

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Percina aurora*, Suttkus and Thompson 1994

COMMON NAME: Pearl darter

LEAD REGION: 4

INFORMATION CURRENT AS OF: March 2010

STATUS/ACTION

Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: May 11, 2004

90-day positive - FR date:

12-month warranted but precluded - FR date:

Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months.

Listing priority change

Former LP:

New LP:

Date when the species first became a Candidate (as currently defined): October 25, 1999

Candidate removal: Former LP:

A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to

conservation efforts that remove or reduce the threats to the species.

- F – Range is no longer a U.S. territory.
- I – Insufficient information exists on biological vulnerability and threats to support listing.
- M – Taxon mistakenly included in past notice of review.
- N – Taxon does not meet the Act’s definition of “species.”
- X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Fishes, Percidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Mississippi, Louisiana

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Jackson, George, Perry, Forrest, Covington, Green, Wayne, Clarke, Lauderdale, and Newton counties, Mississippi

LAND OWNERSHIP

This species currently inhabits only navigable waters of the Pascagoula River drainage, under the jurisdiction of the U.S. Army Corps of Engineers. The Pascagoula River drainage includes 25,123 square kilometers (9,700 square miles) with a wide variety of land uses. Much of the area is in private ownership and agricultural production. The U.S. Forest Service manages significant acreage in Desoto National Forest, however less than 5 river miles are frontage land. The Nature Conservancy protects 14,164 hectares (ha) (35,000 acres (ac)) of the Pascagoula River watershed in Jackson County, Mississippi while an additional 14,164 ha (35,000 ac) are under either private or public protection. The Mississippi Department of Wildlife, Fisheries and Parks manage seven wildlife management areas within the basin totaling approximately 149,188 ha (368,651 ac) that are primarily forest and wetlands. Approximately 48.27 km (30 river miles) of the Pascagoula River main stem are within state lands (Mississippi Department of Environmental Quality 2001, pp. 3-7).

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LEAD FIELD OFFICE: Jackson, Mississippi Field Office, Daniel J. Drennen, 601/321-1127, daniel_drennen@fws.gov

BIOLOGICAL INFORMATION:

Species Description and Taxonomy

The Pearl darter (*Percina aurora*) is a small percid fish with a blunt snout, horizontal mouth, and large eyes situated high on the head, and a medial black caudal spot at the base of the caudal fin (Ross 2001, p.498). The Pearl darter was described in 1994 (Suttkus *et al.* 1994, pp.16-17). Previously known as *Percina* sp. 3 and the Pearl River channel darter (Ross, *et al.* and 1989, p.25), the Pearl darter belongs to the subgenus *Cottogaster* and is closely allied to the channel darter (*P. copelandi*). The Pearl darter is distinguished from the channel darter by its larger body size, lack of tubercles and heavy pigmentation of breeding males, high number of marginal

spines on the modified belly scales of breeding males, and fully scaled cheeks. Breeding males have two dark bands across the spinous dorsal fin, a broad, diffuse, dusky marginal band, and a pronounced dark band across the fin near its base. Breeding females are devoid of pigmentation on the ventral surface of head and body. The Pearl darter reaches a maximum standard length of 57 millimeters (mm) (2.28 inches (in)) in females and 64 mm (2.56 in) in males (Suttkus *et al.* 1994, p. 16).

Habitat/Life History

Little is known about the specific habitat requirements of this species. Pearl darters have been collected from gravel riffles and rock outcrops; deep runs over gravel and sand pools below shallow riffles; swift (90 centimeters per second (35.1 in. per second)), shallow water over firm gravel and cobble in mid-river channels; and swift water near brush piles. Slack *et al.* (2002, p.10) found Pearl darters associated with scour holes on the inside bend of the river downstream from point bars; and substrata primarily of coarse sand with accumulation of detritus in troughs perpendicular to the shore line. A single post-spawning individual was collected in a deep, sluggish run over silty sand (Bart and Piller 1997, p.10).

The Pearl darter is believed to have comparable habitat requirements to the channel darter (Suttkus *et al.* 1994, p. 13). Habitat use of the Pearl darter is centered on deeper runs and pools with larger substrate particle size (Schofield *et al.* 1999, p.1). The channel darter generally inhabits rivers and large creeks in areas of moderate current, usually over sand and gravel substrates found at the lower ends of riffles or at the edges of deep channels. Seasonally, channel darters move into the slower current of pools to use the scattered rubble as spawning sites (Kuehne and Barbour 1983, p.49). Channel darters typically avoid deep sluggish pools, headwater creeks, and lacustrine/palustrine environments (Burr and Warren 1986, p.334) with insufficient current to maintain a bottom of sand or sand mixed with gravel and rock (Page 1983, p.45). Channel darters most often remain at depths approaching 1 meter (3.28 feet) during the day but move to shallow water at night (Kuehne and Barbour 1983, p.49). Chironomids (non-biting midges) and small crustaceans are the most important food items (Kuehne and Barbour 1983).

Suttkus *et al.* (1994, p.19) found Pearl darters spawning in the Pearl and Strong Rivers (Mississippi) during March and April in 1969. Collection data indicated that the species probably spawned in various locations of the Pearl River main stem and upper reaches of the middle Bogue Chitto River. In fish samples from the Pearl River, young-of-the year Pearl darters were collected in June. Females were sexually mature at 39 mm (1.56 in) standard length (SL), while males matured at 42 mm (1.68 in) SL. Five breeding males were collected from the Leaf River (Pascagoula system, Mississippi) during May in shallow water (15 cm (5.85 in)) over firm gravel and cobble in mid channel with a water temperature of 21°Celsius (69.8 °Fahrenheit) (Bart and Piller 1997, p.9). Most Pearl darters mature in one year. Sub-adult Pearl darters may migrate up stream during the fall and winter to spawn in suitable gravel reaches. Elevated river discharge during the spring aids in downstream dispersal of young of the year (Bart *et al.* 2001, p.14, Ross *et al.* 2000, p.11).

Historical Range/Distribution

The Southeastern Fishes Council included the Pearl darter on their list of twelve most imperiled

species (Kuhajda *et al.* 2010, pp. 17-18). The Pearl darter is historically known only from localized sites within the Pearl and Pascagoula River drainages in Mississippi and Louisiana. Examination of site records of museum fish collections from the Pearl River drainage (Suttkus *et al.* 1994, pp.17-19) suggest that the darter once inhabited the large tributaries and main channel habitats from St. Tammany Parish, Louisiana, to Simpson County, Mississippi. This includes approximately 96 river miles of the Pearl River, 10 river miles of the Strong River, and 32 river miles of the Bogue Chitto River. Even before its description in 1994, the Pearl darter was rare and of conservation concern (Deacon *et al.* 1979, p.42) because it was uncommon, infrequently collected, and occurred in low numbers (Bart and Piller 1997, p.1). The Pearl darter was collected from only 14 percent of 716 fish collections from site-specific locations within the Pearl River drainage despite annual collection efforts by Suttkus from 1958 to 1973 (compiled from Bart and Suttkus 1996, pp. 3-4, Suttkus *et al.* 1994, p.19). No Pearl darters have been collected in the Pearl River drainage since 1973, even though Suttkus has made 64 fish collections over the last 25 years from the Pearl River (Bart and Piller 1997, p.1). Suttkus *et al.* (1994, p.19) attributed the loss of the Pearl darter in the Pearl River to increasing sedimentation from habitat modification caused by removal of riparian vegetation and extensive cultivation near the river's edge.

Collection data from Suttkus *et al.* (1994, p.19), Bart and Suttkus (1996, p.4), Bart and Piller (1997, p.4), and Ross (2001, p. 500) suggest that the Pearl darter is very rare in the Pascagoula River system. Bart and Piller (1997, p.4) examined Suttkus' work before 1974 and found that only 19 Pearl darters were collected out of 19,300 total fish in 10 Tulane University Museum of Natural History collections. Additionally, from the Mississippi Freshwater Fishes Database, Dr. Stephen Ross (in Bart and Piller 1997, p.4) estimated the rarity of the Pearl darter within the Pascagoula drainage from 379 collections (81,514 fish specimens) since 1973, and found only one Pearl darter collected for every 4,795 specimens. Site records from museum fish collections suggest that the Pearl darter inhabited the main channels of large Pascagoula drainage tributaries from Jackson to Lauderdale Counties, Mississippi. The species had a historical non-inclusive range of about 30 river miles of the Pascagoula River, 24 river miles of Black Creek, 48 river miles of the Leaf River, 24 river miles of Okatoma Creek, 102 river miles of the Chickasawhay River, 24 river miles of the Bouie River, and 8 river miles of Chunky Creek.

Current Range/Distribution and Population Estimate/Status

Since 1983, Pearl darters are found only in scattered sites within approximately 144 miles of the Pascagoula drainage, including the Pascagoula, Chickasawhay, Chunky, Leaf and Bouie Rivers and Okatoma and Black Creeks, and in considered extirpated from the Pearl River drainage. This has resulted in a decrease of range of approximately 55 percent (compiled from Bart and Piller 1997, pp.3-10; Ross 2001, p.499; Slack *et al.* 2005, pp.5-10). Bart and Piller (1997, p.3) made 27 ancillary collections in 1996 and 1997 from the Pascagoula drainage and collected only 10 Pearl darters at four sites. Three specimens were collected in the Leaf River at Estabutchie in the spring of 1998, whereas, in December 1998, no Pearl darters were found in the upper reaches of the Leaf River between Estabutchie and north Hattiesburg (Bart and Ross pers. comm. 1998). Slack *et al.* (2005, p.5) sampled for Pearl darters in the Leaf and Chickasawhay rivers from their confluence with Pascagoula River up river to the communities of Enterprise and Hebron. Four-hundred and seven Pearl darters were counted: 66% from the Chickasawhay and 34% from the Leaf Rivers. This extended the upstream range on the Leaf River 41.5 kilometers. Slack *et al.*

(2002, p.15) found Pearl darters in the Pascagoula River at the confluence with Big Black Creek (Dead Lake) and in various locations 22 km (13.7 mi) downstream of Dead Lake. The Big Black Creek site was the locality where Hildebrand collected Pearl darters in 1933 (Suttkus *et al.* 1994, p.16). No Pearl darters were found in selected sites of the Chunky River in 1995 and 1997 (Bart pers. comm. 1999). Suttkus *et al.* (1994, p.17) speculated that portions of the Leaf River and possibly the lower Black Creek might continue to support reproducing populations even though no recent collecting attempts had been made.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

The Pearl darter is vulnerable to non-point source pollution, urbanization, and changes in river geomorphology due to its localized distribution within one river drainage and its apparent low population sizes.

Non-point source pollution appears to be a localized threat to the Pearl darter within the drainage. Non-point source pollution from land surface runoff can originate from virtually any land use activity, and may include sediments, fertilizers, herbicides, pesticides, animal wastes, septic tank and gray water leakage, oils and greases. Construction activities that involve significant earthworks typically increase sediment loads into nearby streams. Siltation sources include timber clear cutting, clearing of riparian vegetation, and mining and agricultural practices that allow exposed earth to enter streams. Practices that affect sediment and water discharges into a stream system change the erosion or sedimentation pattern, which can lead to the destruction of riparian vegetation, bank collapse, and increased water turbidity and temperature. Excessive sediments are believed to affect the habitat of darters and associated fish species, by making the habitat unsuitable for feeding and reproduction. Sediment has been shown to abrade and or suffocate periphyton, disrupt aquatic insect natural processes, and, ultimately, negatively affect fish growth, survival, and reproduction (Waters 1995, p.55-62). Non-point source pollution is a more prevalent threat to the Pearl darter in areas outside those lands protected by The Nature Conservancy and other areas managed by the Forest Service and State where Best Management Practices (BMPs) are utilized.

In the Pascagoula drainage, water quality degradation and other biological impairment sources exists throughout the watershed (Mississippi Department of Environmental Quality 2008, pp.13-15). Major problems with brine and dioxin have existed on several main tributaries to the Pascagoula including runoff into the Leaf River from Hattiesburg and the Leaf River Paper Mill at New Augusta. Brine water releases from oil fields on the Chickasawhay River (U.S. Fish and Wildlife Service 1990, pp.5-6) have also contributed to the degradation of water quality within the watershed. The dioxin advisory was removed in 1999 (Mississippi Department of Environmental Quality 1999, p. 59). However, continued concern exists about dioxin being contained in river sediment and the possibility of re-suspension of the chemical within the water column. Monitoring continues of the impacted water bodies. Laboratory results have established that fish are extremely sensitive to the effects caused by dioxins and it has been linked to declines in many fish populations (Hoffman *et al* 2002 p. 1053). Brine discharges may produce acute toxicological effects

when the salinity levels increase to a point greater than the physiological tolerance, thereby affecting the osmoregulatory mechanism of the fish. Oil well production brine also increases incidence of fish tumors, alters biotic community composition and eliminates benthic communities (Killebrew 1993, p.215).

Municipal and industrial discharges into the watershed, particularly during low water, are concentrated and exacerbate water quality degradation including temperature, dissolved oxygen, and pH within all reaches of the Leaf River. Existing housing and urbanization along the banks of the Leaf River between I-59 and Estabutchie may contribute nutrient loading through sewage and septic water effluent. Bart and Piller (1997, p.12) noted extensive algal growth during warmer months in the Leaf and Bouie rivers, suggesting nutrient and organic enrichment which decreases dissolved oxygen and changes pH.

American Sand and Gravel (ASGC) (1995, p. B4) considers the bed of the Bouie River a significant natural resource. Historically, ASGC has mined sand and gravel using a hydraulic suction dredge, operated within the banks of the Bouie River. Sand and gravel mining also has occurred within and adjacent to the Leaf River. Large sections of the river and its floodplain have been removed over the past 50 years resulting in the creation of very large, open water areas that function as deep lake systems (ASGC 1995, pp.B4-B8). Pearl darters have not been collected in impounded waters and are intolerant of lentic (standing water) habitats.

In addition to the creation of large, open water areas, in-stream sand and gravel mining also causes accelerated geomorphic processes, specifically headcutting, that adversely affects the flora and fauna of many coastal plain streams (Patrick *et al.* 1993, p.90). Hartfield (1993, pp.138-139) investigated the negative impacts of stream erosion due to headcutting on aquatic life in several Mississippi river drainages and believed that the drainages were also experiencing geomorphic instability caused by in-stream sand and gravel mining. Mining in active river channels typically results in incision upstream of the mine (by nickpoint migration) and sediment deposition downstream. The upstream migration of nickpoints, or headcutting, may cause undermining of structures, lowering of alluvial water tables, channel de-stabilization and widening, and loss of aquatic and riparian habitat. Geomorphic change, particularly headcutting, may cause the extirpation of riparian and lotic (flowing water) species (Patrick *et al.* 1993, p.96). Lytle (1993, p.70) and Brown and Lytle (1992, p.2) found that in-stream gravel mining reduces overall fish species diversity in Ozark streams and favors a large number of a few small fish species.

Bart and Piller (1997, p.12) attribute the decline of the Pearl darter in the Leaf and Bouie Rivers and Black Creek of the Pascagoula drainage to threats from siltation caused by unstable banks and loose and unconsolidated streambeds. Bart (pers. comm. 1999) believed that bank erosion and bar migration on the Leaf River at Eastabutchie was affecting the riffles where the only known spawning of the Pearl darter occurs.

The confluence of the Bouie and Leaf Rivers, within the Pascagoula drainage, possibly provides significant habitat for the Pearl darter. Fish collections from this area indicate that it may be a site critical for maintaining the current population of Pearl darters. Pearl darter

locality records (1997) within the vicinity of the disturbed reaches of the gravel mine area of the Bouie River in Hattiesburg placed the species within the vicinity of a proposed dam (The Clarion-Ledger, October 28, 1998, p. 1B; Kemp Associates, PA, 2000, pp.4-5).). To date no attempt has been made to dam the river at this site. Maintaining a constant flow of water, free of impoundments will prevent alteration and fragmentation of Pearl darter habitat at the confluence of the Bouie and Leaf Rivers.

The U.S. Department of Energy (2006, pp.2-35) tentatively proposes to expand the Strategic Petroleum Reserve in Perry County (Mississippi) at the Richton salt dome site by 2014. This potentially will reduce the Leaf River flow rate to below the minimum flow rate (water quantity) of 581 cubic feet per second. Approximately 54 million gallons of water a day will be used to construct a cavern in the underground salt dome in order to stockpile strategic petroleum supplies. Reduction of flow rates in the Leaf River will correspondingly affect the flow rates of the Pascagoula River and may decrease the available habitat for the species (D. Drennen pers. observation. 2007).

In summary, the Pearl darter is currently being negatively affected, in localized areas, by water quality degradation from non-point source pollution in association with land surface runoff from urbanization and other land use activities and municipal/industrial discharges. Sand and gravel mining within the drainage, and the resulting de-stabilization of the streams, continues to pose a threat to the habitat of the Pearl darter. A proposed dam on the Bouie River and the proposed expansion of the Strategic Petroleum Reserve in Perry County, Mississippi pose future threats to the Pearl darter, as these projects would reduce water flow within the darters' habitat, likely to the detriment of the species.

- B. Overutilization for commercial, recreational, scientific, or educational purposes. In general, small species of fish such as the Pearl darter, which are not utilized for either sport or bait purposes, are unknown to the public. Therefore, take of these species by the public has not been a problem. Scientific collecting is controlled by the State through permits, therefore, scientific collecting and take by private and institutional collectors are not presently identified as threats.
- C. Disease or predation. Predation upon the Pearl darter undoubtedly occurs; however, there is no evidence to suggest that disease or native predators threaten this species. To the extent that disease or predation occurs, it becomes a more important consideration as the total population decreases in number.
- D. The inadequacy of existing regulatory mechanisms. The Pearl darter and its habitats are afforded some protection from water quality and habitat degradation under the Clean Water Act of 1977 (33 U.S.C. 1251 *et seq.*) and the Mississippi Water Pollution Control Law, as amended, 1993 (Code of Mississippi, §§ 49-17-1, *et seq.* and regulations promulgated there under by the Mississippi Commission on Environmental Quality). However, as demonstrated under Factor A, population declines and degradation of habitat for this species are ongoing despite the protection afforded by these laws. While these laws have resulted in some improvement in water quality and stream habitat for aquatic life, including the Pearl darter, they alone have not been fully adequate to protect this species due to inconsistent

implementation, monitoring, and enforcement. Sedimentation and nonpoint-source pollutants continue to be a significant problem. Sediment is the most abundant pollutant in the Pascagoula River Basin and the greatest threat to the Pearl darter. There are currently no requirements within the scope of other environmental laws within Mississippi to specifically consider the Pearl darter or ensure that a project will not jeopardize its continued existence. The Endangered Species Act would bridge the gap between the existing laws and biological needs of the Pearl darter and help to ensure its continued existence.

The State of Mississippi maintains water-use classifications through issuance of National Pollutant Discharge Elimination System (NPDES) permits to industries, municipalities, and others that set maximum limits on certain pollutants or pollutant parameters. For water bodies on the 303(d) list, States are required under the Clean Water Act to establish a Total Maximum Daily Load (TMDL) for the pollutants of concern that will bring water quality into the applicable standard. The State of Mississippi (Mississippi 2008 Section 303(d) List of Impaired Water Bodies) has listed water bodies throughout the counties included within the Pascagoula River, many of which include or are the upstream portion of the Pearl darter's range. Specifically for sediment, the State of Mississippi has proposed TMDL's for several tributaries and main stem of the Leaf and Chickasawhay rivers all within the Pascagoula River watershed. TMDL's for other pollutants, such as pesticides and nutrients (Mississippi Department of Environmental Quality 2003, 2005), are also proposed.

The State of Mississippi water quality standards adopted from the national standards set by the United States Environmental Protection Agency (USEPA) appear to be protective of the Pearl darter as long as discharges are within permitted limits and enforced according to the provisions of the Clean Water Act. These water quality requirements were established with the intent to protect all aquatic resources within the State of Mississippi and are presumed to be protective of the Pearl darter. The Service is currently in consultation with the USEPA to evaluate the protectiveness of criteria approved in USEPA's water quality standards for threatened and endangered species and their critical habitats as described in the Memorandum of Agreement our agencies signed in 2001 (66 FR 11201). Because the Pearl darter is not currently a federally listed species, it is not considered in the ongoing consultation with USEPA. However, the Pearl darter does receive ancillary protection within its habitat from two listed species, the Gulf sturgeon and yellow blotched map turtle.

In summary, the Pearl darter and its' habitat is currently protected by existing water quality laws and regulations regarding pesticides and nutrients. However, existing regulatory mechanisms have not been adequate enough to protect the species from sediment runoff and turbidity within its habitat associated with land surface runoff from urbanization and other land use activities and municipal/industrial discharges, as described under Factor A.

- E. Other natural or manmade factors affecting its continued existence. The current range of the Pearl darter is restricted to localized sites within the Pascagoula River drainage. Subsequently, genetic diversity has likely declined due to fragmentation and separation of Pearl darter populations. Interbreeding populations of Pearl darters are becoming increasingly disjunct. This disjunct distribution makes Pearl darter populations vulnerable to extirpation from catastrophic events, such as toxic spills, large in-stream-gravel mining

projects, or changes in flow regime. The long-term viability of a species is founded on conservation of numerous local populations throughout its geographic range (Harris 1984, pp. 93-104). These features are essential for the species to recover and adapt to environmental change (Noss and Cooperrider 1994, pp.264-297; Harris 1984, pp.95-104).

In August 2005, Hurricane Katrina destroyed much of the urban and industrial areas along the lower Pascagoula and also impacted the ecology up river to the confluence with the Leaf and Chickasawhay rivers. Many toxic chemicals from grounded and displaced boats and ships, storage facilities, vehicles, business and other sources were reported in the waters along with a substantial increase in salt water concentration and woody debris within the entire Pascagoula River system. Initial assessment identified several fish kills and an increased surge of organic material into the waters lowering dissolved oxygen levels.

In summary, the small, isolated populations of the Pearl darter make this species vulnerable to other natural or manmade factors, such as inbreeding, spills, and/or associated impacts from hurricanes.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

The University of Southern Mississippi has begun surveying the upper Pearl River (above the Ross Barnett Reservoir) for Pearl darters (2010-2011).

The Mississippi Museum of Science plans in 2009-2010 to pursue the differentiation of population genetics and viability of the Pearl darter (*Percina aurora*) using microsatellite DNA markers through Section 6 funding.

Conservation Fisheries Inc. (2006) has developed techniques for the propagation of Pearl darters. However, obtaining sufficient numbers of Pearl darters for husbandry efforts has been difficult and has met limited success.

SUMMARY OF THREATS

The Pearl darter is vulnerable to non-point source pollution caused by urbanization and other land use activities; gravel mining and resultant changes in river geomorphology, especially head cutting; and the possibility of water quantity decline from the proposed Department of Energy Strategic Petroleum Reserve project and a proposed dam on the Bouie River. Additional threats are posed by the apparent lack of adequate state and federal water quality regulations due to the continuing degradation of water quality within the species' habitat. The Pearl darter's localized distribution and apparent low population numbers may indicate a species with lower genetic diversity and would also make this species more vulnerable to catastrophic events. We find that this species is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

RECOMMENDED CONSERVATION MEASURES

- Protect habitat integrity and quality within the entire watershed.
- Consider options for river and stream mitigation strategies that give high priority to avoidance of sensitive areas and restoration.
- Promote voluntary stewardship to reduce non-point and point source pollution.
- Encourage and support community based watershed stewardship planning and action.
- Continue basic research concerning natural history and husbandry techniques of the species.
- Continue surveys for the species within the Pascagoula watershed and the Pearl River watershed.
- Continue networking with partners and other interested stakeholders through educational outreach and the use of best management practices.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8*
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Magnitude: The Pearl darter is located within approximately 144 miles of one drainage system. The magnitude of threats is moderate to low since the threats have a localized impact on the species and its' habitat. Water quality degradation is the most pervasive threat but this threat is not significant within the areas protected through The Nature Conservancy ownership and other areas where BMPs are routinely practiced. Sand and gravel mining impacts are also more

sporadic in occurrence. Potential threats from a proposed dam and possible expansion of Department of Energy Strategic Petroleum Reserve would have localized impacts on the species. For these reasons, we have determined that the magnitude of threats is moderate to low.

Imminence: Federal and state water quality laws have partially reduced major water quality threats. However, despite these efforts water quality degradation from point and non-point source pollution continues to impact localized portions of this species' habitat. Sand and gravel mining operations within the drainage are also an ongoing threat. Thus, we have determined the threats are imminent since they are currently ongoing.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. Although populations of the Pearl darter have been impacted, these impacts can be corrected with careful land and water use practices involving best management practices and enforcement of existing laws and regulations involving water quality, quantity, sediment, and erosion control.

Non-point pollution threats and modification of reach geomorphology and hydrology are cumulative and gradual and the species is in no immediate danger of extinction.

DESCRIPTION OF MONITORING: The Mississippi Natural Science Museum has monitored reaches of the Chickasawhay, Leaf, Bouie and Pascagoula rivers for the Pearl darter on a regular basis. More recently (2009-2010), Jake Schaefer (the University of Southern Mississippi) began monitoring the status of the Pearl darter.

COORDINATION WITH STATES

The State of Mississippi reviewed the candidate form and provided comments. The Pearl darter is listed as a Tier-1 species in the Mississippi's Comprehensive Wildlife Conservation Strategy, 2005-2015 (2005, p.408) the Mississippi State Wildlife Action Plan.

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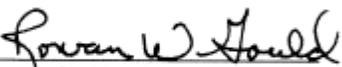
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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:  June 15, 2010
for Regional Director, Fish and Wildlife Service Date

Concur:  Date: October 22, 2010
ACTING
Director, Fish and Wildlife Service

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: March, 2010

Conducted by: USFWS Jackson MS, Field Office