Recovery Plan

For the

Yellowcheek Darter (*Etheostoma moorei*)

Photo courtesy of: J.R. Shute, Conservation Fisheries, Inc.

Prepared by:
Yellowcheek Darter Recovery Team

and

U.S. Fish and Wildlife Service
Arkansas Ecological Services Field Office
Conway, Arkansas

For:
Southeast Region
U.S. Fish and Wildlife Service
Atlanta, Georgia

for Approved: _____
Regional Director, U.S. Fish and Wildlife Service

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Recovery plans delineate reasonable actions that are believed necessary to recover and/or protect the species. Plans are prepared by the U.S. Fish and Wildlife Service (Service), sometimes with the assistance of recovery teams, contractors, State agencies, and others. Plans are reviewed by the public and subject to additional peer review before they are adopted by the Service. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not obligate other parties to undertake specific tasks. Recovery plans do not necessarily represent the views nor the official positions or approval of any individuals or agencies involved in the plan formulation, other than the Service. They represent the official position of the Service only after they have been signed by the Regional Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks. By approving this document, the Regional Director certifies that the information used in its development represents the best scientific and commercial data available at the time it was written. Copies of all documents reviewed in development of the plan are available in the administrative record, located at the Service's Arkansas Field Office, Conway, Arkansas.

Suggested citation:

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Recovery Plan for

Yellowcheek Darter (*Etheostoma moorei*)

This recovery plan describes criteria for determining when the Yellowcheek Darter should be considered for delisting, lists site-specific actions that will be necessary to meet those criteria, and estimates the time required and costs for implementing recovery actions to get to recovery. Additionally, cursory information on the species' biology and status are included, along with a brief discussion of factors limiting its populations. A Species Biological Report, which provides a more detailed accounting of the species status, biology, and threats, and a Recovery Implementation Strategy, which describes the activities to implement the recovery actions, is available at http://www.fws.gov/arkansas-es/. The Recovery Implementation Strategy and a Species Biological Report will be updated separately on a routine basis.

Species' Status: The Yellowcheek Darter (*Etheostoma moorei*) was federally listed as endangered on August 9, 2011 (76 FR 48722). The Yellowcheek Darter grows up to 2.5 inches (6.4 cms) total length and is endemic to the Devils, Middle, South, and Archey forks of the Little Red River in Arkansas. We have assigned the Yellowcheek Darter a recovery priority number of 2C (48 FR 43098), which reflects a high degree of threat and high recovery potential. A total of 102 river miles (164 rkm) in four streams (Middle, South, Archey and Devils forks of the Little Red River) was designated as critical habitat on October 16, 2012 (77 FR 63604). Critical habitat is located in Cleburne, Searcy, Stone, and Van Buren Counties, Arkansas. The Yellowcheek Darter is ranked by Arkansas Natural Heritage Commission as an S1G1 species (extremely rare in Arkansas and critically imperiled globally). The Arkansas Game and Fish Commission ranks the fish species as their top priority among fish species of greatest conservation need in the state (Anderson 2006).

Habitat Requirements and Limiting Factors: The Yellowcheek Darter inhabits high-gradient headwater tributaries with clear water, permanent flow, moderate to strong riffles, and gravel, cobble, and boulder substrates (Robison and Buchanan 1988). Prey items consumed by the Yellowcheek Darter include blackfly larvae, stoneflies, mayflies and other aquatic insects.

The Yellowcheek Darter is threatened primarily by factors associated with the present destruction, modification, or curtailment of its habitat or range. Threats include impoundment, sedimentation from a variety of land uses including dirt and gravel roads, poor livestock grazing practices, improper timber harvest practices, nutrient enrichment, gravel mining, channelization/channel instability, increased stream drying due to water withdrawal and climate change, and natural gas development. Climate change also is likely to adversely affect the species due to alteration of hydrologic cycles of headwater streams, but the extent or magnitude of this threat has not been quantified at this time.

Recovery Strategy: The primary strategy for recovery of Yellowcheek Darter is to conserve the range of genetic and morphological diversity of the species across its historical range; fully quantify population demographics and status within each of the four forks; improve population size and viability within each fork; reduce threats having the greatest adverse effect on the

species within each river; emphasize voluntary soil and water stewardship practices by citizens living and working within the upper Little Red River watershed; and use captive propagation to prevent local extirpation within forks where recruitment failure is occurring.

Yellowcheek Darter recovery will require an increased understanding of the status of the species throughout its range; developing information on life history, ecology, mortality, and habitat requirements; improving our understanding of some poorly understood threat factors potentially affecting the species; and using that information to implement management actions to promote recovery. Local landowners will be encouraged to participate in voluntary stewardship programs like the programmatic Safe Harbor Agreement for yellowcheek darter. Local, state and federal entities will be engaged to ensure existing water quality standards are adequate to promote species recovery and that best management practices to achieve those standards are systematically implemented.

Conservation and recovery of the species will require human intervention for the foreseeable future. It is known that human activities, population numbers, and associated adverse effects will change within watersheds, particularly those associated with activities like natural gas development. Therefore, it is essential to characterize and monitor aquatic habitats on a watershed scale, and respond to changing conditions rapidly, whether through negotiation and partnerships to alleviate threats, or through husbandry and augmentation and/or reintroduction of populations in appropriate areas. This approach will require monitoring extant populations of the yellowcheek darter and characterizing current habitat conditions in each watershed.

Recovery Goal: The goal of this recovery plan is to ensure the long-term viability of the yellowcheek darter in the wild to the point that it can be delisted from the *Federal List of Endangered and Threatened Wildlife* (50 CFR 17.11).

Recovery Criteria: For the Yellowcheek Darter to be considered as recovered, the following criteria must be met:

(1) water quality and quantity in the (1) Middle, (2) South and (3) either Archey or Devils Forks[1], as defined by the best available science (to be refined by recovery actions), supports the long-term survival of Yellowcheek Darter in its natural environment (based on Safe Harbor enrollment and private landowner conservation efforts) (addresses Factors A, D, and E);

(2) streams where the Yellowcheek Darter occurs contain geomorphically stable channels with relatively silt-free, moderate to strong velocity riffles with gravel cobble and boulder substrates that support adequate macroinvertebrate prey items, as defined by reference stream conditions in the Boston Mountain ecoregion (addresses Factors A, D, and E);

[1] Middle and South Forks support the largest Yellowcheek Darter populations; Archey Fork due to its hydrologic connectivity with South Fork provides additional protection from catastrophic events in the South Fork, and Devils Fork populations may be genetically dissimilar to manage as a separate unit pending ongoing research (see Species Biological Report).

(3) healthy, self-sustaining (evident by multiple age classes of individuals, including naturally recruited juveniles, and recruitment rates exceeding mortality rates) natural populations of Yellowcheek Darters, as defined by the best available science (to be refined by recovery actions), are maintained in three of four tributaries (Middle, South, and either Archey or Devils Forks) at stable or increasing levels during a 30-year period (trend based on surveys conducted every three years via standard protocol and incorporating species recovery period from extreme droughts) (addresses Factors A and E); and

(4) a captive propagation, augmentation and reintroduction plan has been established, and a contingency plan is in place to ensure the survival of the species should a catastrophic event affect portions of a wild population (addresses Factor E).

(5) The measures mentioned above have been realized and demonstrated effective via monitoring efforts (addresses Factors A, D, and E);

(6) Commitments are in place to maintain conservation measures and recovered status (addresses Factor A).

Actions Needed:

(1) **Aid in recovery of the Yellowcheek Darter by protecting the habitat integrity and quality of stream reaches that currently support or could support the Yellowcheek Darter (Priority 1)[2].** Stemming the decline and loss of aquatic habitats throughout the known range of the Yellowcheek Darter is essential for recovery of the species. Stream reaches known to be occupied by endangered or threatened aquatic species are generally protected by provisions of the Endangered Species Act from federally funded or permitted actions that could adversely modify supporting habitats or jeopardize the continued existence of the animal. Non-federal activities on private lands that comprise the bulk of Yellowcheek darter habitat require proactive efforts by the Service and natural resource managers to work cooperatively with private landowners to achieve recovery objectives.

(2) **Promote voluntary stewardship as a practical and economical means of reducing nonpoint source pollution from private land use (Priority 2).** Best Management Practices (BMPs) can be effective and practical actions identified to prevent or reduce nonpoint source pollution from specific land use activities. For example, agricultural BMPs are designed to reduce sediments, animal wastes, fertilizers, and pesticides in storm water runoff (Benthrup 2008). Silviculture BMPs include actions to minimize sediments, nutrients, organics, other chemicals, and stream canopy removal (AFC 2002). Natural gas development BMPs have been created specifically to address such activities in the Fayetteville Shale region of Arkansas (Service 2009; Service 2007). BMPs are developed by state and industry planning

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[2] **Priority 1** - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly.
Priority 2 – An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.
Priority 3 – All other actions necessary to provide for full recovery of the species.

partnerships with public participation, and can be effective when they are properly implemented and adequately maintained. BMPs, however, are not always fully implemented or maintained. Industry groups and organizations, and state resource agencies should continue to promote and improve BMPs when necessary as a non-regulatory approach to aquatic habitat management.

(3) **Develop a spill prevention and management plan for the upper Little Red River watershed (Priority 3).** A plan to avoid catastrophic spills of pollutants and/or contaminants within streams of the upper Little Red Watershed should be developed and implemented. Chemicals used in the hydraulic fracturing process for natural gas extraction and other potentially detrimental chemicals are routinely transported across streams supporting the Yellowcheek Darter. Appropriate plans of action for responding to potentially catastrophic spills are essential to aid municipalities in mitigating contamination of drinking water and other environmental resources. Methodology for evaluating the effectiveness of this plan should be developed and that effectiveness should be monitored and evaluated regularly, and as necessary, modified as new information and/or hazardous materials information becomes available.

(4) **Conduct research to aid recovery efforts for the Yellowcheek Darter (Priority 2).** General aspects of the biology and ecology of the Yellowcheek Darter have been studied, but some data gaps persist. This information may provide insight into past declines, current status of the species, vulnerabilities in the life cycle, and management guidance for future recovery efforts. This information will also help natural resource managers better assess the effects of anthropogenic influences such as natural resource extraction, silviculture, infrastructure development, etc. on Yellowcheek Darter populations. All partners should be aware of research efforts and results, so that information can be immediately applied.

(5) **Develop and implement a monitoring protocol for the Yellowcheek Darter (Priority 3).** Periodic surveys of occupied stream reaches, as well as those known to be historically occupied by the species, should be performed in a repeatable fashion. Yellowcheek Darter habitat and population sizes should be monitored to assess the efficacy of conservation measures implemented for recovery of the species. Surveys should be conducted range wide for the species every three years using a rigorous approach to model gear efficiency (e,g., Peterson and Paukert 2009) or detectability (e.g., Magoulick and Lynch 2015). Changes in distribution/abundance (losses and gains), habitat quality, etc. should be used to focus recovery efforts and adjust priorities as needed. Adequately fund stream gages within the watershed to monitor flow trends and stream drying.

Estimated Cost of Delisting: The estimated costs associated with implementing recovery actions for delisting are an additional $45,320,000. Cost estimates reflect costs for specific actions needed to achieve Yellowcheek Darter recovery. Some costs for recovery actions are not determinable at this time; therefore, the total cost for recovery will be higher than this estimate.

Date of Recovery: As we learn more about this species and its threats and recovery actions are implemented and funded with close cooperation of all partners, we will carefully monitor and

assess progress toward recovery to ensure we are on track with 30 years, 2048, needed for delisting.

Years	Action 1	Action 2	Action 3	Action 4	Action 5	Total Cost
1 – 5	5.6M	53K	50K	365K	100K	6.17M
6 – 10	5.2M	53K			75K	5.33M
11 – 15	10.5M	53K			75K	10.63M
16 – 20	10.1M	53K			75K	10.23M
21 – 25	10.1M	53K			75K	10.23M
26 – 30	2.6M	53K			75K	2.73M
Total	44.1M	318K	50K	365K	475K	45.32M

Peer Review:
The Service published a notice of availability of the Technical/Agency Draft Recovery Plan for Yellowcheek Darter in the *Federal Register* on March 6, 2017 (82 FR 12632). We received no comments from the general public. The Service requested three independent peer reviewers to review and provide comments. We received comments from two peer reviewers: Dr. Lance Williams with the University of Texas at Tyler and Mr. Jeff Quinn with the Arkansas Game and Fish Commission. Both peer reviewers offered general support and praise for the draft plan, in addition to providing editorial suggestions and specific comments that were ultimately addressed in the Recovery Implementation Strategy and Species Biological Report. In addition, we have presented all of the criteria presented in the draft recovery plan as recovery criteria here. We have made no changes to the actual criteria themselves.

Prepared By:
Mitch Wine, Arkansas Ecological Services Field Office and the Yellowcheek Darter Recovery Team including Ethan Inlander (The Nature Conservancy), Dr. Steve Lochmann (University of Arkansas at Pine Bluff), Dr. Dan Magoulick (U.S. Geological Survey Arkansas Cooperative Fish and Wildlife Research Unit), Jim Petersen (U.S. Geological Survey), Chris Davidson and Sherri Shoults (U.S. Fish and Wildlife Service), Jason Throneberry (Arkansas Natural Heritage Commission) and Brian Wagner (Arkansas Game and Fish Commission).

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