
<b>Total</b>		<b>517</b>	<b>8.7%</b>	<b>14.7%</b>	<b>0.1%</b>	<b>77.9%</b>		

Note: In Unit 1, 7 miles of proposed critical habitat is shared among State and Federal landowners. For the purposes of this table, those 7 miles are considered under both the Federal and State columns. However, the “total size (miles)” column considers this area once.

Source: U.S. Fish and Wildlife Service. (2020). “Incremental Effect Memorandum for the Proposed Rule to Designate Critical Habitat for Pearl Darter.” May 8, 2020 version. Tables 1 and 2.

## EXHIBIT 2. OVERVIEW OF PROPOSED CRITICAL HABITAT FOR THE PEARL DARTER



Source: IEc map produced using (1) critical habitat shapefiles provided by the Service on May 21, 2020 and (2) national forest boundaries from the Forest Common Names geodatabase made available by the U.S. Forest Service (downloadable from <https://data.fs.usda.gov/geodata/edw/datasets.php>).

Notes: See Appendix for more detailed maps by unit, including overlap with existing critical habitat and area occupied by currently listed species with similar habitat requirements.

## SECTION 2. FRAMEWORK

Guidelines issued by the U.S. Office of Management and Budget (OMB) for the economic analysis of regulations direct Federal agencies to measure the costs and benefits of a regulatory action against a baseline (i.e., costs and benefits that are “incremental” to the baseline). OMB defines the baseline as the “best assessment of the way the world would look absent the proposed action.”<sup>13</sup> In other words, the baseline includes any existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users affected by the designation of critical habitat. The baseline includes the economic impacts of listing the species under the Act, even if the listing occurs concurrently with critical habitat designation. Impacts that are incremental to the baseline (i.e., occurring over and above existing constraints) are those that are solely attributable to the designation of critical habitat. This screening analysis focuses on the likely incremental effects of the critical habitat designation.

We consider incremental effects of the designation in two key categories: 1) those that may be generated by section 7 of the Act; and 2) other types of impacts outside of the context of section 7:

- **Incremental section 7 impacts:** Activities with a Federal nexus that may affect listed species are subject to section 7 consultation to consider whether actions may jeopardize the existence of the species, even absent critical habitat.<sup>14</sup> As part of these consultations, critical habitat triggers an additional analysis evaluating whether an action will diminish the recovery potential or conservation value of the designated area. Specifically, following the designation, Federal agencies must also consider the potential for activities to result in the destruction or adverse modification of critical habitat. These consultations are the regulatory mechanism through which critical habitat rules are implemented. Any time and effort spent on this additional analysis, as well as the costs and benefits of implementing any recommendations resulting from this review, are economic impacts of the critical habitat designation.
- **Other incremental impacts:** Critical habitat may also trigger additional regulatory changes. For example, in some cases, a critical habitat designation may cause other Federal, state, or local permitting or regulatory agencies to expand or change standards or requirements. Regulatory uncertainty generated by critical habitat may also have impacts. For example, landowners or buyers may perceive that a critical habitat rule will restrict land or water use activities in some way and therefore value the use of the land less than they would have absent critical habitat. This is a perceptual, or stigma, effect of critical habitat on markets.

---

<sup>13</sup> OMB, “Circular A-4,” September 17, 2003. Circular A-4 provides “guidance to Federal Agencies on the development of regulatory analysis as required under Section 6(a)(3)(c) of E.O. 12866...”, page 1.

<sup>14</sup> A Federal nexus exists for activities authorized, funded, or carried out by a Federal agency.



### SECTION 3. SECTION 7 COSTS OF THE CRITICAL HABITAT RULE

Section 7 of the Act requires Federal agencies to consult with the Service to ensure that their actions will not jeopardize the pearl darter regardless of whether critical habitat is designated. Thus, section 7 provides some baseline protection and generates some baseline costs associated with conservation and recovery of the pearl darter. Once critical habitat is designated, section 7 additionally requires that Federal agencies ensure their actions will not adversely modify critical habitat. Thus, a key focus of this screening analysis is to determine the likelihood that the designation of critical habitat would trigger project modifications to avoid adverse modification that would be above and beyond any modifications triggered by adverse effects to the species itself.

This screening analysis finds that the incremental costs associated with section 7 consultations for the pearl darter are likely limited to administrative costs. In other words, project modification recommendations to avoid adverse effects to the PBFs for the pearl darter are not anticipated given other, existing habitat protections. Therefore, in both units, the incremental costs of the proposed critical habitat rule are most likely limited to the additional effort to consider the adverse impacts on critical habitat for pearl darter during section 7 consultations. This conclusion is based on multiple factors:

- **In proposed occupied Unit 1, the existing listing status of the pearl darter under the ESA provides substantial baseline protection. The presence of other listed species and existing critical habitat provides additional baseline protection.**
  - All projects with a Federal nexus will be subject to section 7 consultation regardless of whether critical habitat is designated due to the presence of the pearl darter.
  - Critical habitat designation is not likely to change the Service's recommendations for project modifications as part of future consultations considering the pearl darter.
  - The presence of other listed species or existing critical habitat provides additional baseline protection in the proposed critical habitat area.
- **In unoccupied units, section 7 consultations for a particular species generally result from the critical habitat designation because the species is not present to trigger a jeopardy analysis. However, the unoccupied habitat in proposed Unit 2 overlaps completely with the ranges of other listed species with similar habitat requirements and therefore benefits from these baseline protections.**
  - Without the baseline protections from listing, Section 7 consultations and associated costs result from critical habitat designation and affect all projects with a Federal nexus in unoccupied habitat. However, the presence of other listed species with similar habitat requirements as

well as designated critical habitat for species with similar PBFs means the Service is unlikely to consult on additional activities.

- In this unoccupied unit, the management of projects and activities to avoid adverse effects on other listed species and critical habitats will most likely avoid adverse modification of pearl darter critical habitat.

The following sections provide additional information about the costs associated with section 7 implementation. First, we provide additional information on the likelihood that project modifications will be recommended specifically to avoid adverse modification of pearl darter critical habitat. Next, we forecast the future number of section 7 consultations for the pearl darter within the proposed critical habitat based on historical consultation rates. Finally, we summarize the associated costs of these incremental administrative efforts. We find that incremental administrative costs are unlikely to exceed \$710,000 in a given year.

#### LIKELIHOOD OF PROJECT MODIFICATION RECOMMENDATIONS

In occupied Unit 1, the Service “does not anticipate differences in the outcome of section 7 consultations in occupied habitat because generally actions that affect habitat and its ability to function normally would also adversely affect the species.”<sup>15</sup> The Service therefore expects that any recommendations for project modifications to avoid jeopardy under the baseline would also result in projects and activities avoiding destruction or adverse modification of critical habitat.<sup>16</sup> While avoiding jeopardy and avoiding adverse modification are different standards under section 7, in this case the same project modifications would likely be recommended for both.

In both units, the proposed critical habitat for the pearl darter overlaps with the ranges of other aquatic or riparian listed species with similar habitat requirements or designated critical habitat of species with similar PBFs. These species include the Gulf sturgeon and yellow blotched map turtle in Unit 1 (see Exhibit A-1 in the Appendix for more details) and the Gulf sturgeon and ringed map turtle in Unit 2 (see Exhibit A-2 in the Appendix for more details). Because these overlapping species have similar habitat requirements to the pearl darter, project modification recommendations given to avoid impacts to these species and their habitat are expected to be the same as project modification recommendations to avoid impacts to pearl darter habitat.<sup>17, 18</sup>

In particular, the Standard Local Operations Procedures for Endangered Species (SLOPES) agreement for Mississippi establishes similar recommendations for projects

<sup>15</sup> U.S. Fish and Wildlife Service. (2020). “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Pearl Darter.” May 8, 2020 version, page 12.

<sup>16</sup> For reference, the type of project modifications the Service recommends to avoid jeopardy of the pearl darter include avoiding activities that cause or result in physical habitat disturbance, degradation of water quality, channel blockage, excessive sedimentation, or polluted effluents or runoff. More details available in *Ibid*, page 10.

<sup>17</sup> *Ibid*, Table 2, pages 8-9.

<sup>18</sup> Personal communication with the Service on June 23, 2020.

potentially affecting these species. Through this agreement, enacted in June 2017, the U.S. Army Corps of Engineers (hereafter, the Corps) and the Service have established routine procedures for jointly implementing section 7 requirements for all projects that require Corps permits.<sup>19</sup> The agreement requires the Corps to consult species-specific SLOPES documents to determine if a project is expected to adversely affect the species or its habitat. As part of the agreement, species-specific avoidance and minimization measures have been established for Corps projects. As described in Exhibit 3, the measures described for the pearl darter are similar to the measures described for overlapping species. Because the Corps addresses permitting for projects with water impacts, all projects with a Federal nexus in the proposed pearl darter critical habitat are likely to follow the Mississippi SLOPES procedures and recommendations.

**EXHIBIT 3. MISSISSIPPI SLOPES AVOIDANCE AND MINIMIZATION MEASURES BY SPECIES**

PEARL DARTER	GULF STURGEON	RINGED MAP TURTLE	YELLOW BLOTCHED MAP TURTLE
Avoidance of activities that may directly or indirectly impact pearl darter habitat (i.e., maintain the integrity of stream beds and banks and riparian buffer areas)	Stabilize shorelines through bank armoring and rip rap	Avoid activities that result in the removal of in-stream woody debris	Avoid activities that result in removal of in-stream woody debris
Utilize methods and best management practices to reduce initial disturbances to ground and aquatic substrate	Implement best management practices to minimize erosion and prevent sedimentation of drainages	Avoid permanently impacting river sandbars	Avoid permanently impacting river sandbars
Rapidly re-stabilize any disturbed stream banks and stream beds	Maintain a naturally vegetated buffer adjacent to ditches or drainages	Avoid activities that can result in stream instability	Avoid activities that can result in stream instability
Restore and enhance adjacent riparian corridors and buffers	Immediately revegetate disturbed areas	Avoid impoundment of rivers and streams that convert suitable riverine habitat into unsuitable riverine habitat for ringed map turtles	Avoid impoundment of rivers and streams that convert suitable riverine habitat into unsuitable riverine habitat for yellow-blotched map turtles
Source: Mississippi SLOPES Avoidance and Minimization Measures (2020). Provided to IEc by thea the Service via email communication on May 21, 2020.			

<sup>19</sup> "Memorandum of Agreement for Standard Local Operation Procedures for Endangered Species in Mississippi between the U.S. Army Corps of Engineers, Memphis, Mobile, Nashville and Vicksburg Districts and U.S. Fish and Wildlife Service, Mississippi Ecological Services Office." Signed June 28, 2017. Provided to IEc via email correspondence with the Service on June 24, 2020.

## EXPECTED FUTURE CONSULTATIONS

In occupied Unit 1, the Service notes that “no types of additional activities are likely to undergo consultation with critical habitat,” and therefore critical habitat is not expected to result in additional consultations beyond those required due to the presence of the species.<sup>20, 21</sup> In making this determination, the Service acknowledged that the pearl darter is difficult to detect in its habitat through surveys. However, based on their experience, the Service confirms that biologists are likely to “assume the pearl darter is present” in occupied habitat.<sup>22</sup>

Similarly, in unoccupied Unit 2, the Service “do[es] not expect that the critical habitat designation will result in any additional consultations in this unit” because all activities with a Federal nexus that may affect pearl darter critical habitat would already require consultation even absent the rule in order to consider potential effects on other co-occurring species.<sup>23</sup>

The number of potential consultations that may arise from projects or activities with a Federal nexus is uncertain. In developing their Incremental Effects Memorandum, the Service conducted outreach to Federal agencies likely to consult in the proposed critical habitat; however, responses from these agencies did not provide sufficient detail to develop a consultation forecast. In the absence of more specific projections of activity levels within the proposed critical habitat area, we rely on data describing the number of historical consultations to estimate the number of future consultations.<sup>24</sup> The type of activities that have required consultation in the past and are likely to require consultation in the future in these units include: activities that require Clean Water Act 404 permitting, highway and bridge construction and maintenance, riparian management, hydroelectric projects with permit requirements, discharge permits, pesticide permitting, Farm Bill programs, and disaster cleanup activities.<sup>25</sup>

In Unit 1, we forecast future consultation rates based on the historical frequency of consultations regarding the pearl darter over the past ten years as a low-end estimate and the historical frequency of all consultations in the watersheds that surround the Pascagoula River Basin (regardless of whether they considered the pearl darter) as a

---

<sup>20</sup> U.S. Fish and Wildlife Service. (2020). “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Pearl Darter.” May 8, 2020 version, page 13.

<sup>21</sup> The Service’s statement was also the result of responses to questions asked of relevant Federal agencies during its outreach efforts. In particular, the U.S. Forest Service confirmed in email communication with the Service that they did not expect a change in the frequency of consultation (dated March 26, 2020).

<sup>22</sup> U.S. Fish and Wildlife Service. (2020). “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Pearl Darter.” May 8, 2020 version, page 13.

<sup>23</sup> *Ibid*, Table 2, page 17.

<sup>24</sup> Historical consultation information is documented in the Service’s Tracking and Integrated Logging System (TAILS) database. The Service provided IEc with historical consultation information via email communication on May 21, 2020 and June 2, 2020.

<sup>25</sup> U.S. Fish and Wildlife Service. (2020). “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Pearl Darter.” May 8, 2020 version, page 11.

high-end estimate.<sup>26, 27</sup> While this high-end estimated likely overstates the rate of future consultations that will consider pearl darter critical habitat, we include it as a conservative estimate (i.e., more likely to overstate than understate effects of the rule) because the species was listed relatively recently (September 2017) and it is uncertain if the consultation history of the pearl darter before its listing accurately reflects consultation activity for the species. The high-end reflects the consultation history for any species across the Pascagoula River Basin, where most species have similar PBFs. As demonstrated in Exhibit A-1 in the Appendix, the Pascagoula River Basin includes a much larger footprint than the proposed pearl darter critical habitat, therefore the consultation history is likely to include activities that would not affect pearl darter habitat.

Exhibit 4 describes the distribution of historical consultations by consultation type and presents the information separately for the pearl darter and full Pascagoula River Basin. Over the last ten years, Federal agencies consulted with the Service 305 times on projects that might impact the pearl darter, including formal consultations, informal consultations, and technical assistances.<sup>28</sup> Across the Pascagoula Basin, the Service performed 1,327 formal consultations, informal consultations, and technical assistances for all species considered, meaning the pearl darter was considered in 23 percent of all consultations and technical assistance efforts throughout the watershed.

Across all consultations and technical assistance efforts recorded between 2010 and 2019, less than one percent were formal consultations, 95 percent were informal consultations, and 5 percent were technical assistance efforts, with very similar distributions across the pearl darter and full basin.<sup>29</sup> On an annual basis, this translates to less than one formal consultation for the pearl darter and basin, 29 informal consultations for the pearl darter and 125 for the basin, and 1 technical assistance for the pearl darter and 7 for the basin each year.

---

<sup>26</sup> The specific watersheds include Chucky-Okatibbee, Lower Chickasawhay, Lower Leaf, Pascagoula, Upper Chickasawhay, and Upper Leaf.

<sup>27</sup> While the pearl darter was officially listed in 2017, it was a candidate for listing during the ten years included in this analysis. Because the Service considers candidate species during section 7 consultations, the pearl darter has a consultation history before it was officially listed.

<sup>28</sup> This timeframe includes years before the pearl darter was listed as threatened by the Service. This is because the pearl darter was a candidate species for listing for several years before its listing.

<sup>29</sup> The historical consultation data also described “informal emergencies” and “formal emergencies.” This analysis combines informal emergencies with other informal consultations and formal emergencies with formal consultations.

**EXHIBIT 4. NUMBER OF PAST CONSULTATIONS FOR THE PEARL DARTER AND PASCAGOULA RIVER BASIN (2010-2019)**

	FORMAL CONSULTATIONS		INFORMAL CONSULTATIONS		TECHNICAL ASSISTANCES		TOTAL	
	PEARL DARTER	BASINWIDE	PEARL DARTER	BASINWIDE	PEARL DARTER	BASINWIDE	PEARL DARTER	BASINWIDE
2010	0	0	21	59	7	61	28	120
2011	0	0	31	112	3	0	34	112
2012	0	0	28	179	0	0	28	179
2013	1	1	17	199	0	0	18	200
2014	0	1	20	129	0	1	20	131
2015	0	0	24	111	0	3	24	114
2016	0	0	47	119	2	3	49	122
2017	0	0	54	149	0	0	54	149
2018	1	1	21	97	0	0	22	98
2019	0	0	26	96	2	6	28	102
<b>Total</b>	<b>2</b>	<b>3</b>	<b>289</b>	<b>1,250</b>	<b>14</b>	<b>74</b>	<b>305</b>	<b>1,327</b>
<b>Annual average</b>	<b>0.2</b>	<b>0.3</b>	<b>28.9</b>	<b>125</b>	<b>1.4</b>	<b>7.4</b>	<b>30.5</b>	<b>132.7</b>
Source: IEc analysis of output from the TAILS database provided by the U.S. Fish and Wildlife Service via email communication on May 21, 2020 and June 2, 2020. Notes: 1. The presented consultation history serves as a proxy for the proposed Unit 1. 2. Grayed rows represent years when the pearl darter was listed. 3. The informal consultation category includes informal emergencies, and the formal consultation category includes formal emergencies.								

In unoccupied Unit 2, where consultations have not occurred regarding the pearl darter, we reference information on consultation rates across the watershed surrounding the Strong River (i.e., Middle Pearl-Strong watershed). Like Unit 1, we anticipate that pearl darter habitat is likely to be considered in some consultations within the watershed because projects with a Federal nexus occurring near the designated river and creek channels have the potential to affect the critical habitat. This approach to estimating future consultation rates in Unit 2 is more likely to overstate than understate the number of future consultations specific to pearl darter critical habitat because the area reflected in the consultation forecast is substantially larger than the area being proposed as critical habitat for the pearl darter (see Exhibit A-2 in the Appendix).

Exhibit 5 presents the distribution of historical consultations by consultation type across the watershed surrounding the Strong River. Over the last ten years, Federal agencies consulted with the Service 554 times on projects that might impact listed

species or designated critical habitat within the watershed, including formal consultations, informal consultations, and technical assistances. Across all consultations and technical assistance efforts recorded between 2010 and 2019, none were formal consultations, 92 percent were informal consultations, and 8 percent were technical assistance efforts.<sup>30</sup> On an annual basis, this translates to 51 informal consultations and 5 technical assistances.

**EXHIBIT 5. NUMBER OF PAST CONSULTATIONS FOR THE STRONG RIVER WATERSHED (2010-2019)**

	FORMAL CONSULTATIONS	INFORMAL CONSULTATIONS	TECHNICAL ASSISTANCES	TOTAL
2010	0	18	17	35
2011	0	42	0	42
2012	0	36	0	36
2013	0	54	0	54
2014	0	74	2	76
2015	0	69	1	70
2016	0	54	3	57
2017	0	68	3	71
2018	0	43	13	56
2019	0	49	8	57
<b>Total</b>	<b>0</b>	<b>507</b>	<b>47</b>	<b>554</b>
<b>Annual average</b>	<b>0</b>	<b>50.7</b>	<b>4.7</b>	<b>55.4</b>
Source: IEC analysis of output from the TAILS database provided by the U.S. Fish and Wildlife Service via email communication on May 21, 2020.				
Notes:				
1. The presented consultation history serves as a proxy for the proposed Unit 2.				
2. The informal consultation category includes informal emergencies, and the formal consultation category includes formal emergencies.				

Across both Unit 1 and Unit 2, we anticipate Federal agencies will participate in a similar number of consultations and technical assistances per year relative to the consultation history presented in Exhibit 4 and Exhibit 5 respectively. In making this determination, we considered the potential for a future impoundment project along two tributaries of the Pascagoula River (Little and Big Cedar creeks).<sup>31</sup> As of August 2019, the permit applications for these proposed projects had been withdrawn, and therefore

<sup>30</sup> The historical consultation data also described “informal emergencies” and “formal emergencies.” This analysis combines informal emergencies with other informal consultations and formal emergencies with formal consultations.

<sup>31</sup> *Ibid*, page 15.

the likelihood that these activities will proceed is uncertain.<sup>32</sup> This analysis found no evidence of trends over time among historical consultations and therefore relies on an annual average number of consultations by type. We assume that the rate of future consultation activity is likely to be similar to annual average historical rates.

The proposed rule identifies ten activities that pose threats to the pearl darter.<sup>33</sup> To better understand the potential distribution of future consultations across these activities, Exhibit 6 presents the breakdown by historical consultations, relying on the action and work types input into TAILS. As presented in the Exhibit, the activity type identified in the proposed rule with the most historical consultations is commercial or residential development. Approximately 20 percent of the consultations in Unit 1 and 28 percent of the consultations in Unit 2 are associated with activity types not identified as threatening to the pearl darter. Because these consultations capture the full basin for Unit 1 and full watershed for Unit 2, it is possible that the distribution captures some activities that would not necessarily affect pearl darter critical habitat.<sup>34</sup>

---

<sup>32</sup> Letter from the Army Corps of Engineers (Mobile District) to George County Board of Supervisors, dated August 8, 2019.

<sup>33</sup> U.S. Fish and Wildlife Service. Draft proposed rule for the “Designation of Critical Habitat for Pearl Darter.” May 4, 2020 version.

<sup>34</sup> Equivalent activity information was not provided with the consultation history specific to the pearl darter.



**EXHIBIT 6. DISTRIBUTION OF PAST CONSULTATIONS BY ACTIVITY TYPE**

ACTIVITY TYPE	UNIT 1	UNIT 2
Roadway and bridge construction and repair	13.1%	10.8%
Commercial or residential development	28.4%	23.3%
Dredging	2.0%	3.4%
Groundwater pumping	0.0%	0.0%
In-stream dams and diversions	2.3%	2.0%
Storage, distribution, discharge of chemical pollutants	0.2%	0.4%
Oil and gas	9.1%	7.8%
Utilities	18.7%	19.3%
Water quantity and supply	5.8%	4.5%
Water quality	0.4%	0.2%
Other activity types	20.2%	28.3%
Source: IEc analysis of output from the TAILS database provided by the U.S. Fish and Wildlife Service via email communication on May 21, 2020.		
Notes:		
<ol style="list-style-type: none"> <li>1. The proposed rule identifies these ten activity types as potentially threatening to the pearl darter critical habitat.</li> <li>2. The activity type classification represents best judgement in categorizing the action and work types in the TAILS database.</li> <li>3. The consultation history used in this analysis includes the full Pascagoula River basin for Unit 1 (see Exhibit 4) and full Strong River Watershed for Unit 2 (see Exhibit 5).</li> </ol>		

**ADMINISTRATIVE COSTS OF SECTION 7 CONSULTATIONS**

Exhibit 7 presents estimates of per-consultation administrative costs used in this analysis. In occupied habitat, the incremental cost to consider adverse modification during technical assistance communications and informal, formal, and programmatic consultations totals \$420, \$2,500, \$5,300, and \$9,800 respectively (2020 dollars). These estimates assume that consultations would occur even in the absence of critical habitat due to the presence of the listed species, and the amount of administrative effort to address critical habitat for the pearl darter during this process is relatively minor. In unoccupied habitat, the incremental cost associated with a new consultation considering only adverse modification during technical assistance communications and informal, formal, and programmatic consultations totals \$1,300, \$7,600, \$16,000, and \$29,000 respectively (2020 dollars). These estimates assume that consultation addressing the pearl darter would not occur in the absence of critical habitat designation.

## EXHIBIT 7. RANGE OF INCREMENTAL ADMINISTRATIVE CONSULTATIONS COSTS (2020 USD)

CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (OCCUPIED HABITAT)					
Technical Assistance	\$160	N/A	\$260	N/A	\$420
Informal Consultation	\$680	\$860	\$510	\$500	\$2,500
Formal Consultation	\$1,500	\$1,700	\$880	\$1,200	\$5,300
Programmatic	\$4,600	\$3,800	N/A	\$1,400	\$9,800
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Technical Assistance	\$470	N/A	\$790	N/A	\$1,300
Informal Consultation	\$2,000	\$2,600	\$1,500	\$1,500	\$7,600
Formal Consultation	\$4,500	\$5,100	\$2,600	\$3,600	\$16,000
Programmatic	\$14,000	\$11,000	N/A	\$4,200	\$29,000
Source: IEc analysis of administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2020, and a review of consultation records from several Service field offices across the country conducted in 2002.					
Notes:					
1. Estimates are rounded to two significant digits and may not sum due to rounding.					
2. Estimates reflect average hourly time required by staff.					

Applying these unit costs to the number of future consultations forecast for Unit 1 (Exhibit 4) and Unit 2 (Exhibit 5), we estimate the incremental administrative costs of consultations pursuant to critical habitat designation for the pearl darter is unlikely to exceed \$710,000 per year (2020 dollars), including approximately \$9,200 for technical assistances, \$700,000 for informal consultations, and \$1,600 for formal consultations (Exhibit 8). These estimates consider the upper-estimate of future consultation activity for Unit 1, where historical consultation across the full Pascagoula Basin is considered. Under the alternate assumption that the historical consultation history specific to the pearl darter is more likely to be representative of future consultation activity in Unit 1, then the total costs are unlikely to exceed \$470,000, including approximately \$6,700 for technical assistances, \$460,000 for informal consultations, and \$1,100 for formal consultations (Exhibit 8).

**EXHIBIT 8. TOTAL ANNUAL INCREMENTAL ADMINISTRATIVE CONSULTATION COSTS BY PROPOSED UNIT FOR THE PEARL DARTER (2020 USD)**

	UNIT 1		UNIT 2	TOTAL	
	LOWER ESTIMATE <sup>1</sup>	UPPER ESTIMATE <sup>2</sup>		LOWER ESTIMATE <sup>1</sup>	UPPER ESTIMATE <sup>2</sup>
Technical assistances	\$590	\$3,100	\$6,100	\$6,700	\$9,200
Informal consultations	\$72,000	\$310,000	\$390,000	\$460,000	\$700,000
Formal consultations	\$1,100	\$1,600	\$0	\$1,100	\$1,600
<b>Total</b>	<b>\$74,000</b>	<b>\$320,000</b>	<b>\$390,000</b>	<b>\$470,000</b>	<b>\$710,000</b>
Source: IEc calculations using data presented in Exhibits 4, 5, and 7. See notes to these tables for more details. Notes: <ol style="list-style-type: none"> <li>1. The lower estimates reflect the assumption that future consultation activity in Unit 1 will be similar to historical consultation activity specific to the pearl darter.</li> <li>2. The upper estimates reflect the alternate assumption that future consultation activity in Unit 1 will be similar to historical consultation activity across the full Pascagoula Basin.</li> <li>3. Estimates may not sum to the totals reported due to rounding.</li> </ol>					

**SECTION 4. OTHER COSTS OF THE CRITICAL HABITAT RULE**

This section discusses the potential for incremental costs to occur outside of the section 7 consultation process. These types of costs include triggering additional requirements or project modifications under other laws or regulations, and perceptual effects on markets. These types of costs may occur even when activities do not have a Federal nexus for consultation.

**ADDITIONAL STATE AND LOCAL REGULATION**

Incremental costs may occur outside of the section 7 consultation process if the designation of critical habitat triggers additional requirements or project modifications under state or local laws, regulations, or management strategies. These types of costs typically occur if the designation increases awareness of the presence of the species or the need for protection of its habitat. Under the baseline, the pearl darter receives some protection from state laws governing water quality and habitat degradation (i.e., Mississippi Water Pollution Control Law, Mississippi Surface Mining and Reclamation Law). The Service does not expect additional state regulations or other local regulations to be triggered by the designation of critical habitat for the pearl darter.<sup>35</sup>

<sup>35</sup> Personal communication with the Service on May 20, 2020.

## POSSIBLE IMPACTS OF PUBLIC PERCEPTION

Comments received regarding proposed designations of critical habitat in various locations throughout the United States indicate that the public perceives critical habitat designation as possibly resulting in incremental changes to private property values, above and beyond those associated with specific forecast project modifications under section 7 of the Act.<sup>36</sup> These commenters suggest that, all else being equal, a property that is inhabited by a threatened or endangered species, or that lies within a critical habitat designation, will have a lower market value than an identical property that is not inhabited by the species or that lies outside of critical habitat. This lower value results from the perception that critical habitat will preclude, limit, or slow development, or somehow alter the highest and best use of the property.

Public attitudes about the limits and costs that the Act may impose can cause real economic effects to the owners of property, regardless of whether such limits are actually imposed. Over time, as public awareness grows of the regulatory burden placed on designated lands, particularly where no Federal nexus compelling a section 7 consultation exists, the effect of critical habitat designation on properties may subside. As a riverine species, the pearl darter does not occur on private land, and the literature has not evaluated effects of riverine critical habitat on adjacent property values.

## SECTION 5. GEOGRAPHIC DISTRIBUTION OF SECTION 7 AND OTHER COSTS

Estimating the geographic distribution of section 7 costs is complicated by the geographic area included in the historical consultation data used in this analysis. Because location-specific project information is not available, this analysis looks more broadly at consultation history across the broader watersheds, which include significantly larger areas than the river miles proposed for critical habitat. Information is not available to determine areas within watersheds that may experience relatively high levels of consultation activity and therefore costs. Additionally, while Unit 1 is significantly larger than Unit 2 (487 miles and 30 miles, respectively); the incremental unit costs associated with consultations and technical assistances in unoccupied Unit 2 are greater than the unit costs in occupied Unit 1 (see Exhibit 7).

## SECTION 6. SECTION 7 AND OTHER ECONOMIC BENEFITS

The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species. Quantification and monetization of species conservation benefits requires information on: (1) the incremental change in the

---

<sup>36</sup> See, for example, public comments on the possible impact of designating private lands as critical habitat for the Northern spotted owl (as summarized in Industrial Economics, Incorporated. Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl: Final Report. Prepared for the U.S. Fish and Wildlife Service. November 20, 2012. (p.5-21) and the cactus ferruginous pygmy owl (as summarized in Industrial Economics, Incorporated. Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl. Prepared for the U.S. Fish and Wildlife Service. June 1999. p.44)).

probability of conservation of the pearl darter that is expected to result from the designation; and (2) the public's willingness to pay for such beneficial changes.

As described in this memorandum, additional efforts to conserve the pearl darter are not predicted. Thus, the designation is unlikely to measurably increase the probability that the species will be conserved, and ancillary benefits are not anticipated.

## **SECTION 7. SUMMARY**

The incremental costs of designating critical habitat for the pearl darter are likely to be limited to additional administrative effort to consider adverse modification in section 7 consultations for the species. The incremental administrative burden resulting from the designation of critical habitat for the pearl darter is not anticipated to reach \$100 million in any given year based on the anticipated annual number of consultations and associated consultation costs, which are not expected to exceed \$710,000 in any year.

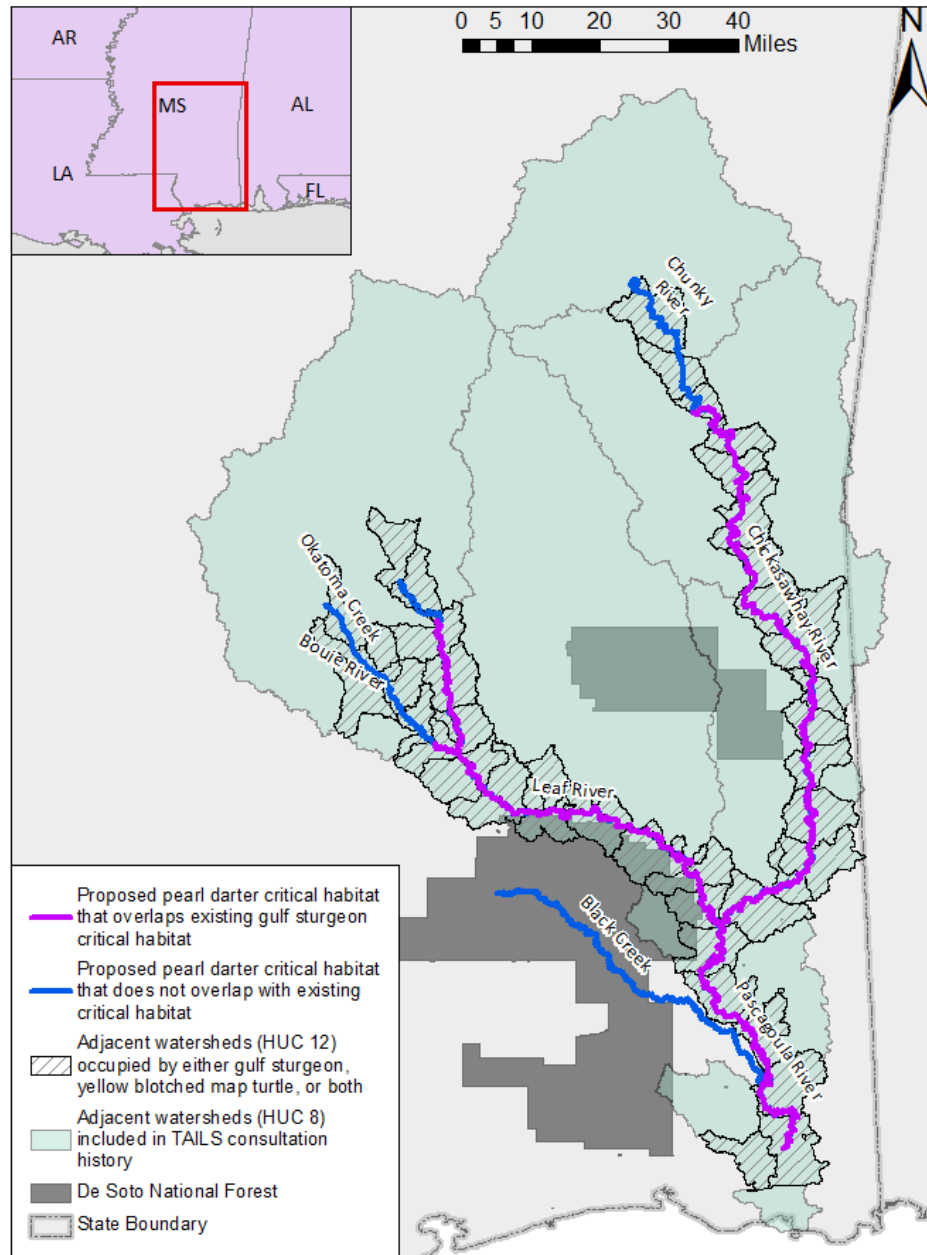
In Unit 1, which constitutes 94 percent of the proposed critical habitat area, the activities that may affect the critical habitat are already subject to section 7 consultation due to the presence of pearl darter. The Service has determined that the project modification recommendations made to avoid jeopardy to the pearl darter would also result in the avoidance of adverse modification. Thus, for projects and activities occurring in Unit 1, no additional project modification recommendations are likely to result from the proposed critical habitat rule and costs are limited to additional administrative effort.

A relatively small fraction of the proposed critical habitat (6 percent), is in Unit 2, which is not currently occupied by the species. In these areas, activities that may affect the critical habitat for the pearl darter are also already subject to section 7 consultation due to the presence of other listed species with similar habitat requirements and designated critical habitat. Additionally, activities that may affect pearl darter critical habitat in Unit 2 generally implement project modification recommendations from a standardized set provided in the Mississippi SLOPES agreement that are similar to recommendations established for overlapping species. Therefore, even absent critical habitat designation, these activities are likely to avoid adverse effects on the habitat.

Because the designation is not expected to result in additional project modifications recommendations for the species, the designation is unlikely to measurably increase the probability that the species will be conserved, and benefits are unlikely to exceed \$100 million in a given year.

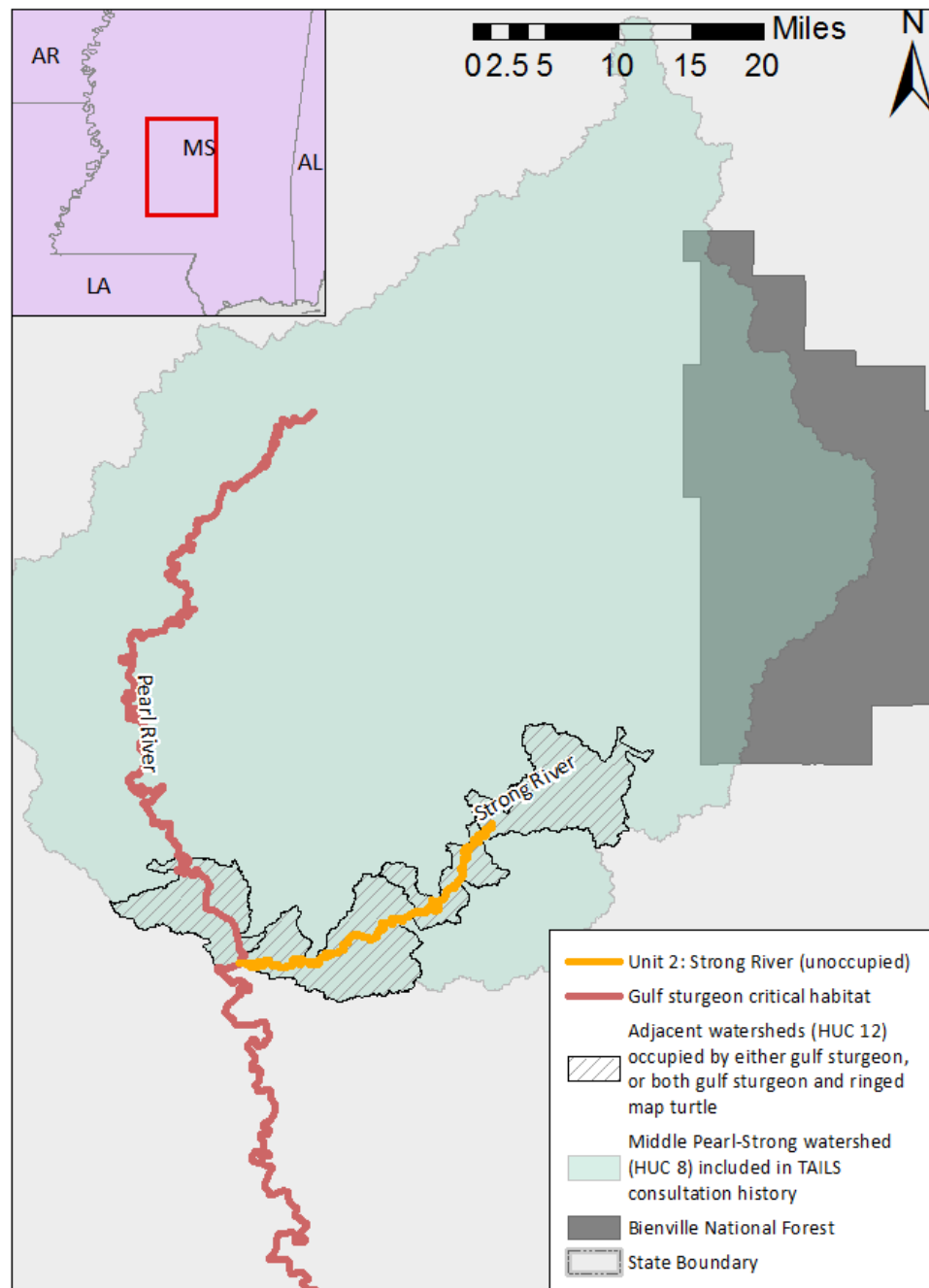
## APPENDIX

EXHIBIT A-1. PROPOSED CRITICAL HABITAT, UNIT 1 DETAIL



Source: IEc map produced using (1) critical habitat shapefiles and HUC 12 boundaries provided by the Service on May 21, 2020, (2) HUC 8 boundaries from the Watershed Boundary Dataset made available by the U.S. Geological Survey and the U.S. Department of Agriculture (downloadable from <https://nrcs.app.box.com/v/huc/folder/39640323180>), and (3) national forest boundaries from the Forest Common Names geodatabase made available by the U.S. Forest Service (downloadable from <https://data.fs.usda.gov/geodata/edw/datasets.php>).

## EXHIBIT A-2. PROPOSED CRITICAL HABITAT, UNIT 2 DETAIL



Source: IEc map produced using (1) critical habitat shapefiles and HUC 12 boundaries provided by the Service on May 21, 2020, (2) HUC 8 boundaries from the Watershed Boundary Dataset made available by the U.S. Geological Survey and the U.S. Department of Agriculture (downloadable from <https://nrcs.app.box.com/v/huc/folder/39640323180>), and (3) national forest boundaries from the Forest Common Names geodatabase made available by the U.S. Forest Service (downloadable from <https://data.fs.usda.gov/geodata/edw/datasets.php>).