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

SCIENTIFIC NAME: *Fusconaia rotulata, Ptychobranchus jonesi, Fusconaia escambia, Hamiota australis* (formerly *Lampsilis australis*), *Pleurobema strodeanum, Villosa choctawensis,* and *Quincuncina burkei*

COMMON NAME: round ebonyshell, southern kidneyshell, narrow pigtoe, southern sandshell, fuzzy pigtoe, Choctaw bean, and tapered pigtoe

LEAD REGION: 4

INFORMATION CURRENT AS OF: October, 2005.

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
_X_ Continuing candidate
___ Non-petitioned
_X_ 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)?
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions?
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.
___ Listing priority change
Former LP: ___
New LP: ___
Date when the species first became a Candidate (as currently defined): May 4, 2004
___ 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: Clams*:* Unionidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Alabama and Florida, USA.

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Alabama and Florida, USA.

LAND OWNERSHIP: Upon statehood in 1819 for Alabama, and 1845 for Florida, these states were granted ownership of lands beneath tidally influenced and navigable waters up to the high water mark (Pollard v. Hagan, 44 U.S. (3How.) 212 (1845)). It is possible that prior sovereigns or the States have made grants to private parties, which include lands below mean high waters of the navigable waters included in this document. Other public lands (e.g., Blue Springs and Florala State Parks, Alabama; Ponce de Leon Springs State Recreation Area, Florida; Blackwater River State Forest, Florida; Geneva State Forest, Alabama, Conecuh National Forest, Alabama; Covington County and Barbour County Wildlife Management Areas, both in Alabama; Eglin Air Force Base, Florida; and Ft. Rucker Military Reservation, Alabama) occur along historical and extant streams of occurrence for these species or in their watersheds. However, the majority of riparian lands along non-navigable streams occupied by these species are privately owned. Riparian activities that occur outside or upstream of public lands may be pervasive and have a profound impact on populations of these species. Habitat protection benefits on public lands may therefore be negated by detrimental activities upstream in the watershed.

LEAD REGION CONTACT: Richard Gooch 404/679-7124 (Region 4, Atlanta, GA)

LEAD FIELD OFFICE CONTACT: Panama City, Panama City Field Office, Patty Kelly, 850/769-0552 x 228 or Holly Blalock-Herod, 850/769-0552 x 239.

BIOLOGICAL INFORMATION
Fusconaia rotulata, Ptychobranchus jonesi, F. escambia, Hamiota australis, Pleurobema strodeanum, Villosa choctawensis, and *Quincuncina burkei* are all mussels in the family Unionidae. Historical distribution data from museum records dated between the late 1800s and 1989 are sparse and most species were more than likely present throughout their respective river basins. Knowledge of the historical and current distribution and abundance data were summarized from Williams et al. (in review), Blalock-Herod et al. (in review), and Blalock-Herod et al. (2002). These studies represent a compilation of museum records and recent status surveys conducted between 1995 and 2000 and other periodic collections made between 1990 and 1999 by biologists from U.S. Geological Survey (Gainesville, Florida), Douglas Shelton (Alabama Malacological Research Center, Mobile, Alabama), and Stuart McGregor (Geological Survey of Alabama, Tuscaloosa). Approximately 400 historical and new locations were surveyed within the Escambia, Yellow, and Choctawhatchee River drainages of Alabama and Florida in an effort to locate these seven mussel species.

Fusconaia rotulata

The round ebonyshell, (*Fusconaia rotulata* (Wright 1899)) is a small to medium-sized mussel that attains a maximum length of 61 mm. The shell is thick, heavy, inflated, and circular in outline. There is no posterior ridge, but often two slight folds are present. The periostracum is dark brown to black. Internally, the interdentum is moderately broad, with straight to slightly curved lateral teeth. The umbo cavity is deep and wide and nacre is iridescent white (Williams et al. in review). The round ebonyshell was formerly placed in the Genus *Obovaria* (Turgeon et al. 1998); however, recent genetic analysis indicates that the round ebonyshell is not a sister taxa to other members of the genus *Obovaria* (Lydeard et al. 2000). Williams and Butler (1994) placed the round ebonyshell in the genus *Fusconaia* based on internal shell characteristics (i.e., pseudocardinal teeth and umbo cavity).

Life history and ecological data regarding the round ebonyshell are sparse at best. This animal only occurs in one main river channel, with moderate current over sand and gravel substrate (Williams and Butler 1994). The reproductive period and host fish are unknown for the round ebonyshell (Williams et al. in review). Observations of this species during June 1995, August – October 1996, and August – December 1998, failed to detect any gravid individuals.

The round ebonyshell is endemic to the Escambia River drainage and is only known from the main channel of the Conecuh and Escambia River (same river however the name changes across the state boundary from Alabama to Florida) (Williams and Butler 1994). Due to recent survey data the known historical range was expanded (based on shell material only) to include the Conecuh River from the junction with the Sepulga River, Escambia County, Alabama, downstream in the Escambia River to Bluff Springs, Escambia and Santa Rosa Counties, Florida (Williams et al., in review) for a total of approximately 95 km (59 river miles – RM). The current range of live individuals is restricted to 43 km (27 RM). Only 3 of 9 historic locations contain living individuals; thereby indicating a 67% decline in the number of locations known to support this species. Round ebonyshell population levels within the Escambia River drainage are extremely low. On average, only 2 live individuals were found at the remaining 3 locations (Williams et al. unpublished data). It is unknown if these remaining populations are capable of reproduction and recruitment, making its population viability questionable.

Ptychobranchus jonesi

The southern kidneyshell (*Ptychobranchus jonesi* (van der Schalie 1934)) is a small to medium-sized mussel that attains a maximum length of 65 mm. The southern kidneyshell has a moderately thick, elliptical shell with the dorsal and ventral margins nearly parallel. The shell is very inflated with prominent biangulation on the posterior end. The periostracum is smooth, olive green to blackish in color, sometimes with irregularly distributed green rays. Internally, lateral teeth are curved and thin, and pseudocardinals are compressed. The nacre is bluish-white and iridescent (Williams et al. in review). *Ptychobranchus jonesi* was originally described as a species of the genus *Lampsilis*, where it remained until 1973. Following examination of a gravid female, Fuller and Bereza (1973) found characteristics that place it in the genus *Ptychobranchus.*

The southern kidneyshell is known from medium-sized creeks to rivers in silty sand substrates with slow current and woody debris (Williams and Butler 1994). It has also been located in claystone pockets with sand (Blalock-Herod et al. unpubl. data). The reproductive period and host fish for the southern kidneyshell are unknown (Williams and Butler 1994). Surveys for this species have been conducted periodically during June-August 1995, July-October 1996, June-July 1998, May-June 1999, March 2000, and May-June 2000.

The southern kidneyshell is endemic to the Escambia and Yellow river drainages in Alabama, and Choctawhatchee river drainage in Alabama and Florida (Williams and Butler 1994). In the Escambia River drainage, the southern kidneyshell was known from the Sepulga River, Conecuh County; Conecuh River and Patsaliga Creek, Covington and Crenshaw Counties; and Little Patsaliga Creek, Crenshaw County. In the Yellow River drainage, the southern kidneyshell is known from Hollis Creek, Covington County, Alabama. In the Choctawhatchee River drainage, the southern kidneyshell was known from Sandy Creek, Walton County, Florida; Pea River, Coffee, Dale, and Barbour Counties, Alabama; Choctawhatchee River, Walton County, Florida, and Dale County, Alabama; West Fork Choctawhatchee River, Dale and Barbour Counties, Alabama; East Fork Choctawhatchee River, Dale and Henry Counties, Alabama; Flat Creek, Geneva County, Alabama; and Whitewater Creek, Coffee County, Alabama (Williams et al. in review, Blalock-Herod et al. in review).

There are 7 known historical locations for the southern kidneyshell in the Escambia River drainage; 2 in the Yellow River drainage; and 14 in the Choctawhatchee River drainage for a total of 23 historical locations. Population status is undetermined at 1 location in the Escambia and 1 location in the Yellow River basins. The remaining locations in these two drainages are inactive and the southern kidneyshell may be extirpated from these basins. Within the Choctawhatchee River drainage, the southern kidneyshell was detected during the last 10 years at only 2 of 14 historic locations, one on the Pea River, Coffee County, Alabama, and one on West Fork Choctawhatchee River, Barbour County, Alabama (Williams et al. in review, Blalock-Herod et al. in review). Population status is undetermined at one location within the Choctawhatchee; however, locations above and below this site do not currently support the southern kidneyshell. Population abundance was low at the two locations where live individuals were detected with an average of 6 specimens detected per location (Blalock-Herod et al. unpublished data). The Pea River population may have recently become extirpated. This population was examined in the early 1990s, but when the locality was revisited in 1998, southern kidneyshells were not located (Blalock-Herod et al., in review). In totality, of 23 historical locations, 3 have unknown population status, 18 –19 are inactive, and 1-2 are current, representing a 78 – 83% decline in the number of locations supporting the southern kidneyshell. It is unknown if these remaining populations are capable of reproduction and recruitment, making the long-term population viability of the southern kidneyshell questionable.

Fusconaia escambia

The narrow pigtoe, (*Fusconaia escambia* Clench and Turner 1956), is a small to medium-sized mussel attaining a maximum length of 74 mm. The shell is moderately thick, subcircular, slightly inflated, and has a well-defined posterior ridge. The periostracum is smooth and juveniles are chestnut brown in color. Older individuals become darker brown to blackish in

color. Internally, the umbo pocket is moderately deep. The hinge plate and lateral teeth are curved. The nacre is white and sometimes has an iridescent salmon hue (Williams et al. in review).

Little is known regarding the life history of the narrow pigtoe. It inhabits small to medium-sized rivers with slow to moderate current over gravel, and gravel mixed with sand or some silt (Williams and Butler 1994). Individuals have been found gravid in June; however, host fish are unknown (Williams et al. in review). Surveys for this species have been conducted periodically during June-August 1995 and July –October 1996.

The narrow pigtoe is endemic to the Escambia River drainage in Alabama and Florida and the Yellow River drainage in Florida (Williams and Butler 1994). Known historical distribution included the main channel of the Escambia River, Escambia and Santa Rosa Counties, Florida; Conecuh River, Escambia, Covington, Crenshaw, and Pike Counties, Alabama; and Murder Creek, Conecuh County, Alabama. In the Yellow River, this species is known from the main channel in Okaloosa County, Florida (Williams et al. in review). Due to finding live or shell material of narrow pigtoes in recent status surveys, the historical range has been expanded to include: Patsaliga Creek, Covington and Crenshaw Counties; Bottle Creek, Conecuh County, Alabama; and Panther and Three Runs Creeks, Butler County, Alabama, all Escambia River drainage.

The following locations known from museum records continue to support narrow pigtoes: Escambia River, Escambia and Santa Rosa Counties, Florida; Conecuh River, Escambia, Covington, Crenshaw, and Pike Counties, Alabama; all Escambia River drainage.

In the Escambia River drainage, narrow pigtoes (live and shell material) have been documented from 27 locations. Currently 21 locations support narrow pigtoes, population status is undetermined at 1 location, and 5 locations are inactive. In the Yellow River drainage, there were 2 known historical locations, none of which are currently active. Recent survey results indicate a 24% decline in its entire historic range (29 locations); however, this decline represents the loss of one entire river basin within the historic range. Population levels within the Escambia River drainage appear to be low. Abundance at historical locations is unknown. At locations currently supporting narrow pigtoes, an average of 3 live individuals were found per location (Williams et al. unpublished data). Recent mussel surveys did not target documentation of recruitment, but with population averages of 3 individuals, recruitment if occurring is likely low and long-term viability of the narrow pigtoe is questionable.

Hamiota australis

The southern sandshell (*Hamiota australis* Simpson 1900, formerly *Lampsilis australis*) is a small to medium-sized mussel that attains a maximum length of 83 mm. The southern sandshell has a long, elliptical, somewhat pointed shell with moderate inflation. Shell thickness is moderate. Externally, the shell of young specimens is yellowish with green rays and in adults is typically dark brown to black with obscured rays (Williams et al. in review). Sexual dimorphism is present as a slight rounding of the ventral shell margin of females (Athearn 1964). Internally, lateral teeth are somewhat curved, interdentum is wide, and pseudocardinal teeth are delicate and

slightly compressed (Williams et al. in review). The nacre is bluish white and iridescent posteriorly.
This year, Roe and Hartfield (2005) confirmed earlier published suggestions (Fuller and Bereza 1973, O'Brien and Brim-Box 1999) that this species and three others of the genus *Lampsilis* represent a distinct genus. The new genus, *Hamiota*, is distinguished based on several characters, including production of a superconglutinate lure (which suspends glochidia in the water column for infecting a fish host) and a unique shape and placement of the marsupia (where females brood developing larvae). This separation from other *Lampsilis* is supported by DNA analysis (Roe et al. 2001).

The southern sandshell has been found in clear creeks and rivers with slow to moderate currents over sandy substrates (Williams and Butler 1994). The southern sandshell is one of only four species that produce a superconglutinate to facilitate larval dispersal (Blalock-Herod et al. 2002). A superconglutinate is a mass that mimics the shape, coloration and movement of a fish, but is produced by the female mussel to hold all the glochidia (larval stage) from one year's reproductive effort (Haag et al. 1995). The superconglutinate is tethered to the female mussel after release by a mucus strand. The southern sandshell begins brooding in the summer (July/August) and overwinters glochidia in the two outer gills. Superconglutinate release occurs in the spring (April in laboratory trials) though they have been detected in early summer (Blalock-Herod et al. 2002, Haag et al. 1995). Preliminary trails indicate that like other superconglutinate producers, the southern sandshell can use black bass (*Micropterus* species) as host fish (Blalock-Herod et al. 2002, O'Brien and Brim Box 1999, Haag et al. 1999). Surveys for this species have been conducted periodically during June-August 1995, July-October 1996, June-July 1998, May-June 1999, March 2000, and May-June 2000.

The southern sandshell is endemic to the Escambia River drainage in Alabama, and the Yellow and Choctawhatchee River drainages in Alabama and Florida (Blalock-Herod et al. 2002). The historical distribution within the Escambia River basin is restricted to Alabama and included: the main channel of the Conecuh River, Covington, Crenshaw, and Pike Counties; Burnt Corn Creek, Escambia County; Sepulga River, Conecuh County; and Little Patsaliga Creek, Crenshaw County. In the Yellow River drainage, the southern sandshell is known from the Yellow River main channel, Covington County, Alabama. In the Choctawhatchee River drainage, the southern sandshell is known from Alligator Creek, Washington County; Holmes and Tenmile Creeks, Holmes County; Limestone Creek, Walton County; and the Choctawhatchee River, Holmes County, all in Florida; Choctawhatchee River, Dale, Geneva, and Houston Counties; Pea River, Barbour, Coffee, and Dale Counties; East Fork Choctawhatchee River, Dale and Henry Counties; West Fork Choctawhatchee River, Barbour and Dale Counties; Little Choctawhatchee River, Dale and Houston Counties; Whitewater Creek, Coffee County; Pea Creek, Dale County; and Pea Creek (different from the one in Dale County), Barbour County, all in Alabama (Williams et al. in review, Blalock-Herod et al. in review, Blalock-Herod et al. 2002).

Due to finding live southern sandshells during recent surveys, the historical range of the southern sandshell was expanded to include: Patsaliga Creek, Crenshaw County, Alabama, Escambia River drainage; Yellow and Shoal Rivers, Okaloosa County, Florida; and Five Runs Creek, Covington County, Alabama, all Yellow River drainage; and Eightmile Creek, Walton County,

Florida and Geneva County, Alabama; Flat and Natural Bridge Creeks, Geneva County, Alabama; Pea River, Pike County; Double Bridges Creek, Coffee County; and Pauls Creek, Barbour County, Alabama, all Choctawhatchee River drainage (Williams et al. in review, Blalock-Herod et al. in review, Blalock-Herod et al. 2002).

The following locations known from historical museum records continue to support the southern sandshell: Little Patsaliga Creek, Crenshaw County; and the Conecuh River, Pike County, both within the Escambia River drainage, Alabama; Yellow River, Covington County, Yellow River drainage, Alabama; Limestone Creek, Walton County, Florida; Pea River, Geneva County; Choctawhatchee River, Dale and Houston Counties; West Fork Choctawhatchee River, Barbour and Dale counties; East Fork Choctawhatchee River, Henry County; and Pea Creek, Barbour County; all in Alabama, all Choctawhatchee River drainage (Williams et al. in review, Blalock-Herod et al. in review, Blalock-Herod et al. 2002).

Recent mussel surveys found that live populations of the southern sandshell have declined from 7 historic locations to 3 currently active locations and one location with unknown population status within the Escambia River basin. It has declined from 9 historic locations to 8 currently active locations within the Yellow river basin; and within the Choctawhatchee River basin it has declined from 35 historic locations to 19 currently active locations (Blalock-Herod et al., 2002) and 4 locations with unknown population status. In totality, the southern sandshell has declined from a total of 51 historic locations to its remaining distribution of 30 active locations and 5 locations with unknown population status. It has been extirpated from approximately 31-41% of its historic range. Recent mussel surveys found an average of 2 -3 live animals per location (Williams et al. unpublished data; Blalock-Herod et al. unpublished data). Only 2 populations within the Choctawhatchee River drainage supported 20-30 individuals (Blalock-Herod et al. 2002). Gravid females have been detected within the 2 larger populations found in the Choctawhatchee River basin. Low levels of recruitment are likely occurring within these two populations, but juvenile southern sandshells were not detected. It is unknown if other populations are capable of reproducing, making the long-term viability of the southern sandshell questionable.

Pleurobema strodeanum

The fuzzy pigtoe (*Pleurobema strodeanum* (Wright 1898)) is a small mussel that attains a maximum length of 58 mm. The shell is moderately thick, subtriangular in outline, with a rounded anterior margin and a bluntly pointed posterior margin. The posterior ridge is poorly defined and the posterior slope is slightly concave. Externally, the periostracum is cloth-like, and varies in color from dark olive to brown to almost black. Internally, the pseudocardinal teeth are heavy, and triangular, with two divergent teeth in left valve and one in the right. The lateral teeth are short and almost straight. The nacre is bluish-white with a slight iridescent hue (Williams et al. in review, Garner et al. in review).

The fuzzy pigtoe inhabits medium-sized creeks to rivers with slow to moderate currents in sand and silty substrates (Williams and Butler 1994). Little is known about the life history of the fuzzy pigtoe. Specimens have been found with glochidia and/or eggs in the marsupia during March, April, June, and July (Blalock-Herod et al. unpublished data, Pilarczyk et al. unpublished

data, Williams et al. in review). A preliminary host fish has been identified as the blacktail shiner, *Cyprinella venusta*. Surveys for this species have been conducted periodically during June-August 1995, July-October 1996, June-July 1998, May-June 1999, March 2000, and May-June 2000.

The fuzzy pigtoe is endemic to the Escambia and Choctawhatchee rivers in Alabama and Florida, and the Yellow River in Alabama. Within the Escambia River drainage, the fuzzy pigtoe has been found in the Escambia River, Escambia and Santa Rosa Counties, Florida; Conecuh River, Escambia, Covington, Crenshaw, and Pike Counties, Alabama; Murder, Sandy, and Burnt Corn Creeks, Conecuh County, Alabama; Sepulga River, Conecuh County, Alabama; Pigeon Creek, Covington County, Alabama; Patsaliga and Little Patsaliga Creeks, Crenshaw County, Alabama; and Mill Creek, Pike County, Alabama. Within the Yellow River drainage, the fuzzy pigtoe is known from the Yellow River, Covington County, Alabama. Within the Choctawhatchee River drainage, the fuzzy pigtoe was known from Choctawhatchee River, Washington, Walton, and Holmes Counties, Florida; Limestone Creek, Walton County, Florida; Wrights Creek, Holmes County, Florida; Holmes Creek, Washington County, Florida; Choctawhatchee River, Geneva and Dale Counties, Alabama; Little Choctawhatchee River, Dale and Houston Counties, Alabama; Panther Creek, Houston County, Alabama; West Fork Choctawhatchee River, Dale and Barbour Counties, Alabama; East Fork Choctawhatchee River, Henry County, Alabama; and Pea River, Geneva, Dale, and Coffee Counties, Alabama (Williams et al., in review; Blalock-Herod et al., in review).

Due to recent status surveys the historical range of the fuzzy pigtoe has been expanded to include: Jordan and Bottle Creeks, Conecuh County, Alabama, both Escambia River drainage; Eightmile and Sandy Creeks, Walton County, Florida; East Pittman Creek, Holmes County, Florida; Hurricane and Flat Creeks, Geneva County, Alabama; Judy and Harris Mill Creeks, Dale County, Alabama; East Fork Choctawhatchee River, Dale County, Alabama; Pea and Pauls Creeks, and an unnamed tributary to Lindsey Creek, Barbour County, Alabama; and Pea River, Pike and Barbour Counties, Alabama, all in Choctawhatchee River drainage (Williams et al. in review, Blalock-Herod et al. in review).

The following locations known from historical museum records continue to support the fuzzy pigtoe: Escambia River, Escambia and Santa Rosa Counties, Florida; Conecuh River, Escambia, Covington, Crenshaw, and Pike Counties, Alabama; Burnt Corn and Murder Creeks, Conecuh County, Alabama; Pigeon Creek, Covington County, Alabama; and Patsaliga and Little Patsaliga Creeks, Crenshaw County, Alabama, all in Escambia River drainage; Choctawhatchee River, Washington, Walton, and Holmes Counties, Florida; Holmes Creek, Washington County, Florida; Limestone Creek, Walton County, Florida; Wrights Creek, Holmes County, Florida; Choctawhatchee River, Geneva County, Alabama; West Fork Choctawhatchee River, Dale and Barbour Counties, Alabama; East Fork Choctawhatchee River, Henry County, Alabama; and Pea River, Geneva, Coffee, and Dale Counties, Alabama, all Choctawhatchee River drainage (Williams et al. in review, Blalock-Herod et al. in review).

Recent mussel status surveys found that the populations of the fuzzy pigtoe (represented by live animals and shell material) have declined from: 31 historic locations to 18 currently active

locations, 8 inactive, and 5 undetermined population status within the Escambia River drainage; 4 historic locations to 0 currently active locations within the Yellow River drainage; and 51 historic locations to 40 currently active locations, 7 inactive locations, and 4 locations with undetermined population status within the Choctawhatchee River drainage (Williams et al. in review, Blalock-Herod et al. in review). In totality, the fuzzy pigtoe has declined from a total of 86 historic locations to its remaining distribution of 58 locations. It has been extirpated from approximately 22% of its historic range. Only 4 populations were represented by 10 – 20 individuals, but most supported only 1 or 2 individuals (Williams et al. unpublished data, Blalock-Herod et al. unpublished data). At least some of the extant populations may be capable of reproducing, as one specimen was found with eggs partially in swollen marsupia during July (Williams et al. in review). Low-level recruitment may be occurring; however, long-term viability of the fuzzy pigtoe is questionable.

Villosa choctawensis

The Choctaw bean (*Villosa choctawensis* Athearn 1964) is a small mussel with a moderately thick shell that obtains a maximum length of 49 mm. The shell is somewhat inflated, ovate in outline, with rounded anterior and posterior margins. Sexual dimorphism is present, in that females may be somewhat more broadly rounded posteriorly. The posterior ridge is low and rounded. The umbo is broad and full, extending little, if any, above hinge line and positioned well anterior of center. The periostracum is shiny and smooth. External shell color is chestnut to dark brown or black, with variable fine, green rays, which may be obscure in older specimens. Internally, two well-developed pseudocardinal teeth occur in left valve and one well-developed and two rudimentary pseudocardinal teeth are present in the right valve. The lateral teeth are short and almost straight. The interdentum is moderately wide and the umbo cavity is moderately deep. Shell nacre is white to bluish and sometimes iridescent, but may be blotched and brown (Garner et al. in review).

The Choctaw bean is known from large creeks and rivers with moderate current over sand to silty-sand substrates (Williams and Butler 1994). Gravid individuals (38 and 39 mm in shell length) have been found in August (Williams et al. in review); however, this species is likely a long-term brooder. Host fish are unknown. Surveys for this species have been conducted periodically during June-August 1995, July-October 1996, June-July 1998, May-June 1999, March 2000, and May-June 2000.

The Choctaw bean is endemic to the Escambia, Yellow, and Choctawhatchee River drainages in Alabama and Florida (Williams and Butler 1994). Within the Escambia River drainage, it is known from the Escambia River, Escambia County, Florida; Murder Creek, Conecuh County, Patsaliga and Little Patsaliga creeks, Crenshaw County; and Pigeon Creek, Butler County, all in Alabama. Within the Yellow River drainage, it is known from the main channel Yellow River in Okaloosa County, Florida, and Covington County, Alabama. Within the Choctawhatchee River drainage, the Choctaw bean is known from the Choctawhatchee River main stem in Washington and Holmes Counties, Florida; and the Pea River, Geneva County, Alabama (Williams et al. in review, Blalock-Herod et al. in review).

Due to recent status surveys the historical range of the Choctaw bean has been expanded to include: Conecuh River, Crenshaw and Pike Counties; and Olustee Creek, Pike County, all Alabama, all Escambia River drainage; Five Runs Creek, Covington County, Alabama, Yellow River drainage; and Choctawhatchee River, Walton County, Florida and Geneva and Dale Counties, Alabama; Limestone Creek, Walton County; Wrights Creek, Jackson County, both in Florida; Pea River, Coffee, and Pike Counties; Whitewater Creek, Coffee County, Claybank and Judy Creeks, Dale County; West Fork Choctawhatchee River, Dale and Barbour Counties; East Fork Choctawhatchee River, Barbour and Henry Counties; Pea and Pauls Creeks, Barbour County, and Big Sandy Creek, Bullock County, all Alabama, all Choctawhatchee River drainage (Williams et al. in review; Blalock-Herod et al. in review).

The following locations known from historical museum records continue to support the Choctaw bean: Escambia River, Escambia County, Florida; and Patsaliga Creek, Crenshaw County, Alabama, all Escambia River drainage; Yellow River, Okaloosa County, Florida, and Covington County, Alabama, all Yellow River drainage; Choctawhatchee River, Washington County, Florida, and Geneva and Dale Counties, Alabama; Pea River, Geneva County; Alabama, all Choctawhatchee River drainage (Williams et al. in review, Blalock-Herod et al. in review).

The Choctaw bean appears to be extirpated from Murder Creek, Conecuh County; Pigeon Creek, Butler County; and Little Patsaliga Creek, Crenshaw County, all Alabama, all Escambia River basin; and Choctawhatchee River, Holmes County, Florida. Recent mussel status surveys found that populations (live and shell material only) of the Choctaw bean have declined from 13 historic locations to 7 currently active locations, 4 inactive, and 2 with an undetermined population status within the Escambia River drainage; it has declined from 6 historic locations to 5 currently active locations and 1 with an undetermined population status within the Yellow River drainage; and from 26 historic locations to 22 currently active locations, 1 inactive location, and 3 locations with undetermined population status within the Choctwhatchee River drainage (Williams et al. in review, Blalock-Herod et al. in review). In totality, the Choctaw bean has declined from a total of 45 historic locations to its remaining distribution of 34 locations. It has been extirpated from approximately 11% of its historic range. An average of 2 individuals were found live per location (Williams et al., unpublished data; Blalock-Herod et al., unpublished data). Two gravid individuals have been detected, but recent recruitment has not been confirmed (Williams et al. in review). The long-term viability of the Choctaw bean is questionable.

Quincuncina burkei

The tapered pigtoe (*Quincuncina burkei*, Walker 1922 *in* Ortmann and Walker (1922)) is a small mussel that attains a maximum length of 60 mm. The shell is inflated and subelliptical in outline. The anterior margin is broadly rounded and the posterior margin is narrowly pointed. The posterior ridge is well defined with radial ridges on the posterior slope. Chevron-shaped ridges cover much of the disk. Shell sculpture may be indistinct in some specimens. The periostracum is brown or greenish-yellow in young specimens, but becomes dark brown to black in adults. Pseudocardinal teeth are well-developed, divergent, and double in both valves. There are two lateral teeth in left valve and usually one in right valve. The interdentum is very narrow. Shell nacre varies from light purple to bluish-white (Garner et al. in review).

The tapered pigtoe is found in medium-sized creeks to large rivers in stable sand or sand and gravel substrata, occasionally occurring in silty sand in slow to moderate current (Williams and Butler 1994). Little is known about the reproductive biology of the tapered pigtoe. It is presumably a short-term brooder. Ortmann and Walker (1922) reported a female gravid with eggs in May, with all four gills used as marsupia, and subcylindrical conglutinates. Pilarczyk (unpublished data) found the tapered pigtoe gravid in March, April, and June 2004, and preliminarily identified the blacktail shiner, *Cyprinella venusta* as a host fish. Surveys for this species have been conducted periodically during June-July 1998, May-June 1999, March 2000, May-June 2000, and March-June 2004.

The tapered pigtoe is endemic to the Choctawhatchee River drainage in Alabama and Florida (Williams and Butler 1994, Blalock-Herod et al. in review). The tapered pigtoe is known from Horseshoe Lake (an oxbow lake with flowing connection to main channel of the Choctawhatchee River), Washington County; Limestone Creek, Walton County; East Pitman Creek, Holmes County; Choctawhatchee River, Washington, Walton, and Holmes Counties; Holmes Creek, Washington and Holmes Counties; and Tenmile Creek, Holmes County; all in Florida. In Alabama, the historical distribution of the tapered pigtoe included: Flat and Hurricane creeks, Geneva County; Pea River, Barbour, Coffee and Dale Counties; Choctawhatchee River, Dale County; Little Choctawhatchee River, Dale and Houston Counties; East Fork Choctawhatchee River, Dale County; Bear and Panther Creeks; Houston County; and West Fork Choctawhatchee River, Barbour County (Blalock-Herod et al. in review).

Due to recent surveys, the historical distribution of the tapered pigtoe has been expanded to include: Crews Lake (an oxbow lake with flowing connection to main channel of the Choctawhatchee River) and Pine Log Creek, both Washington County; Sandy, Eightmile, and Bruce Creeks, Walton County; and Wrights Creek, Jackson and Holmes Counties, all in Florida; East Fork Choctawhatchee River, Henry County; Pea River, Pike County; Judy Creek, Dale County; West Fork Choctawhatchee River, Big, Pea, and Pauls Creeks, all in Barbour County, all Alabama. Additionally, a relic shell was found recently in Big Creek, Pike County, Alabama (Blalock-Herod et al. in review).

The following locations known from historical museum records continue to support tapered pigtoe populations: Limestone Creek, Walton County; East Pittman Creek, Holmes County; Choctawhatchee River, Washington, Walton, and Holmes Counties; and Holmes Creek, Washington and Holmes Counties; all in Florida; and Flat Creek, Geneva County; Alabama (Blalock-Herod et al. in review).

Populations of the tapered pigtoe appear to be extirpated from Hurricane Creek, Geneva County; Bear and Panther Creeks, Houston County; Little Choctawhatchee River, Houston and Dale Counties; Pea River, Coffee and Dale counties; Choctawhatchee River and East Fork Choctawhatchee River, Dale county, and probably Big Creek, Pike County, all in Alabama. During recent status surveys, the tapered pigtoe was found live and as shell material at 33 of 54 historical locations with an average of 7 individuals per location. Populations were inactive at 15 historical locations and status is undetermined at 6 locations. Four populations were

represented by 10 – 20 individuals (Blalock-Herod et al. unpublished data). The tapered pigtoe has been extirpated from approximately 28% of its historic range. Recruitment status of the tapered pigtoe is unknown, and may be occurring at low levels within the existing populations.

THREATS:

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

The round ebonyshell, southern kidneyshell, narrow pigtoe, southern sandshell, fuzzy pigtoe, Choctaw bean, and tapered pigtoe represent seven narrowly endemic mussel species from Gulf Coastal drainages in Alabama and Florida. The exact cause for decline is unknown, but it is believed that these seven species have disappeared from portions of their historical ranges due to a variety of factors outlined below. Several species may be extirpated from the Yellow River and a variety of other tributary streams within the Escambia and Choctawhatchee river drainages. The stream and river habitats of these seven species are vulnerable to habitat modification, sedimentation, and water quality degradation from a number of activities associated with modern civilization. Highway and reservoir construction, improper logging practices, agricultural runoff, housing developments, pipeline crossings, and livestock grazing often result in physical disturbance of stream substrates or the riparian zone, and/or changes in water quality, temperature, or flow (Neves et al. 1997).

Sedimentation can cause direct mortality of mussels by deposition and suffocation (Ellis 1936, Box and Mossa 1999) and can eliminate or reduce the recruitment of juvenile mussels (Negus 1966, Box and Mossa 1999). For example, increased suspended sediment loads may directly impact the southern sandshell life-cycle by reducing the chance of a sight-feeding host fish encountering the visual display of a superconglutinate lure (Haag et al. 1995, Blalock-Herod et al. 2002). If the superconglutinate isn't encountered by a host within a short time period, the glochidia will become non-viable (O'Brien and Brim Box 1999). Suspended sediment can also interfere with feeding activity of mussels (Dennis 1984). Many of the streams recently surveyed for these seven species have or have the potential for high nonpoint source pollution for sediments (Bennett 2002 and references therein, Hoehn 1998 and references therein). Potential sources of sand and other sediment accumulation in south-central Alabama and western Florida stream channels include row crop agriculture on sloping landscapes, clear cutting of timber including riparian zones, and livestock grazing along streams (Bennett 2002 and references therein, Hoehn 1998 and references therein). Uncontrolled access to small streams by cattle and other livestock may result in destruction of riparian vegetation, bank degradation and erosion, and localized sedimentation of stream habitats. Limited range and low numbers make these seven species vulnerable to land use changes within occupied watersheds that would result in increases in nonpoint source pollution impacts. Strict adherence to Forestry Best Management Practices (BMPs) and maintaining buffers between cultivated fields, pastures, and riparian areas minimizes these impacts.

Many of the confirmed extant populations of these seven species are in the vicinity of highway and unpaved road crossings due to ease of access for surveyors. Highway and bridge construction and widening could affect populations of these species unless appropriate precautions are implemented during construction to reduce erosion and sedimentation, and

maintain water quality standards. Unpaved roads and roadside gullies contribute to greater than 50% of the sediment transported into streams of the Choctawhatchee River drainage (Bennett 2002 and references therein). Other river drainages of the coastal plain of Alabama and Florida may be similar. Efforts to reduce the number of unpaved roads or following maintenance and service guidelines may reduce erosion and sedimentation problems within these basins. The construction of reservoirs and the associated habitat changes (e.g., changes of sediments, flow, water temperature, dissolved oxygen) can directly impact mussel populations (Neves et al. 1997). The completion of several large and small dams on streams within the Escambia, Yellow, and Choctawhatchee River drainages, may have contributed to populations being lost, and other populations declining.

Nutrients, usually phosphorus and nitrogen, may emanate from agricultural fields, residential lawns, livestock feedlots, poultry houses, and leaking septic tanks in levels that result in eutrophication and reduced oxygen levels in small streams. Many mussel species are more sensitive to nitrogen and ammonia compounds than other test organisms currently used in bioassays and therefore, current EPA water quality criteria may be inadequate to protect them (Augspurger et al. in review). Nutrient loading has been identified as a concern within the Escambia, Yellow, and Choctawhatchee River drainages, in Florida (Hoehn 1998 and references therein).

Adult mussels appear to respond to agricultural and residential pesticide and herbicide residues similar to commonly used test organisms (N. Kernaghan, U.S. Geological Survey (USGS), Gainesville, Florida, pers. comm., March 2003), therefore current water quality criteria should protect adult mussels from mortality. Additionally, many chemicals known to be harmful to aquatic organisms in general are no longer in use. However, breakdown products of pesticides and herbicides are often still present within the sediments and water column. Sublethal effects to adults and lethal and sublethal effects to juveniles and glochidia from these chemicals and their breakdown products are not fully understood. Other complexities arise when pesticide and herbicide residues affect host fish. For example, preliminary evidence from laboratory trials indicated that host fish carrying a body burden of atrazine failed to transform glochidia into juvenile mussels, while hosts without body burden concentrations were successful (N. Kernaghan, USGS, pers. comm., March 2003). Atrazine is an herbicide commonly used to control broad leaf grasses and weeds in corn, other crops, and conifer reforestation plantings (Extension Toxicology Network 1996). Current and historical data regarding agricultural and residential pesticide and herbicide use within the Escambia, Yellow, and Choctawhatchee River drainages are not readily available and the impact of these chemicals on the seven mussel species is unknown.

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

These seven species are not commercially valuable nor are the streams and rivers they inhabit subject to harvesting activities for commercial mussel species. These species have been taken for scientific and private collections in the past. Such activity may increase as knowledge of the species increasing rarity becomes known. Although collecting is not considered a factor in the decline of these species, the restricted distribution and small sizes of the known extant populations renders them vulnerable to overzealous recreational or scientific collecting. In the

State of Florida, commercial harvesting is prohibited and a bag limit has been set for recreational harvesting. Commercial harvesting in the Escambia, Yellow, and Choctawhatchee River basins in Alabama is illegal and recreational harvesting is restricted.

C. Disease or predation.

Diseases of mussels are poorly known. Juvenile and adult mussels are prey items for some invertebrate predators (e.g., non-biting midges, dragonfly larvae, hydra, flatworms) and parasites (e.g., nematodes, mites), and provide prey for a few vertebrate species (e.g., birds, raccoons, otter, fish). Although predation by naturally occurring predators is a normal aspect of the population dynamics of a healthy mussel population, predation may contribute to the further decline of these species due to their restricted distributions and low numbers associated with extant populations.

D. The inadequacy of existing regulatory mechanisms.

Although the negative effects of point source discharges on aquatic communities in Alabama and Florida have been reduced over time by compliance with State and Federal regulations pertaining to water quality, there has been less success in dealing with nonpoint source pollution impacts, particularly sediments, to small stream drainages. Such impacts result from individual private landowner activities (e.g., construction, grazing, agriculture, silviculture), and public construction works (e.g., bridge and highway construction and maintenance). The effects of such activities can be, and often are reduced by employing voluntary BMPs. There is currently no requirement within the scope of Federal environmental laws to specifically consider these seven species during Federal activities, or to ensure that Federal projects will not jeopardize their continued existence.

E. Other natural or manmade factors affecting its continued existence.

Population Fragmentation, Isolation and Genetic Considerations

It is generally accepted that large river mussels form beds and historically occurred in high numbers within these beds (Holly Blalock-Herod, pers. comm. 6/2004). The biology of freshwater mussels in the family Unionidae makes it necessary that individuals are in fairly close proximity to each other for successful reproduction. Female mussels must siphon the sperm from the water column to fertilize their eggs. Successful fertilization has been demonstrated to be density dependant. The likelihood is high that some populations of these seven species are below the effective population size (Soulé 1980) required to maintain long-term genetic and population viability. Population fragmentation and isolation prohibits the natural interchange of genetic material between populations, and small population size reduces the reservoir of genetic diversity within populations, which can lead to inbreeding depression (Avise and Hambrick 1996), decreased fitness, and an increased risk of extinction in localized populations (Saccheri et al. 1998).

Host Fish Considerations

Additionally, these seven species would be adversely affected by the loss or reduction in numbers of the fish host essential to its parasitic glochidial stage. The specific fish host for four of seven of these species is not known, therefore, impacts to this aspect of the life cycle are not easy to evaluate. Reduction in host fish distribution and abundance makes natural repopulation of any extirpated population less probable.

Random Catastrophic Events

The majority of the remaining populations of these seven species are generally small and geographically isolated. The round ebonyshell and southern kidneyshell are vulnerable to random catastrophic events (e.g., flood scour, drought, toxic spills) because of low population numbers known from 3 and 2 locations, respectively. The effects of recent droughts on these seven species are currently unknown, however, the habitats of these species are susceptible to dewatering, reduced food availability, decreased dissolved oxygen and increased water temperatures from droughts. Glycogen levels were examined in a population of *Elliptio mcmichaeli* (fluted elephantear) that was affected by drought conditions that occurred within the Choctawhatchee River drainage, Alabama. Glycogen levels in mussels that experienced dewatering mimicked levels of specimens that were starved in laboratory trials (Herod et al. 2001). The affected population of the fluted elephantear was nearly extirpated during the recent drought.

Alien Species

Alien or nonnative species of aquatic organisms are firmly established in the range of these seven species. The Asian clam (*Corbicula fluminea*) has spread throughout the Escambia, Yellow, and Choctawhatchee river drainages since its introduction into these basins around 1960. This species has been implicated as a competitor with native mussels for resources such as food, nutrients, and space, particularly as juveniles (Neves and Widlak 1987). According to Strayer (1999), dense populations of Asian clams may ingest large numbers of unionid sperm, glochidia, and newly-metamorphosed juveniles. Asian clams may actively disturb sediments, so dense populations could reduce habitable space for juvenile native mussels. Periodic dieoffs may produce enough ammonia and consume enough oxygen to kill native mussels (Strayer 1999). However, specific impacts upon native mussel populations remain largely unresolved (Leff et al. 1990, Strayer 1999). Yeager et al. (2000) determined that high densities of Asian clams negatively impacted the survival and growth of newly metamorphosed juvenile mussels and thus reduced recruitment. They proved from laboratory experiments that Asian clams readily ingested glochidia, clam density and juvenile mussel mortality were positively correlated, growth rates were reduced with the presence of clams, and juvenile mussels were displaced in greater numbers downstream in laboratory tests with clams (Yeager et al. 2000).

Other alien species that are potential threats to these seven species are zebra mussels (*Dreissena polymorpha*) and black carp (*Mylopharyngodon piceus*). The invasion of the zebra mussel poses a threat to mussel faunas in many regions, and species extinctions are expected as a result of its continued spread in the eastern United States (Ricciardi et al. 1998). Strayer (1999) reviewed in detail the mechanisms in which zebra mussels impact native mussels. The primary means of impact is direct fouling of the shells of live native mussels, as zebra mussels have attached in large numbers to the shells of live native mussels and have been implicated in the loss of mussel beds. Fouling impacts include impeding locomotion (both laterally and vertically), interfering with normal valve movements, deforming valve margins, and locally depleting food resources and increasing waste products. Heavy infestations of zebra mussels on native mussels may overly stress the animals by reducing their energy stores. They may also reduce food concentrations to levels too low to support reproduction or even survival in extreme

cases. Other ways in which zebra mussels may impact native mussels is potentially through filtering their sperm and possibly even their tiny glochidia from the water column. Habitat for native mussels may also be degraded by large deposits of zebra mussel pseudofeces (Vaughan 1997). Fortunately, zebra mussels have not been detected within the Escambia, Yellow, and Choctawhatchee river drainages. However, reports of the nuisance species continue to move eastward from the Mississippi River drainage. Active education and prevention programs could eliminate this potential threat.

Native to China, the black carp is also a potential threat (Strayer 1999). Nico et al. (2001) prepared a risk assessment of the black carp and summarized all known aspects of its ecology, life history, and intentional introduction (since the 1970s) into North America. A molluscivore (mollusk eater), the black carp has been proposed for widespread use by aquaculturists to control snails, the intermediate host of a trematode (flatworm) parasite affecting catfish in ponds in the Southeast and lower Midwest. Intentionally brought to the United States, black carp are known to eat clams (*Corbicula* spp.) and unionid mussels in China, in addition to snails. They are the largest of the Asiatic carp species, reaching more than 4 feet in length and achieving a weight in excess of 150 pounds (Nico et al. 2001). During 1994, 30 black carp escaped from an aquaculture facility in Missouri during a flood. Other escapes into the wild by nonsterile black carp is deemed imminent by conservation biologists. If these species invade streams with mussel communities, they could wreak havoc on already stressed native mussel populations. Black carp are not known to be introduced to the Escambia, Yellow, or Choctawhatchee river drainages. No aquaculture facilities are known to contain black carp within these basins. Active education and programs to prevent accidental introductions may alleviate this potential threat.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

Conservation activities have been limited to working with private landowners in south Alabama and west Florida to encourage the use of Best Management Practices to reduce the effects of sedimentation from unpaved roads, agriculture and silviculture. Population and habitat surveys have been funded to better quantify threats that these species have experienced, those that are ongoing, and any foreseeable threats that are likely to negatively affect populations or their habitats. Potential host fish have been identified for the fuzzy pigtoe and the tapered pigtoe through cooperation with Troy State University.

SUMMARY OF THREATS (including reasons for addition or removal from candidacy, if appropriate)

For species that are being removed from candidate status:

___Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES

LISTING PRIORITY

(Please note that there are a total of seven species under three listing priorities).

Fusconaia rotulata* and *Ptychobranchus jonesi

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

Rationale for listing priority number:

Magnitude:
Few numbers of populations, with few individuals, and habitat loss and degradation throughout the range of the round ebonyshell and southern kidneyshell are the main threats. Habitat loss and degradation threats include nonpoint and point source pollution (e.g., sedimentation, nitrogen, ammonia) and existing and proposed impoundments.

The round ebonyshell is only known from gravel with sand substrates in a small reach of the main channel of the Conecuh River in Alabama and Escambia River in Florida. The entire range of the round ebonyshell is affected by threats. Upstream impoundments may cause adverse effects to this habitat by dewatering during drought and low oxygen levels, peaking flows during power generation, altering temperature regimes, and altering natural sediment transport processes. A proposed dam, if realized, would alter water quality, quantity, and sedimentation within the known range of the round ebonyshell. Poor land use practices are increasing sedimentation to this section of the river which can make the gravel habitat unsuitable for this species. The existing populations are small with only 3 of 9 historic locations containing an average of 2 live individuals. This species may not be currently reproducing, leaving the species susceptible to a single catastrophic event or extinction from “old age”. If these threats aren’t acknowledged by other Federal, State, NGO, and private landowners, they will continue to persist and will be long-lasting. Fortunately these effects do not have to be permanent. Minimum flows below impoundments with more natural temperature regimes have resulted in

reproduction and recruitment in other mussel species. Riparian buffers of only 9 m wide for each stream bank (may need adjusting for slope of bank) have been documented to reduce sediment, excess nutrient, and contaminant input from surrounding areas.

The southern kidneyshell is likely extirpated from 2 of 3 historic river drainages. In the remaining river drainage, it occurs at only 2 of 14 historic locations. It is unknown if this species is reproducing. Downstream of this location is State land, upstream consists of private land-owners with rural residences, and crop, pasture, and timberland. The current location is threatened by any adverse practices that occur upstream that would deliver increased sediments or contaminants to the location. Threats that occur downstream that would cause head-cutting would also affect the only known locality. As with the round ebonyshell these effects do not have to be permanent if riparian buffers and other appropriate best management and land use practices are used.

Imminence:
The round ebonyshell is facing ongoing habitat deterioration and a proposed reservoir would increase habitat loss by altering water quality and quantity in throughout their known range. The southern kidneyshell has been reduced to one population and any alterations or modifications to habitats upstream will likely jeopardize this species.

Rational for Change in Listing Priority Number (insert if appropriate):

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. We have evaluated the current immediacy and magnitude of identified threats to the species in the threats analysis section of this form. At this time, we do not believe the species warrants the need for emergency listing as outlined in Section 4 of the Endangered Species Act. However, we will continue to monitor and assess the status and trends of the species and could adjust this conclusion based on the best scientific and commercial information available. (See next page for additional species in this package.)
LISTING PRIORITY

Fusconaia escambia, Hamiota australis, Pleurobema strodeanum,* and *Villosa choctawensis

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 Species Subspecies/population	7 8 9
	Non-imminent	Monotypic genus Species Subspecies/population	10 11 12

Rationale for listing priority number:

Magnitude:
Fusconaia escambia, Hamiota australis, Pleurobema strodeanum, and *Villosa choctawensis* have significant threats present throughout their respective ranges, affecting nearly all populations and thus are high in magnitude. Mussel surveys last year (2004) in the Escambia, Yellow, and Choctawhatchee river basins (25 wadeable sites that were last surveyed in the 1990's) show a possible continuing loss of range for each species (Pilarczyk et al. 2005). F. escambia was found at 1 of 3 sites resurveyed where it occurred in the 90's; H. australis at 5 of 6 sites; P. strodeanum at 11 of 18 sites; and V. choctowensis at 3 of 7 sites. Threats associated with habitat loss and degradation occur throughout the range of these species, including nonpoint and point source pollution (e.g., sedimentation, nitrogen, ammonia). Portions of these species' ranges have been impounded and adversely affected by poor land use practices; population losses due to habitat destruction have probably contributed more to the decline and imperilment of these species than any other single factor. Additionally several new impoundments have been proposed in basins where these species persist. Remaining populations of these species are small and most are geographically isolated thereby making natural repopulation and genetic interchange difficult. Specific threats will be quantified in ongoing studies.

Imminence:
Threats to the narrow pigtoe, southern sandshell, fuzzy pigtoe, tapered pigtoe, and Choctaw bean are ongoing but non-imminent due to lack of specific data regarding threats at individual locations.

Rational for Change in Listing Priority Number (insert if appropriate):

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. We have evaluated the current immediacy and magnitude of identified threats to the species in the threats analysis section of this form. At this time, we do not believe the species warrants the need for emergency listing as outlined in Section 4 of the Endangered Species Act. However, we will continue to monitor and assess the status and trends of the species and could adjust this conclusion based on the best scientific and commercial information available.

LISTING PRIORITY

Quincuncina burkei

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

Rationale for listing priority number:

Magnitude:
The threats to the tapered pigtoe are the same as for the other six species; however, the magnitude is moderate to low due to the number of locations within its range that support live individuals. Threats associated with habitat loss and degradation occur throughout the range of this species, including nonpoint and point source pollution (e.g., sedimentation, nitrogen, ammonia). Portions of this species' range have been impounded and adversely affected by poor land use practices; population losses due to habitat destruction have probably contributed more to the decline and imperilment of these species than any other single factor. Additionally several new impoundments have been proposed in basins where these species persist. Remaining populations of these species are small and most are geographically isolated thereby making natural repopulation and genetic interchange difficult. Specific threats will be quantified in ongoing studies.

Imminence:
Threats to the tapered pigtoe are ongoing but non-imminent due to lack of specific data regarding threats at individual locations.

Rational for Change in Listing Priority Number (insert if appropriate):

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. We have evaluated the current immediacy and magnitude of identified threats to the species in the threats analysis section of this form. At this time, we do not believe the species warrants the need for emergency listing as outlined in Section 4 of the Endangered Species Act. However, we will continue to monitor and assess the status and trends of the species and could adjust this conclusion based on the best scientific and commercial information available.

DESCRIPTION OF MONITORING: Freshwater mussel experts are contacted at a minimum of twice per year by discussing these species and their habitats at the Alabama Mollusk Meeting and through an email discussion group for the Northeastern Gulf watersheds. A new population and habitat survey was initiated in 2004 to update status, distribution, relative abundance data, current habitat condition, and threats at locations known to support at least one of these seven species. Standard protocols are followed to provide consistency among sampling efforts and repeatability for future work. Presence/absence survey methods follow Carlson et al. (2003). Quantification of habitat condition and threats follows Barbour et al. (1999). This level of monitoring is appropriate to update the status of the populations and their habitats. However, since relatively few scientists are conducting on the ground research in these habitats, additional effort needs to be made to contact other Federal, State, Non-government agencies and private land-owners to make them aware of the presence of these seven species and their habitat needs. We need to promote the Partners for Fish and Wildlife program to any landowners near populations of these species and make Federal agencies aware of "Conferencing" procedures as well as update Best Management Practices and monitoring.

During 2004 population and habitat surveys within the Escambia, Yellow, and Choctawhatchee river basins were funded to update status and distribution data and to better quantify threats that these species have experienced, those that are ongoing, and any foreseeable threats that are likely to negatively affect populations or their habitats. Survey work is underway at sites identified as having supported at least one or more species considered in this candidate review. Each species has been detected as still inhabiting at least one site. The updated habitat survey will quantify conditions using a standardized habitat measurement index that will be comparable across locations and with future surveys.

COORDINATION WITH STATES
Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: FWS has funded the majority of the status assessments for these species and we are in the process of sending reports to appropriate state agencies in Alabama and Florida.

Indicate which State(s) did not provide any information or comments:

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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: /s/ Jeffrey M. Fleming 11/16/2005
Acting Regional Director, Fish and Wildlife Service Date

Concur: _____ _____
Director, Fish and Wildlife Service Date

Do Not Concur: _____ _____
Director, Fish and Wildlife Service Date

Date of annual review: October 2005

Conducted by: Panama City, Florida Field Office