Maryland darter
(*Etheostoma sellare)*

5-Year Review:
Summary and Evaluation

July 2007

U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
Annapolis, Maryland

5-YEAR REVIEW
Maryland darter (*Etheostoma sellare)*

1.0 GENERAL INFORMATION

1.1 Reviewers

U.S. Fish and Wildlife Service: Mary Parkin

Others: Jim McCann, Dave Brinker, and Jay Killian of Maryland Department of Natural Resources

Dr. Richard Raesley of Frostburg State University, Frostburg, Maryland

Lead Regional Office

Northeast Regional Office, Mary Parkin, 413-253-8617

Lead Field Office

Chesapeake Bay Field Office, Andy Moser, 410-573-4537

Cooperating Offices

Not applicable

1.2 Methodology used to complete the review: This 5-year review was developed by the U.S. Fish and Wildlife Service's (USFWS) Chesapeake Bay Field Office staff, with Andy Moser serving as the lead biologist and primary author. Data for this review were solicited from interested parties through a January 29, 2007, Federal Register (FR) notice and through a January 31, 2007, electronic mail soliciting new information from interested parties. Information was provided by biologists from the Maryland Department of Natural Resources and by Dr. Richard Raesley of Frostburg State University. A conference call was held with interested parties on April 9, 2007, to discuss past survey efforts and future survey needs to document the current status of the Maryland darter.

1.3 Background: A 5-year review normally evaluates information obtained since the last formal status assessment. The 1985 Recovery Plan revision constitutes the Maryland dater's last formal status assessment. However, because the Maryland darter was last observed in 1988, an assessment of the darter's status is best seen in light of the longer history of surveys for this species. This review will evaluate the history of surveys for the Maryland darter since it was first described based on a 1912 collection from Swan Creek in Harford County, Maryland (Radcliffe and Welsh 1913).

1.3.1 FR Notice citation announcing initiation of this review

Endangered and Threatened Wildlife and Plants; Initiation of a 5-Year Review of Ten Listed Northeastern Species (72 FR 4018-4019, January 29, 2007)

1.3.2 Listing history

FR notice: Endangered Species Notice (32 FR 4001)
Date listed: March 11, 1967
Entity listed: Species
Classification: Endangered

1.3.3 Associated rulemakings

Critical Habitat designated (49 FR 34228, August 29, 1984)

1.3.4 Review history

The Maryland darter was included in cursory 5-year reviews conducted for all listed species between 1979 and 1991, as follows:

1. May 21, 1979 (44 FR 29566) – review of all species listed prior to 1975

2. July 22, 1985 (50 FR 29901) – all species listed before 1976 and in 1979-80, resulting in a 1987 notice of completion (no change) on July 7, 1987 (52 FR 25522)

3. November 6, 1991 (56 FR 56882) – all species listed before 1991

In addition, on December 15, 1996 (61 FR 5971) – a "not substantial" finding was made for a petition to delist the Maryland darter.

1.3.5 Species' recovery priority number at start of 5-year review

5 -- This recovery priority number is indicative of a species facing a high degree of threat and with a low recovery potential.

1.3.6 Recovery Plan

Name of plan or outline: Maryland Darter Recovery Plan, 1st Revision
Date issued: September 1985
Previous plan: Maryland Darter Recovery Plan, February 2, 1982

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate? Yes

2.1.2 Is the species under review listed as a DPS? No

2.1.3 Was the DPS listed prior to 1996? Not applicable

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy? No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?
Yes, the final plan contains a recovery objective which includes criteria for downlisting to threatened. No criteria were developed for delisting, because this was not considered possible given known conditions.

2.2.2 Adequacy of recovery criteria

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?
No. The 1985 recovery plan does not reflect the lack of sightings or inability to find the species since 1988. New, albeit limited, information concerning water quality and fish populations found within the habitats of this species has also become available since the recovery plan was issued. There is no new information on the biology of the species.

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria? No

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met.
The criteria for downlisting to threatened are:

1) Protect, maintain, and enhance the present population and habitat of the Maryland darter in order to restore a stable and self-sustaining population. **This criterion has not been met. The sole extant population (in Deer Creek) known at the time of recovery plan completion has not been restored. In fact, the Maryland darter**

has not been observed or collected since 1988 at this, or any other, site, in spite of intensive survey efforts.

2) Six additional such populations are found in disparate locations. **This criterion has not been met. No additional populations have been found.**

2.3 Updated Information and Current Species Status

2.3.1 Biology and habitat

2.3.1.1 New information on the species' biology and life history: No new information has become available since 1985.

2.3.1.2 Abundance, population trends, demographic features, and/or demographic trends: All collections or observations of the Maryland darter have occurred in three Harford County, Maryland, streams: Swan Creek, Gashey's Run, and Deer Creek. The species was originally described based on specimens collected from Swan Creek in 1912 (Radcliffe and Welsh 1913) but was never collected there again, despite significant search efforts (USFWS 1985). The species was not rediscovered until 1962, when a single juvenile was collected in Gashey's Run, a tributary of Swan Creek. A second Maryland darter, an adult female, was collected from Gashey's Run in 1965, but the species has not been collected or observed there since. Also in 1965, the species was found for the first time in Deer Creek; more than 70 individuals were collected from Deer Creek indicating that this was the most significant of the three locations. Additional sightings of the darter in Deer Creek, using seines or by snorkeling, were made irregularly from 1974 through 1988. Numbers observed during this period ranged from 1 to 10. There have been no further observations of the darter since 1988. Intensive surveys to find the Maryland darter in 1991 and 1992 were unsuccessful (Raesly 1991 and 1992). In 1998, following the passage of nearly 10 years without observations of the darter, the USFWS met with Maryland Department of Natural Resources biologists and Dr. Richard Raesley of Frostburg State University to design a survey program for obtaining reliable data on the current population status of the Maryland darter. The program called for 4 years of intensive sampling in six tributary streams to the lower Susquehanna, with sampling effort concentrated in the three historical localities of Deer Creek, Gashey's Run, and Swan Creek. Unfortunately, due to a number of issues including limited funding, only 1 year of this survey effort was completed (D. Brinker, MDDNR, pers. comm.).

A number of more recent surveys have been conducted by the Maryland Biological Stream Survey (MBSS) in the probable historic range of the Maryland darter. During the years 2001 through 2006, MBSS surveyed six sites in Deer Creek proper and 22 other sites in the Deer Creek watershed, one site in Gashey's Run, one site in mainstem Swan Creek, and four other sites in the Swan Creek watershed (Killian 2007). However, these surveys did not focus on the lower portions of these Susquehanna tributaries and did not target specific historical Maryland darter locations, as was envisioned in the 1998 recommendations for a survey program.

The Maryland darter has only been infrequently observed since its discovery in 1912. Given the difficulty of detection, the failure to find any specimens since 1988 (despite intensive sampling in 1991 and 1992) is not definitive evidence of extinction (Raesly 1996). Etnier (1994) has stated that it is not uncommon for rare species of fish to be absent from samples at a given location for long periods of time and then to reappear in samples taken subsequently in the same location. A recent example of this occurred with another darter, the stripeback darter (*Percina nottogramma)*, in Maryland. The stripeback darter had been considered extirpated in Maryland, because it had not been observed in Maryland streams for 51 years; however, it was rediscovered in Maryland in 1995 (61 FR 5971, February 15, 1996).

2.3.1.3 Genetics, genetic variation, or trends in genetic variation: No new information

2.3.1.4 Taxonomic classification or changes in nomenclature: No new information

2.3.1.5 Spatial distribution, trends in spatial distribution, or historic range: Not applicable with respect to current distribution. See 2.3.1.2, above, for historical distribution and past trends.

2.3.1.6 Habitat or ecosystem conditions: There is some evidence that the suitability of habitat in lower Deer Creek (the only location known to support the Maryland darter at the time of the 1985 recovery plan revision) has decreased, possibly due to water quality degradation and effects of residential development in the watershed. Raesly (1991) reported that between 1986 and 1990 the numbers and diversity of fishes was greatly reduced at this location. Sampling at this site on June 12, 1986, produced 695 individual fishes distributed among 24 species, while the same sampling effort on May 25, 1990, yielded only 45 individuals and

10 species (Raesly 1991). Raesly (1991) also reported that nitrate and chloride concentrations were significantly elevated at this site. However, the role of poor water quality in the decline of fish species richness and abundance in Deer Creek in recent years is largely unknown (Raesly 1992).

2.3.2 Five-factor analysis

2.3.2.1 Present or threatened destruction, modification or curtailment of habitat or range: See 2.3.1.6 above. No other new information is available.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes: No new information/not applicable at current time

2.3.2.3 Disease or predation: No new information/not applicable at current time

2.3.2.4 Inadequacy of existing regulatory mechanisms: The species' apparent decline and the further decline in water quality and additional residential development in the watershed is indicative of inadequacy of regulations. Implementation of the Endangered Species Act regulatory mechanisms for this species is contingent on establishing its presence.

2.3.2.5 Other natural or manmade factors affecting its continued existence: The very low numbers of Maryland darter that have been observed since the species was listed, particularly the absence of any collections or observations of the species since 1988, are a clear indication of the species' vulnerability to small population effects such as inbreeding depression.

2.4 Synthesis

The discussion in section 2.3.1.2 summarizes the Maryland darter's survey history and what we know about its current status. The Maryland darter has been only infrequently observed since its discovery in 1912. However, given its difficulty of detection, the failure to find any specimens since 1988 – notwithstanding intensive sampling in 1991 and 1992 – is not definitive evidence of extinction. There have been long periods in the past when the species was not found despite significant survey efforts, and Etnier (1994) has stated that it is not uncommon for rare species of fish to be absent from samples at a given location for long periods of time and then to reappear in samples taken subsequently in the same location.

At this time, the central question in regard to the status of this species is whether it continues to survive. Although the darter has not been observed for 19 years, the exhaustive survey effort recommended by the Service and its partners in 1998 has never been completed, resulting in a high degree of uncertainty about the darter's status. This leads us to conclude that at least 2 more years of intensive surveying should be completed to provide the data upon which to base a status determination. Until those surveys are completed, it is our recommendation that the Maryland darter's status as an endangered species remain unchanged.

3.0 RESULTS

3.1 Recommended Classification: Endangered. No change is needed.

3.2 New Recovery Priority Number: Unchanged (5)

Brief rationale: The darter continues to be classified as a species, and it continues to face a high degree of threat to its continued existence and low recovery potential, based upon its exceedingly precarious population status and continuing threats to its known habitat.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

To provide reliable data upon which to base a decision concerning the Maryland darter's continued existence, it is recommended that at least 2 additional years of intensive surveying for the Maryland darter, by electrofishing/seining, be completed in the lower reaches of six Susquehanna River tributaries (Deer Creek, Gashey's Run, Swan Creek, Broad Creek, Octaroro Creek, and Conowingo Creek), with emphasis on the three streams having historic records for the species (Deer Creek, Gashey's Run, and Swan Creek).

5.0 REFERENCES

Etnier, D.A. 1994. Our Southeastern Fishes – What Have We Lost and What Are We Likely to lose. Proceedings of the Southeastern Fishes Council 29: 5-9.

Killian, J. 2007. Electronic mail of 3/29/07 responding to the USFWS' request for new information on the Maryland darter.

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Raesly, R.L. 1991. Population Status of the Endangered Maryland Darter, *Etheostoma sellare*, in Deer Creek. Report submitted to the Maryland Natural Heritage Program. 28pp.

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Raesly, R.L. 1996. Summary of Proposed Work for the Determination of the Population Status of the Maryland Darter, *Etheostoma sellare*. 6pp.

U.S. Fish and Wildlife Service. 1985. Maryland Darter Recovery Plan, 1st revision. Newton Corner, Massachusetts. 38pp.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of the Maryland Darter

Current Classification: Endangered

Recommendation resulting from the 5-Year Review: No change needed.

Appropriate Listing/Reclassification Priority Number, if applicable: Not applicable

Review Conducted By: Andy Moser, Chesapeake Bay Field Office.

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve Mary Ratnaswamy, Program Supervisor For John Wolflin, Field Supervisor Date 9/28/2007

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

Approve Thomas J. Healy Acting Date 10-05-07

Thomas J. Healy