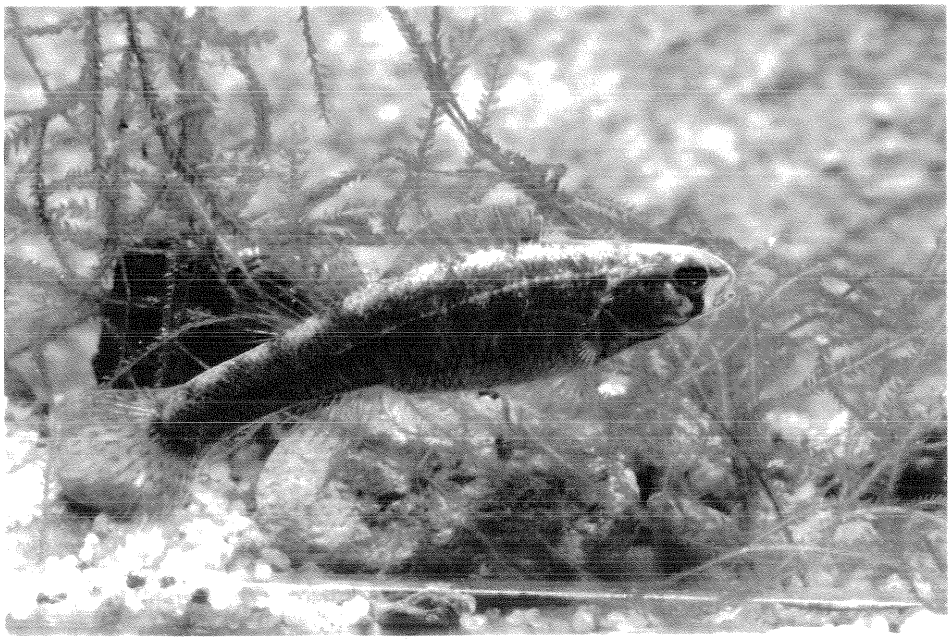
Recovery Outline

For

Rush darter (*Etheostoma phytophylum*)

August 2011



Rush Darter

Conservation Fisheries, Inc., Knoxville, TN.

I. INTRODUCTION

This document outlines a preliminary course of action for the recovery of the rush darter (*Etheostoma phytophilum*) until a comprehensive recovery plan for the species is approved. The rush darter is a small freshwater fish that occupies springs and spring-fed reaches of relatively low-gradient small streams. The rush darter currently occupies three watersheds in Alabama: Clear Creek drainage in Winston County; Turkey Creek drainage in Jefferson County; and the Locust Fork drainage in Etowah County. This fish was listed as an endangered species in the *Federal Register* on August 9, 2011 (76 FR 48722). The primary threat to the rush darter is modification and reduction of its habitat and range. This threat of declined water quality and quantity is due to a variety of human-induced impacts such as siltation runoff into streams near development sites, increased stormwater runoff, groundwater withdrawal, disturbance and channelization of spring heads and spring run corridors, and changes in channel or run hydrology. The species' small, isolated populations also make it vulnerable to natural and human induced catastrophic events (e.g., droughts, resource extraction, pollution spills, etc.).

Listing and Contact Information:

Listing Classification:	Endangered range wide
Effective Listing Date:	September 8, 2011
Lead Agency, Region:	U.S. Fish and Wildlife Service, Southeast Region
Lead Field Office:	Mississippi Ecological Services Field Office
Lead Biologist:	Daniel J. Drennen, 601-321-1127, daniel_drennen@fws.gov
Cooperating Office:	Alabama Ecological Services Field Office

II. RECOVERY STATUS ASSESSMENT

A. BIOLOGY

Taxonomy, Life History, Habitat, Distribution, and Trends

The rush darter was described by Bart and Taylor in 1999 and is closely related to the goldstripe darter (*E. parvipinne*). The goldstripe darter is a drab-colored species with a thin gold stripe along the lateral line (canal along the side of a fish with sensory capabilities) that is surrounded by heavily mottled or stippled sides (Shaw 1996). The distinct gold stripe characteristic of goldstripe darters is not well developed in rush darters (Bart and Taylor 1999). The rush darter has less intense brown pigment on its sides compared to the goldstripe darter. Other characteristics of the rush darter are described in Bart and Taylor (1999). The rush darter is a medium-sized darter (average size 5 cm (2 in) standard length (SL: the length of the fish from

the tip of the snout to its last vertebrate, excluding the length of the tail fin)) in the family Percidae, tribe Etheostomatini, and subgenus *Fuscatelum* (Johnston and Kleiner 2001; Bart and Taylor 1999).

Stiles and Mills (2008) found gravid rush darter females in February and fry (newly hatched larval fish) in late April from pools (Winston County, Alabama). These pools act as fry nursery areas (Stiles and Mills 2008). Little is known specifically about the life history of the rush darter, however, information available for the closely related goldstripe darter suggests that spawning could be occuring from mid-March through June (Mettee *et al.* 1996). Preferred food items for the goldstripe darter include midge larvae, mayfly nymphs, blackfly larvae, beetles, and microcrustaceans (Mettee *et al.* 1996).

Rush darters have been collected from various habitats, including root masses of emergent vegetation along the margins of spring-fed streams in very shallow, clear, cool, and flowing water; and from both small clumps and dense stands of bur reed (*Sparganium* sp.), coontail (*Ceratophyllum* sp.), watercress (*Nasturtium officinale*), and rush (*Juncus* sp.) in streams with substrates of silt, sand, sand and silt, muck and sand or some gravel with sand, and bedrock (Stiles and Mills 2008; Bart 2002; Johnston and Kleiner 2001; Stiles and Blanchard 2001; Bart and Taylor 1999). Rush darters appear to prefer springs and spring-fed reaches of relatively low-gradient small streams (Stiles and Mills 2008; Fluker *et al.* 2007; Bart 2002; Johnston and Kleiner 2001; Stiles and Blanchard 2001; Bart and Taylor 1999). Rush darters have also been collected in wetland pools (Stiles and Mills 2008). Water depth at collection sites ranged from 3.0 cm to 0.5 m (1.2 inches to 1.6 ft), with moderate water velocity in riffles and no flow or low flow in pools. Rush darters have not been found in higher gradient streams with bedrock substrates and sparse vegetation (Stiles and Mills 2008; Bart 2002; Johnston and Kleiner 2001; Stiles and Blanchard 2001; Bart and Taylor 1999).

The rush darter has a restricted distribution (Johnston and Kleiner 2001). Specifically, rush darters have been found in Alabama only in: Doe Branch, Wildcat Branch, and Mill Creek of the Clear Creek drainage in Winston County; an unnamed spring run of Beaver Creek and Penny Springs of the Turkey Creek drainage in Jefferson County; and Cove Spring (Little Cove Creek system) and Bristow Creek of the Locust Fork drainage in Etowah County. Rush darters are generally located above the Fall Line (the inland boundary of the Coastal Plain where softer sedimentary rock switches to harder crystalline rock generally noticeable by waterfalls in streams) in areas where topography and elevation changes present a barrier for fish movement.

Currently, the rush darter occurs within the same drainages it was historically reported from but in a more limited distribution. Within the Clear Creek drainage, the rush darter has been collected in portions of Wildcat Branch, Mill Creek, and Doe Creek (which represents about 13 km (9 mi) of stream or about 89 percent of the species' total cumulative range). The Little Cove Creek and Bristow Creek drainage constitutes a small portion of occupied stream habitat. In the Turkey Creek drainage, rush darters have been collected sporadically within Penny Springs, the type locality for the species (an unnamed spring run in Jefferson County, Alabama) (Bart and Taylor 1999) and in an unnamed tributary of Beaver Creek and an unnamed spring to Beaver Creek (Kuhajda pers. comm.. 2009). This area contains about 1.6 km (1 mi) of occupied stream habitat or approximately 11 percent of the rush darter's total cumulative range.

Where it occurs, the rush darter is apparently an uncommon species that is usually collected in low numbers (compiled from Stiles and Mills 2008; Johnston 2003; Stiles and Blanchard 2001; Johnston and Kleiner 2001; Bart and Taylor 1999; Rakes pers. comm. 2010; Drennen pers. obsv. 2006–2010; Kuhajda pers. comm. 2009); however, there are no population estimates at this time.

The rush darter is ranked by the Alabama Department of Conservation and Natural Resources (ADCNR) (Wildlife and Freshwater Fisheries Division, ADCNR 2005) as a P1G1S1 species signifying its rarity in Alabama and its status as critically imperiled globally. It is also considered a species of Greatest Conservation Need by the state (Bart 2004). The rush darter has a High Priority Conservation Actions Needed and Key Partnership Opportunities ranking of "CA 6," the highest of any fish species listed by the state. The State Wildlife Action Plan states that the species consists of disjoint populations and information is needed to determine genetic structuring within the populations (Wildlife and Freshwater Fisheries Division, ADCNR 2005). Conservation actions for the species may require population augmentation or reintroduction of the species to suitable habitats to maintain viability.

B. THREAT ASSESSMENT

In this outline, we present a summary of threats affecting the rush darter and the species' habitat. A detailed evaluation of factors affecting the species can be found in the listing determination (76 FR 48722). The most significant threat to the rush darter is habitat degradation caused by stormwater runoff and siltation, from an increase in urbanization and impervious surfaces in the watershed. Other threats include spring head alteration, roadside maintenance, industrialization, coal mining, logging and other landscape scale land changing processes. These threats are ongoing. The magnitude of the threats is high due to the rush darter's small population sizes and high levels of alteration and destruction of its springs and streams.

Water and Habitat Quality: Non-point source pollution from land surface runoff can originate from virtually any land use activity and may be correlated with impervious surfaces and storm water runoff. Pollutants may include sediments, fertilizers, herbicides, pesticides, animal wastes, septic tank and gray water leakage, pharmaceuticals, and petroleum products. These pollutants tend to increase concentrations of nutrients and toxins in the water and alter the chemistry of affected streams such that the habitat and food sources for the rush darter are negatively impacted. Construction and road maintenance activities associated with urban development typically involve earth-moving activities that increase sediment loads into nearby streams. Other siltation sources, including timber harvesting, natural gas development activities, clearing of riparian vegetation, mining, and agricultural practices, allow exposed earth to enter streams during or after precipitation events. These activities result in canopy removal, elevated stream temperatures, and increased siltation, thereby degrading habitats used by fishes (similar to the rush darter) for both feeding and reproduction (Mattingly *et al.* 2005 report on blackside dace). Undisturbed riparian corridors are important because they prevent elevated stream temperatures due to solar heating, serve as buffers against non-point source pollutants, provide submerged root materials for cover and feeding, and help to stabilize stream banks (Mattingly *et al.* 2005).

Sediment is a major threat to the rush darter. Within the Clear Creek drainage, Johnston and Kleiner (2001) reported that Doe Branch and Mill Creek have forest surrounding them, and no obvious threats to water quality. Johnston and Kleiner (2001) also reported that clear-cutting in the Wildcat Branch watershed may have increased sedimentation into the stream. Heavy siltation at the County Road 329 Bridge over Doe Branch and at several other road crossings in other tributary streams in the immediate area during a modest spring rain event have been noted (USFWS 2001). Sediment in area streams is also the result of continued erosion from the scouring of roadside ditches and erosion of the graveled County Road 329 adjacent to Doe and Wildcat branches (Drennen pers. obs. 2005, 2011). To begin correcting some of this problem the Winston County Roads Department and the Service have completed an erosion control project involving a road crossing at Wildcat Branch (Drennen pers. obs. 2011).

Blanco (2001) identified siltation from development projects as the greatest threat to the fauna of Turkey Creek. New subdivisions throughout the watershed have increased the impervious surfaces in the recharge areas of springs. The increase in impervious surface is leading to increased stormwater runoff and decreased recharge (water storage) available to the aquifers that feed springs in the watershed. In turn, flow alterations reduce the quantity and complexity of rush darter habitat by eroding stream banks, destabilizing substrates and aquatic vegetation, and decreasing overall water quality. There are 4 major soil types that occur within the Turkey Creek watershed, and all are highly erodible due to steep topography (Spivey 1981). Therefore, activities that remove native vegetation, like roadside and bridge maintenance and construction, within the rush darter habitat in this drainage increases sediment loads and stormwater runoff. Industrialization is expanding throughout the Turkey Creek watershed (Jefferson County) particularly near the type locality (Bart and Taylor 1999, Drennen pers obs 2007-2010), along with an increase in coal mining in the Clear Creek watershed (Winston County).

Point source siltation has impacted the Turkey Creek watershed, including an abundance of sites affecting Beaver Creek, a major tributary to Turkey Creek. These sites are impaired by bridge, road, and sewer line construction; industrialized areas; road maintenance; and storm water mismanagement (Drennen pers. obs. 1999, 2004–2010). Rapid urbanization in this area renders this population extremely vulnerable during the breeding season when rush darters concentrate in wetland pools and shallow pools with aquatic vegetation in headwater streams (Stiles and Mills 2008; Fluker *et al.* 2007).

Springs throughout the rush darter's range, especially in the Turkey Creek watershed, flush and dilute sediments and excessive nutrients from streams by providing a constant flow of cool, clean water. However, the ongoing destruction of spring heads and wetlands throughout the species' range has significantly reduced the species' movement and colonization. Little Cove Creek and Bristow Creek spring heads have been channelized, and the head of Cove Spring has a pumping facility built on it (Fluker *et al.* 2007). Channelization and groundwater withdrawals from spring heads might do more to impact water quality in these systems than overall spring drainage disturbances such as beaver dam construction, and road maintenance (Drennen per. obs. 2005). Alteration of spring head habitats has reduced water quality and increased sediment loads into spring-fed tributary streams throughout the range of the rush darter.

In summary, habitat threats to the rush darter include stormwater runoff and siltation, resulting from an increase in urbanization and impervious surfaces in the watershed. Other threats include spring head alteration, roadside maintenance, and logging. These threats are ongoing. The magnitude of the threats is high due to the rush darter's small population sizes and high levels of alteration and destruction of its springs and streams.

Existing Regulatory Mechanisms: The rush 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.*), however, population declines and degradation of habitat for this species are ongoing despite the level of protection afforded by these laws. These laws have resulted in some improvement in water quality and stream habitat for aquatic life including the rush darter, but have not been adequate to fully protect this species. Stormwater mismanagement, sedimentation, and non-point source pollutants continue to be significant problems. In addition, these laws have not adequately addressed water quantity (withdrawal amounts from certain aquifers), water removal, issues that are a problem throughout the range of the species.

The State of Alabama 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 TMDL for the pollutants of concern that will bring water quality into the applicable standard. The State of Alabama has not identified any impaired water bodies in Jefferson, Winston, and Etowah counties in the immediate or upstream portion of the rush darter range or in any watersheds in Winston or Etowah counties.

Stormwater events are temporary in nature, but can be harmful to aquatic species. The size and frequency of floods and stormwater events increases with urbanization (Konrad 2003). Stormwater events in urban areas decrease the storage capacity for water in urban basins compared to rural basins; and urbanization such as the Turkey Creek watershed, promotes more rapid runoff, higher peak discharge rates, and total volume of water (Konrad 2003). Not only does urbanization and associated runoff change the physical aspects of water resources, but also the chemical and biological conditions of waterways (AMEC Earth and Environmental 2001). The expansion of impervious surfaces in the Turkey Creek Drainage Basin caused an increase in flood heights and water velocity during stormwater events (Jefferson County, Alabama, 2005,). Even though the rush darter's habitat in Winston and Etowah counties is not threatened by industry and urbanization, agriculture, silviculture, and mining have the potential in the future to greatly impact their habitat. In general, flow alterations associated with stormwater runoff reduce the amount and complexity of rush darter habitat by eroding stream banks, destabilizing substrates and aquatic vegetation, and decreasing overall water quality.

In summary, degradation of habitat for the rush darter is ongoing. Despite the laws in place, sedimentation, flow alterations, and non-point source pollution continue to adversely affect the species. Because of the vulnerability of the rush darter's small remaining populations, we find the inadequacy of existing regulatory mechanisms is a threat.

Restricted Range and Population Size
The rush darter has a limited geographic range and small population sizes. Existing populations are extremely localized, and geographically isolated from one another. All populations are dependent on spring systems, and have a propensity to be vulnerable to localized extinctions from toxic spills, spring system habitat modification, runoff from non-point source pollutants, natural catastrophic changes to their habitat such as drought and to other stochastic disturbances. Potential sources of unintentional spills include accidents involving farm or off road vehicles transporting fuels, oils and chemicals for agriculture silviculture and mining, vehicles transporting chemicals over road crossings of streams inhabited by the species and urban and residential applications of yard chemicals such as fertilizers and pesticide into the spring/stream systems. Daming or ponding of small feeder springs along with containerizing the spring head for potable or irrigation water also will impact the general flow and quality of the spring fed system and rush darter habitat.

Climate Change: Climate change has the potential to increase the vulnerability of the rush darter to random catastrophic events (e.g., McLaughlin et al. 2002; Thomas et al. 2004). Climate change is expected to result in increased frequency and duration of droughts and the strength of storms (e.g., Cook et al. 2004). Thomas et al. (2004) report that the frequency, duration, and intensity of droughts are likely to increase in the southeast as a result of global climate change.

Specifically, Fluker *et al.* (2007) reported that drought conditions, coupled with rapid urbanization in watersheds that contain rush darters; render the populations vulnerable, especially during the breeding season when they concentrate in wetland pools and shallow pools of headwater streams. Drought conditions from 2006 to 2007 greatly reduced spawning habitat for rush darter in Jefferson County (Drennen pers. obs. 2007). Survey numbers for the rush darter within the spring-fed headwaters for the unnamed tributary to Turkey Creek during 2007 were reduced due to a lack of water (Kuhajda pers. comm. 2008). In Winston County, Stiles and Mills (2008) noted that Doe Branch almost completely dried up during the summer of 2007 (Stiles pers. comm. 2008).

Summary: The rush darter is threatened by the destruction, modification, or curtailment of its habitat or range, the inadequacy of existing regulatory mechanisms, and other natural and manmade threats. Activities associated with surface coal mining, silviculture, agriculture, road construction, and urban development have caused chemical and physical degradation of habitats across the species' range. These threats continue despite the protection afforded by State and Federal laws and corresponding regulations. The species' restricted range and small population sizes make it vulnerable to localized extinctions from intentional or accidental chemical spills, habitat modification, natural or human-induced catastrophic change, and decreased fitness due to reduced genetic diversity. These problems may be exacerbated by the effects of climate change, which could intensify or increase the frequency of drought events. All of these threats are considered imminent and of high magnitude throughout the species' entire range.

C. CONSERVATION ACTIONS

There are no written agreements currently in place for this species or its habitat. As mentioned, the rush darter and its habitats are afforded some protection from water quality and habitat degradation under the Clean Water Act and the Alabama Water Pollution Control Act, as

amended, 1975 (Code of Alabama, §§ 22-22-1 to 22-22-14). Sediment is the most abundant pollutant in the Mobile River Basin and is among the greatest threats to the rush darter.

The State of Alabama maintains water-use classifications through issuance of 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 TMDL for the pollutants of concern that will bring water quality into the applicable standard. The State of Alabama has not identified any impaired water bodies in Jefferson, Winston, and Etowah counties in the immediate or upstream portion of the rush darter range or in any watersheds in Winston or Etowah counties. However, sedimentation events are usually related to stormwater runoff episodes, and are usually not captured by routine water quality sampling.

Within Jefferson County (Turkey Creek watershed), there is a very active watershed protection group (START). Along with the Freshwater Land Trust and the City of Pinson, the Turkey Creek watershed has had direct conservation actions, such as Fee Title transfer or voluntary protection, directed toward the mainstem and many of the peripheral streams and springs.

Within Winston and Etowah counties, the majority of the rush darter habitat is within private ownership. Little formal habitat conservation has been achieved in these areas besides initial mapping for land use and planning. However some landowners within the three counties have protected rush darter habitat using their own resources.

The Winston County Roads Department has assisted the Service in preventing gravel from altering Wildcat Branch along the county road crossing. The county has become a very important partner in the conservation of the species.

In Etowah County, a particular landowner has routinely considered the rush darter in his farming and water management strategies by providing necessary best management practices in preventing habitat alterations to Cove Springs and the Cove Spring run.

Conservation Fisheries, Inc. has successfully developed husbandry and captive propagation techniques for the species. Having this information will enable the Service to establish a living ark of the three county populations that are genetically distinct. These populations can be used for augmentation or reintroduction.

III. PRELIMINARY RECOVERY STRATEGY

A. RECOVERY PRIORITY NUMBER WITH RATIONALE

The rush darter is assigned a recovery priority of 5, based on the imminent threat of water quality deterioration (i.e., increased sedimentation due to urbanization, road maintenance, and silviculture practices), indicating that the species faces a high degree of threat and demonstrates a low recovery potential. The recovery potential is considered low for the rush darter because the majority of its range within two of the three known sites has had significant impairment of the water quality, water quantity and geomorphology of the spring systems.

B. RECOVERY STRATEGY

Distinguish and monitor aquatic habitats within the species' range. Monitor populations of the species throughout the species' range. During episodes of habitat or water quality and water quantity deterioration, respond quickly to the challenge by direct habitat and species protection or conservation response. Engage negotiation and advice of partners, landowners and stakeholders to reduce and alleviate species' threats.

C. INITIAL ACTION PLAN

Recovery actions for the rush darter will focus on protection of existing habitat and monitoring. Recovery actions include:

1. Jointly work with the NRCS and others to determine land cover and usage within the watersheds of the three counties containing the rush darter. Identify and prioritize areas in the Cove Creek (Etowah County), Clear Creek (Winston County) and Turkey Creek (Jefferson County) basins for protection, enhancement, and restoration.

2. Catalogue and determine the status and threats to all springs that drain into the rush darter habitat and prioritize those accordingly to opportunities for enhancement and conservation including the spring head and spring run, by using various conservation programs and acquisition methods available.

3. Work cooperatively with the Alabama Department of Conservation and Natural Resources, Alabama Department of Transportation, and the Winston, Jefferson and Etowah Counties Road Departments to protect current habitat integrity and quality and to improve specific segments of habitat that support the species with the following actions:

    a) Determine and map by GPS and GIS all points where roads cross the habitat of the rush darter (three counties); evaluate and rank their status as a fish passage barrier (National Inventory and Assessment Procedure, USDA, 2005); from rankings determine model projects for each county and obtain funds for a demonstration project showing removal or modification of fish passage barrier.

    b) In Jefferson County:

        1) Protect the type locality for the rush darter, adjacent to Highway 79 by installing car railings to prevent accidental entry; by habitat restoration activities through funding sources that could include Partners for Fish and Wildlife funding, and by working to obtain the upper spring run and spring head of the type locality by fee title or conservation easement.

        2) Work to obtain the upper spring run and spring head of the Unnamed Tributary to Beaver Creek by fee title or conservation easement or through other funding sources.

3) Work with the City of Pinson and industry along the unnamed tributary of Beaver Creek to establish a 50 foot buffer zone; similar to the zone established by the Town of Trussville, Alabama (City of Trussville, 2001.).

4) Continue supporting the Turkey Creek Nature Preserve. Increase support for community based watershed stewardship planning, outreach and action within the Turkey Creek Watershed.

5) Organize and implement a rush darter best management practice (BMP) workshop with the county DOT and with the City of Pinson for road crews to find better ways to protect this fish's habitat.

6) Continue supporting the Freshwater Land Trust with their conservation projects and acquisitions within the area.

c) In Winston County:

1)

a) Organize a Wildcat Branch/Doe and Mill Creek watershed group based on the Turkey Creek Nature Center model.

b) Determine land ownership of the entire reaches of Wildcat Branch, Mill Creek and Doe Branch.

c) Evaluate land management procedures on each parcel and as appropriate assist in BMP's and/or more species' friendly land management practices.

d) Pave saddles and stream crossings at all sites within the rush darter's habitat to prevent erosion of gravel into the stream.

e) Obtain an MOU between the coal industry and the Service that highlights an awareness of the species and its habitat and cooperatively highlights ways the coal industry in working with the Service can find new ways and measures to protect this fish. Network with the coal industry and provide incentives for protection of sites or future sites within the Clear Creek watershed (Rush darter habitat area).

d) In Etowah County:

1)

a) Organize a Little Cove Creek and Bristow Creeks watershed group based on the Turkey Creek Nature Center model.

b) Determine land ownership of the entire reaches of Little Cove Creek and Bristow Creeks.

c) Evaluate land management procedures on each parcel and assist in BMP's and/or more species' friendly land management practices.

d) Complete an MOU with Etowah Water and Sewer concerning water extraction, chlorination, maintenance procedures and cleaning processes at Little Cove Spring. Network with the Water Company and provide incentives for protection of the site through adequate safeguards to prevent spills and notification of the Service if problems occur.

4. Continue to support voluntary, cooperative agreements with landowners as a practical and economical means of reducing nonpoint pollution from private land use.

5. Conduct basic research on the rush darter and apply the results toward management and protection of the species. Monitor existing rush darter populations and their habitats; initiate searches for unknown populations, especially in the upper Bristow Creek watershed.

6. Continue to develop and implement technology for maintaining and propagating the rush darter in captivity.

IV. PREPLANNING PROCESS

A. PLANNING APPROACH

A recovery plan will be prepared for the rush darter. The recovery plan will include objective and measurable criteria which, when met, will ensure the conservation of the species. Recovery criteria will address all meaningful threats to the species, as well as estimate the time and the cost to achieve recovery. The recovery plan will be prepared by the Mississippi Ecological Services Field Office, with review by the Daphne, Alabama Ecological Services Field Office. The draft recovery plan should be finalized and sent to the Regional Office for review in December 2013. The final recovery plan should be finalized and sent to the Regional Office for review by July 2014. These timelines may be affected by available resources and regional priorities.

B. STAKEHOLDER INVOLVEMENT

During the recovery planning process, input, comments and review will be sought from multiple stakeholders within Alabama. These will include State and Federal agencies, industrial and agricultural groups, research universities, and conservation organizations. Many stakeholders are currently cooperating in ongoing aquatic conservation planning and action groups within the Turkey Creek basin (Jefferson County). Some stakeholders within the Winston County and Etowah County rush darter habitats are providing voluntary conservation efforts for the protection of the rush darter on their land. The Winston County Roads Department has protected the rush darter at the Wildcat Branch crossing and is currently assisting the Service in identifying other conservation projects.

Approve: Mark J Musaus Date: 10/7/11

Regional Director, Region 4

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