

CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: Etheostoma phytophilum Bart and Taylor 1999

COMMON NAME: rush darter

LEAD REGION: 4

INFORMATION CURRENT AS OF: February 2003

STATUS/ACTION (Check all that applies):

- New candidate  
 Continuing candidate  
     Non-petitioned  
     Petitioned - Date petition received: \_\_\_\_  
         90-day positive - FR date: \_\_\_\_  
         12-month warranted but precluded - FR date: \_\_\_\_  
         Is the petition requesting a reclassification of a listed species?  
 Listing priority change  
    Former LP: \_\_\_\_  
    New LP: \_\_\_\_

Latest date species first became a Candidate: \_\_\_\_\_

- Candidate removal: Former LP: \_\_\_\_ (Check only one reason)  
     A - Taxon more abundant or widespread than previously believed or not subject to a degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.  
     F - Range is no longer a U.S. territory.  
     M - Taxon mistakenly included in past notice of review.  
     N - Taxon may 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: Alabama

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:  
Alabama

LEAD REGION CONTACT (Name, phone number):Rick Gooch, 404/679-7124

LEAD FIELD OFFICE CONTACT (Office, name, phone number): Jackson, Mississippi Field Office, Daniel J. Drennen, 601/321-1127.

BIOLOGICAL INFORMATION (Describe habitat, historic vs. current range, historic vs. current population estimates (# populations, #individuals/population), etc.):

Species Description/ Taxonomy

The rush darter (*Etheostoma phytophilum*), a medium-sized darter in the subgenus *Fuscatelum*, was described by Bart and Taylor in 1999. The average size of the rush darter is 40 mm (2 in) standard length (30 to 58 mm or 1 to 2 in) (Bart and Taylor 1999, Johnston and Kleiner 2001). Diagnostic characters of this subgenus include the lack of bright colors on the body and fins and breeding males with anal fin tubercles (bumps) (Page 1983). The rush darter is closely related to the goldstripe darter (*Etheostoma parvipinne*), a drab colored species with a thin, golden stripe along the lateral line that is surrounded by heavily mottled or stippled sides (Shaw 1996). However, the distinct golden stripe characteristic of goldstripe darters is not well developed in rush darters (Bart and Taylor 1999). Also, the brown pigment on the sides of the rush darter is usually not as intense as in the goldstripe darter. Other characteristics of the rush darter include 47 or fewer lateral line scales, 13 or fewer transverse (across the body) scales, and 22 or fewer caudal peduncle (end of body and beginning of caudal fin) scales (Bart and Taylor 1999).

### Habitat

Rush darters have been collected from various habitats (Bart 2002, Johnston and Kleiner 2001, Stiles and Blanchard 2001, Bart and Taylor 1999) including: (a) root masses of emergent vegetation along the margins of spring-fed streams in very shallow, clear, cool and flowing water and (b) from both small clumps and dense stands of bur reed (*Sparganium* sp.) and coontail (*Ceratophyllum* sp.) in streams with substrates of silt, sand, sand and silt, muck and sand or some gravel with sand, and bedrock. Rush darters appear to prefer relatively low gradient small streams, and some of the streams where they occur are not influenced by springs. Water depth at collection sites ranges from 3.0 cm to 0.5 m (0.1 ft to 1.6 ft) with moderate water velocity in riffles and no flow or low flow in pools. No rush darters have been found in higher gradient streams with bedrock substrates and sparse vegetation, and rush darters also have not been found in dense growths of watercress (*Nasturtium officinale*) along the sides and mid-channel of spring runs.

The life history of the rush darter is poorly known, but its life history and habitat characteristics are likely similar to the goldstripe darter. Spawning of the goldstripe darter in Alabama occurs from mid-March through June (Mettee et al. 1996) and from mid-April through May in Tennessee and Mississippi (Etnier and Starnes 1993). Preferred food items for the goldstripe darter include midges, mayflies, blackflies, beetles, and microcrustaceans (Mettee et al. 1996). The life span of the goldstripe darter is estimated to be 2 to 3 years. The rush darter does not appear to be active nocturnally (Stiles and Blanchard 2001).

### Historical Range/Distribution

Historically, rush darters have been found in three distinct watersheds: Doe Branch, Wildcat Branch, and Mill Creek of the Clear Creek drainage in Winston County; an unnamed spring run of Beaver Creek and from Penny Springs of the Turkey Creek drainage in Jefferson County; Cove Spring (Little Cove Creek system) and Bristow Creek in Etowah County of the Locust Fork drainage. Currently, there are only two known extant rush darter populations. One is located in Wildcat Branch and Mill Creek in the Clear Creek drainage in Winston County (Johnston and Kleiner 2001), and the second is located in an unnamed spring run to Beaver

Creek and in Penny Springs in the Turkey Creek drainage in Jefferson County (Stiles and Blanchard 2001). The Little Cove Creek drainage population was known from only a single specimen collected in Cove Spring in 1975 (Jandebeur 1975, Bart and Taylor 1999) and one specimen from Bristow Creek collected in 1997 (Bart 2002) but identified in 2002 from a museum collection. Additional collection attempts by Bart and Taylor (1999) and Stiles and Blanchard (2001) did not find rush darters in Cove Spring or Little Cove Creek, and we do not consider this an extant population.

### Current Range/Distribution

The rush darter is currently known to have one of the most restricted distributions of any vertebrate in Alabama (Johnston and Kleiner 2001). All rush darter populations are located above the Fall Line in the Tombigbee-Black Warrior drainage (Warren *et al.* 2000) in portions of the Appalachian Plateau and Valley and Ridge physiographic provinces. The closely related goldstripe darter only occurs below the Fall Line. Reports of goldstripe darters from the 1960's and 1970's in Winston and Jefferson Counties (Caldwell 1965, Barclay 1971, Dycus 1972, Dycus and Howell 1974, Mettee *et al.* 1989), which is above the Fall Line, were made prior to the description of the rush darter. Those specimens are now considered to be rush darters (Bernard Kuhajda, University of Alabama, pers. comm.. 2002).

### Population Estimates/Status

Rush darter populations are widely separated from each other, and individual rush darters are only sporadically collected within its range. Where it occurs, the rush darter is apparently an uncommon species that is usually collected in low numbers (Bart and Taylor 1999). Since 1969, approximately 100 rush darters have been collected or captured and released within the species range (compiled from Bart and Taylor 1999, Johnston and Kleiner 2001, Stiles and Blanchard 2001). Within the Clear Creek drainage in Winston County, the most individuals captured in one collection was six (6) from Mill Creek in August 2001 (Johnston and Kleiner 2001). Bart and Taylor (1999) reported collecting up to 11 individuals during a survey of Wildcat Branch between 1990 and 1993. However, only one individual was collected by Johnston and Kleiner (2001) in August 2001 at a road crossing of Wildcat Branch, and Stiles and Blanchard (2001) did not collect rush darters in that locality later that same month after several attempts.

In Jefferson County, collections have also been sporadic, with four individuals recorded at the Penny Springs site (Stiles and Blanchard 2001), seven individuals at the unnamed spring run that is the type locality (Stiles and Blanchard 2001, Drennen pers. obs. 2001), and only one individual at a bridge crossing over the same unnamed spring run (type locality). However, no rush darters were collected at the bridge crossing over the spring run 1 week later (Stiles and Blanchard 2001, Drennen pers. obs. 2001).

Cumulatively, the rush darter is only known from localized collection sites within approximately 14 km (9 miles) of streams in the Clear Creek, Little Cove and Bristow Creek, and Turkey Creek drainages in Winston, Etowah, and Jefferson Counties, respectively. Currently, about 3 km (2 miles) of stream, or about 23 percent, of the rush darter's known range is not occupied, which

may be due to non-point source pollution, especially sedimentation. Within the Clear Creek drainage, the rush darter has been collected in Wildcat Branch, Mill Creek, and Doe Creek, which consists of about 13 km (8 miles) of stream or about 94 percent of the species= total range. Recent surveys (Johnston and Kleiner 2001) have documented the apparent absence of the rush darter in Doe Creek, so, if the species is extirpated from Doe Creek, this reduces the species= known range within the Clear Creek drainage by about 3 km (2 miles) of stream or 21 percent. No rush darters have been collected in the Little Cove Creek drainage (Cove Spring run) since 1975. No collections in Bristow Creek have been made since 1997. The creek has since had geomorphic modifications. The Little Cove Creek drainage constitutes a loss of only 0.05 km (0.02 miles) of occupied stream habitat or a 1.6 percent reduction. However, this loss is significant in that this also represents the extirpation of the species from Etowah County. In the Turkey Creek drainage, rush darters have been collected sporadically within Penny Springs and at the type locality for the species (Bart and Taylor 1999). This area contains about 0.5 km (0.3 miles) of occupied stream habitat or approximately 4 percent of the rush darter=s total range.

**THREATS** (Describe threats in terms of the five factors in section 4 of the ESA providing specific, substantive information. If this is a removal of a species from candidate status or a change in listing priority, explain reasons for change):

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

The rush darter is vulnerable to non-point source pollution, urbanization, and changes in stream geomorphology due to its localized distribution in parts of two unconnected stream drainages and its apparent low population sizes. 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, 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 species like 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, and other siltation sources, including timber harvesting, clearing of riparian vegetation, and mining and agricultural practices, allow exposed earth to enter streams during or after precipitation events. The rush darter=s range is in close proximity to metropolitan Birmingham, Alabama, an area in which all of these activities are occurring, so impacts from these activities to the rush darter and its habitat are very likely to occur.

Land use practices that affect sediment and water discharges into a stream can also change the erosion or sedimentation pattern of the stream, which can lead to the destruction or modification of in-stream habitat and riparian vegetation, stream bank collapse, and increased water turbidity and temperature. Excessive siltation can make the habitat of rush darters and associated benthic fish species unsuitable for feeding and reproduction by covering and eliminating available food sources and nest sites. Sediment has been shown to wear away and/or suffocate periphyton (organisms that live attached to objects underwater and provide likely food items for species such as the rush darter), disrupt aquatic insect communities, and negatively impact fish growth, physiology, behavior, reproduction and survivability (Waters 1995, Knight and Welch 2001). Sediment is the most abundant pollutant in the Mobile River Basin (Alabama Department of Environmental Management 1996).

Within the Clear Creek drainage, Johnston and Kleiner (2001) reported that during August 2001, land uses in the Doe Branch and Mill Creek area appeared to be dominated by forests and that there were no obvious threats to water quality. However, U.S. Fish and Wildlife Service and U.S. Forest Service (USFS) personnel noted extensive siltation at the bridge over Doe Branch at County Road 329 on March 12, 2001, during a modest spring rain and also noted siltation at several other road crossings and at other tributaries in the immediate area. Johnston and Kleiner (2001) reported that recent clear cutting in the Wildcat Branch watershed may have increased sedimentation into the stream. Approximately 84 percent (i.e., 5 km or 3 miles) of Wildcat Branch is privately owned, and recent land exchanges within the Bankhead National Forest have taken about 0.9 km (0.6 miles) of stream west of Clear Creek out of USFS management and protection. Therefore, it is likely that additional, periodic sedimentation events will occur in the Clear Creek drainage that may impact rush darter populations and habitat.

Cove Spring is a water source for the West Etowah County Water Authority. Water that is pumped from the spring for human consumption is chlorinated on the site, and an overflow pipe from the building that protects the spring outfall provides a constant water source for the spring run. Service personnel visually evaluated the habitat within Cove Spring and its spring run and found that it appeared suitable for rush darters. However, it is not known if previous releases of chlorinated spring water from the overflow pipe might have contributed to the apparent loss of the species at this site. Additional investigation is needed to confirm that chlorination caused the demise of the darters at this site.

Blanco (2001) identified siltation from development projects as the greatest threat to the fauna of Turkey Creek. Blanchard *et al.* (1998) identified five specific non-point source siltation sites that have impacted the Turkey Creek watershed, including four sites affecting Beaver Creek, which is a major tributary to Turkey Creek. These sites included bridge, road, and sewer line construction sites and a wood pallet plant. In addition, Service personnel noted in 1998 that Turkey Creek at the confluence Tapawingo and Penny Springs was sediment-laden and completely turbid after medium to heavy rainfalls. Four major soil types occur within the Turkey Creek watershed and all are considered highly erodible due to the steep topography (Goode, Natural Resources Conservation Service, Birmingham, Alabama, pers. comm. 1998). Therefore, any activity that removes native vegetation on these soils can be expected to lead to increased sediment loads in Turkey Creek, and urbanization, in particular, has contributed significantly to siltation within the Turkey Creek watershed (U.S. Fish and Wildlife Service 2001), including the areas near Penny and Tapawingo Springs. Industrialization is extensive throughout the watershed, particularly near the type locality for the rush darter (Bart and Taylor 1999).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

In general, small species of fish such as the rush darter, which are not utilized for either sport or bait purposes, are unknown to the general public. Therefore, take of these species by the general public has not been a problem. Scientific collecting and take by private and institutional collectors are not presently identified as threats, and scientific collecting is controlled by the State of Alabama through the issuance of collection permits.

C. Disease or predation.

Predation upon the rush darter undoubtedly occurs; however, there is no evidence to suggest that disease or natural 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.

There is currently no requirement within the scope of other environmental laws to specifically consider the rush darter or ensure that a project will not jeopardize its continued existence. Under the State of Alabama regulations for water use classification, Fish and Wildlife, Rule 355-6-10-09(4), "No turbidity, other than natural causes, that cause substantial visible contrasts with natural appearance or interfere with any beneficial uses they serve; in no case shall turbidity exceed 50 NTU above background (Sheppard et al. 1994.). However, there is insufficient information on the rush darter's ecology, life history, and sensitivity to contaminants to determine the effectiveness of this or other existing environmental laws and regulations. Also, there is little or no enforcement of sedimentation regulations by the state.

E. Other natural or manmade factors affecting its continued existence. Currently, there are only two extant populations of rush darters, and genetic diversity of these two populations has likely declined due to isolation of the populations in separate watersheds within the Tombigbee-Black Warrior River drainage. The long-term viability of a species is founded on conservation of numerous local populations throughout its geographic range (Harris 1984). These features are essential for the species to recover and adapt to environmental change (Noss et al. 1994, Harris 1984). Interbreeding populations of rush darters are becoming increasingly disjunct due to degradation of suitable habitat areas, which makes dispersal difficult. This disjunct distribution makes rush darter populations vulnerable to extirpation from catastrophic events, such as toxic spills or changes in flow regimes.

The endangered watercress darter (E. nuchale) was introduced by the Service into Tapawingo Springs in 1988 in order to assist in the species recovery through the establishment of a new population (Moss 1995). Since that time, the watercress darter has reproduced repeatedly (U.S. Fish and Wildlife Service 1992), and, recently, a population of watercress darters was found in the Penny Springs site (Stiles and Blanchard 2001). Interspecific competition between the watercress darter and the rush darter at this site needs study to determine if the robust watercress darter population is negatively affecting the rush darter at this site, as has been suggested by Stiles (Samford University, pers. comm. 2001).

FOR RECYCLED PETITIONS:

- a. Is listing still warranted? \_\_\_
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? \_\_\_
- c. Is a proposal to list the species as threatened or endangered in preparation? \_\_\_
- d. If the answer to c. above is no, provide an explanation of why the action is still precluded.

LAND OWNERSHIP (Estimate proportion Federal/state/local government/private, identify non private owners):

The species is believed to currently inhabit stream habitats that are approximately 86 percent privately-owned industrial, forestry, agricultural and urbanized lands. The State of Alabama owns and maintains the ditch along the highway at the type locality for water control, which equates to about 1 percent of the rush darter's habitat. The USFS manages some rush darter habitat in the Bankhead National Forest, which is approximately 10 percent of the rush darter's total habitat. In addition, the Black Warrior Land Trust owns the Penny and Tapawingo Springs area or approximately 3 percent of the rush darter's habitat.

PRELISTING (Describe status of conservation agreements or other conservation activities):

The Alabama Highway Department is aware of the occurrence of the rush darter at the type locality and will consider it during roadside vegetation control. In conjunction with the Service, the Jefferson County Lands Division and the Black Warrior River Land Trust have purchased and rehabilitated the Tapawingo Springs and spring run site. The Black Warrior River Land Trust has also purchased Penny Springs, and the USFS is funding additional surveys for the rush darter on the Bankhead National Forest.

REFERENCES (Identify primary sources of information (e.g., status reports, petitions, journal publications, unpublished data from species experts) using formal citation format):

Alabama Department of Environmental Management. 1996. Water Quality Report to Congress for Calendar Years 1994 and 1995. Montgomery, AL. 154 pp.

Barclay, L.A. 1971. Studies of the fishes of the Black Warrior River system in Alabama. Unpubl. M.S. thesis. Samford University. Birmingham, AL.

Bart, H.L. and M.S. Taylor. 1999. Systematic review of subgenus *Fuscatelum* of *Etheostoma* with description of a new species from the Upper Black Warrior System, Alabama. *Tulane Studies in Zoo. and Bot.* 31:23-50.

Bart, H.L. 2002. Final Report for Contract 1448-40181-98-G-059. Conservation Status of the Rush Darter, *Etheostoma phytophilum*. Report to U.S. Fish and Wildlife Service Jackson, MS. 20 pp.

Blanchard, Paul, T. Young, and O. C. Brasher. 1998. Watershed Threat Survey, Turkey Creek, Jefferson County, AL. Power-point presentation report to U.S. Fish and Wildlife Service Jackson, MS. 20 pp.

Blanco, Cesar, C. 2001. Historical ecology, land use associations, and species-habitat associations, of the vermilion darter (*Etheostoma chermocki*) in the upper Turkey Creek watershed, tributary of Locust Fork, Black Warrior River drainage, Alabama. Unpublished. Ph.D. dissertation. Univ. of AL. Tuscaloosa. 199 pp.

Caldwell, R.D. 1965. A study of the fishes from limestone springs in the Valley and Ridge Province of the Mobile Basin. Unpubl. M.S. thesis. Univ. of AL. Tuscaloosa.

- Dycus, D.L. 1972. Fishes of the Bankhead National Forest in Alabama. Unpublished. M.S. thesis. Samford University. Birmingham, AL. 236 pp.
- Dycus, D.L. and W.M. Howell. 1974. Fishes of the Bankhead National Forest. Ala. Dept. of Cons. and Nat. Res. 51 pp.
- Etnier, R. A. and W. C. Starnes. 1993. The Fishes of Tennessee. University of Tennessee Press. Knoxville, TN. 681 pp.
- Harris, L. D. 1984. The Fragmented Forest. Univ. of Chicago Press. 211 pp.
- Jandebeur, T. 1975. University of Alabama, Ichthyological Collection Notes.
- Johnston, C.E. and K. J. Kleiner. 2001. Status of the rush darter (Etheostoma phytophilum) in the Clear Creek system, Winston County, Alabama. Report to U.S. Fish and Wildlife Service. Jackson, MS. 9 pp.
- Knight, S. S. and T.D. Welch. 2001. Ecological and Water Quality Effects of the Mississippi Delta Management Systems Evaluation Area on Oxbow Lakes. Proceedings of the Thirty-First Mississippi Water Resource Conference. April 10-11. Water Resources Research Institute. MS State Univ., MS State, MS. pp. 131-143.
- Mettee, M.F. 1978. The Fishes of the Birmingham-Jefferson County Region of Alabama with ecologic and taxonomic notes. Geological Survey of Alabama. Bull. 115. Tuscaloosa, AL. 183 pp.
- Mettee, M. F., P. E. O=Neil, and J. M. Pierson. 1996. Fishes of Alabama. Oxmoor House, Birmingham, AL. 820 pp.
- Mettee, M. F., P. E. O=Neil, J. M. Pierson, and R.D Suttkus. 1989. Fishes of the Black Warrior System in Alabama. Geological Survey of Alabama. Bull. 133. Tuscaloosa, AL. 201 pp.
- Moss, Jerry. 1995. Watercress darter population monitoring, October 1, 1994 through September 30, 1995. Annual Perf. Rep. Al. Dept. of Cons. and Nat. Res. 14 pp.
- Noss, R. E. and A. Y. Cooperrider. 1994. Saving Nature=s Legacy. Protecting and Restoring Biodiversity. Island Press. CA. pp. 416.
- Page, L. A. 1983. Handbook of darters. Illinois Natural History Survey. TFH. Publication, Inc. Ltd. Neptune City. 271 pp.
- Shaw, K.A. 1996. Phylogenetic analysis and taxonomy of the Oligocephalus group of darters (Teleostei:Percidae). Unpublished. Ph.D. Diss. Univ. Kansas. 338 pp.
- Sheppard, ONeil, McGregor and Harris, 1994. Water- Quality and Biomonitoring Studies in the Upper Cahaba River Drainage of Alabama. Geo. Survey of Alabama, Bull. 160.

- Stiles, R. and P. Blanchard. 2001. Status survey of the rush darter, Etheostoma phytophilum, in the Turkey Creek watershed of Jefferson County, Alabama. Report to U.S. Fish and Wildlife Service. Jackson, MS. 14 pp.
- U. S. Fish and Wildlife Service. 2001. Endangered and threatened wildlife and plants: Final rule to list the vermilion darter as endangered. 66 FR. 59367.
- U. S. Fish and Wildlife Service. 1992. Watercress darter (Etheostoma nuchale) recovery plan. Jackson, MS. 16 pp.
- Warren, M.L., Jr., B.M. Burr, S.J. Walsh, H.L. Bart, Jr., R.C. Cashner, D.A. Etnier, B.J. Freeman, B.R. Kuhajda, R.L. Mayden, H.W. Robison, S.T. Ross, and W.C. Starnes. 2000. Diversity, distribution, and conservation status of the native freshwater fishes of the Southern United States. Fisheries, 25(10): 7-31. American Fisheries Society. Bethesda, MD. 23 pp.
- Waters, T. F. 1995. Sediment in streams: sources, biological effects and control. Am. Fish. Soc. Mono. 7. Bethesda, MD. 251 pp.

LISTING PRIORITY (place \* after number)

THREAT
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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

**Rationale for listing priority number:**

*Magnitude:* mall stream and spring run habitats occupied by the rush darter are highly vulnerable to changes in adjacent land use and water quality disturbances due to restricted distribution.

*Imminence:* ederal and State water quality laws have reduced water quality threats to some degree. Non-point pollution resulting from urbanization are cumulative and gradual.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all additions of species to the candidate list, annual retentions of candidates, removal of candidates, and listing priority changes.

Approve: Linda Kelsey March 14, 2003  
Acting Regional Director, Fish and Wildlife Service Date

Concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Director's Remarks:

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-

Date of annual review: February 2003

Conducted by: Daniel J. Drennen - Jackson, Mississippi FO

Comments:

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