

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

SCIENTIFIC NAME: *Fusconaia lananensis*

COMMON NAME: Triangle pigtoe

LEAD REGION: Interior Region 6 (Arkansas-Rio Grande-Texas-Gulf)

DATE INFORMATION CURRENT AS OF: 09/01/2020

STATUS/ACTION

Species assessment - determined either we do not have sufficient information on threats or the information on the threats does not support a proposal to list the species and, therefore, it was not elevated to Candidate status

Listed species petitioned for uplisting for which we have made a warranted-but-precluded finding for uplisting (this is part of the annual resubmitted petition finding)

Candidate that received funding for a proposed listing determination; assessment not updated

New candidate

Continuing candidate

Listing priority number change

Former LPN: \_\_\_\_

New LPN: \_\_\_\_

N/A Candidate removal: Former LPN: \_\_\_\_

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 taxonomy, or 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.

Date when the species first became a Candidate (as currently defined):

Petition Information:

Non-petitioned

Petitioned; Date petition received: June 25, 2007

90-day substantial finding FR publication date: December 16, 2009

12-month warranted but precluded finding FR publication date: N/A

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? N/A

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? N/A

c. Why is listing precluded? N/A

PREVIOUS FEDERAL ACTIONS:

On June 25, 2007, the U.S. Fish and Wildlife Service (Service) received a petition dated June 18, 2007 from Forest Guardians (now WildEarth Guardians) requesting that the Service list 475 species, including the triangle pigtoe, as threatened or endangered species and designate critical habitat under the Endangered Species Act (Act). All 475 species occur within the Southwestern Region and are ranked as G1 or G1G2 species by NatureServe. In a July 11, 2007 letter to the petitioner, the Service acknowledged receipt of the petition and stated that the petition was under review by staff in the Southwest Regional Office.

On December 16, 2009, the Service published a 90-day finding on 192 of the 475 species and stated that the petition presented substantial scientific information indicating that listing may be warranted for 67 of the 192 species (74 FR 66865). As a result, the Service initiated status reviews for all 67 species, including the triangle pigtoe.

ANIMAL/PLANT GROUP AND FAMILY: Mollusca, Unionidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE:

Countries: United States

States/U.S. Territories: Texas

U.S. Counties: Angelina, Cherokee, Hardin, Jasper, Jefferson, Liberty, Nacogdoches, Orange, Polk, Rusk, Sabine, San Augustine, Shelby, Smith, and Tyler counties, Texas.

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:

Countries: United States

States/U.S. Territories: Texas

U.S. Counties: Angelina, Cherokee, Hardin, Jasper, Jefferson, Liberty, Nacogdoches, Orange, Polk, Rusk, Sabine, San Augustine, Shelby, Smith, and Tyler counties, Texas.

#### LAND OWNERSHIP:

All of the known triangle pigtoe populations occur in the Neches River basin and its tributaries within Texas. The majority of occupied range is under private ownership with portions adjacent to U.S. Forest Service and National Park Service land parcels.

#### LEAD REGION CONTACT:

Susan Oetker, 404-679-7050, [Susan\\_Oetker@fws.gov](mailto:Susan_Oetker@fws.gov)

#### LEAD FIELD OFFICE CONTACT:

Arlington Ecological Services Field Office, Jacob Lewis, 817-277-1100 x22125,  
[Jacob\\_Lewis@fws.gov](mailto:Jacob_Lewis@fws.gov)

#### BIOLOGICAL INFORMATION

##### Species Description

The triangle pigtoe, which has, since the 90-day finding was published, been determined to be synonymous with the Texas pigtoe (*Fusconaia askewi*; Williams *et al.* 2017, p. 39), is described as a rare freshwater mussel with a moderately solid and thick sub-rhomboidal shell. The beaks are elevated above the hinge line but usually eroded. External shell color is dark brown or black, occasionally with darker fine rays. The interior shell surface (nacre) is typically salmon-pink, with yellow blotches and pearly bumps. Pseudocardinal teeth (molar-like structures located near the beaks on the interior surface) are triangular and compressed while the lateral teeth are long, straight or slightly curved. Soft tissues are described as yellow, pink, or orange. Individuals over 3 inches (80mm) in length have been collected in Texas. This description is now considered an ecophenotypic description of Texas pigtoe.

##### Taxonomy

CLASS Bivalvia Linnaeus, 1758

ORDER Unionida Gray, 1854

FAMILY Unionidae Rafinesque, 1820

SUBFAMILY Ambleminae Rafinesque, 1820

TRIBE Pleurobemini Hannibal, 1912

GENUS *Fusconaia* Simpson, 1900

SPECIES *Fusconaia lananensis* (Frierson, 1901)

The triangle pigtoe was first described as *Quadrula lananensis* by L.S. Frierson (1901, p. 75) and was later moved to *Fusconaia* by Ortmann (1912, p. 244). The triangle pigtoe, as *Fusconaia lananensis*, was considered to be a valid species (Howells *et al.* 1996; Turgeon *et al.* 1998); however, in the 1990s, species validity came into question due to similar morphology and

overlapping distribution with the more common Texas pigtoe (*Fusconaia askewi* Marsh 1896)(Howells 2010, p. 4). In 1995, Texas Parks and Wildlife Department (TPWD) performed preliminary electrophoretic analyses of Texas *Fusconaia*, including specimens of Texas pigtoe collected from the Sabine River and presumed triangle pigtoe from Attoyac Bayou (Howells 2010, p. 4). Results indicated a clear distinction between populations of Wabash pigtoe (*F. flava*) and Southern pigtoe (*P. georgianum*) from Texas *Fusconaia*, but no difference between triangle pigtoe and Texas pigtoe . In 2010 and 2012, similar studies by Hayes (2010) and Burlakova *et al.* (2012) supported the earlier TPWD findings (Howells *et al.* 2012). Williams *et al.* (2017), based on Burlakova *et al.* (2012) results, placed Texas pigtoe and triangle pigtoe in synonymy with Trinity pigtoe (*F. chunii*). As of March 30, 2020, TPWD removed the triangle pigtoe from their list of State Threatened species.

Recent genetic studies have determined that triangle pigtoe is synonymous with Texas pigtoe, but distinct from Trinity pigtoe, with a genetic divergence of 1.3% at *cox1*, likely indicating a recent evolutionary divergence (Inoue *et al.* 2018, p. 698; Pieri *et al.* 2018, p. 9). Morphometric (shell shape) analysis results suggested that Texas pigtoe and triangle pigtoe are different morphotypes of the same species (Inoue *et al.* 2018, p. 698). Molecular phylogenetic and species delimitation analyses showed that Trinity pigtoe was genetically distinct from Texas pigtoe, and confirmed that triangle pigtoe was genetically indistinguishable from Texas pigtoe (Inoue *et al.* 2018, p. 698; Pieri *et al.* 2018, p. 9). Time-calibrated phylogenies indicated that Trinity pigtoe split from Texas pigtoe/triangle pigtoe as recently as 2.49-2.03 million years ago in the early Pleistocene epoch (Pieri *et al.* 2018, p. 8). Pieri *et al.* (2018, p. 9) also concluded that triangle pigtoe is a junior synonym of Texas pigtoe. This conclusion has been supported by the scientific community, including the Freshwater Mollusk Conservation Society, and TPWD; therefore, the Service no longer considers the triangle pigtoe (*F. lananensis*) to be a listable entity under the Act.

#### Habitat/Life History

Not applicable

#### Historical Range/Distribution

Not applicable

#### Current Range/Distribution

Not applicable

#### Population Estimates/Status

Not applicable

#### SUMMARY OF BIOLOGICAL INFORMATION

Subsequent to the Service's 90-day finding, molecular data has shown that the triangle pigtoe is

synonymous with Texas pigtoe (*F. askewi*); therefore, triangle pigtoe is no longer a listable entity as defined in the Act (Inoue *et al.* 2018, p. 698; Pieri *et al.* 2018, p. 9; Williams *et al.* 2017, pp. 39, 49).

#### DISTINCT POPULATION SEGMENT (DPS)

Not applicable

#### SIGNIFICANT PORTION OF THE RANGE (SPR)

Not applicable

#### THREATS

An assessment of threats is not applicable because the taxon no longer qualifies as a listable entity as defined in the Act (i.e., the taxonomic classification of this mussel has changed; the triangle pigtoe is a synonym of the more widespread Texas pigtoe). Any assessment of threats would apply to Texas pigtoe, not the triangle pigtoe separately.

#### SUMMARY OF THREATS

Not applicable

#### FINDING

Recent genetic studies (Inoue *et al.* 2018, p. 698; Pieri *et al.* 2018, p. 9) revealed that the triangle pigtoe (*Fusconaia lananensis*) is synonymous with the Texas pigtoe (*F. askewi*). These studies have been widely accepted by the relevant scientific community and the Service. As the species has been synonymized with the Texas pigtoe, the triangle pigtoe is no longer a listable entity as defined in the Act. Therefore, it is not warranted for listing under the Act.

#### RECOMMENDED CONSERVATION MEASURES

Not applicable because the taxon is no longer a listable entity as defined in the Act (i.e., the taxonomic classification of this mussel has changed; the triangle pigtoe is a synonym of the more widespread Texas pigtoe).

#### COORDINATION WITH STATES

Texas Parks and Wildlife Department (TPWD) agrees with the Service's assessment that the triangle pigtoe is no longer a listable entity as defined in the Act. As of March 30, 2020, TPWD removed the triangle pigtoe from the list of State Threatened species.

## LITERATURE CITED

- Burlakova, L.E., D. Campbell, A.Y. Karatayev, and D. Barclay. 2012. Distribution, genetic analysis and conservation priorities for rare Texas freshwater mussels in the genera *Fusconaia* and *Pleurobema* (Bivalvia: Unionidae). *Aquatic Biosystems* 8:12.
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- Hayes, D.M. 2010. Genetic diversity and distribution of selected freshwater mollusks (Gastropoda and Bivalvia) from west of the Mississippi River with emphasis on Arkansas taxa. Ph.D. Dissertation, Arkansas State University, Jonesboro.
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- Pieri, A.M., K. Inoue, N.A. Johnson, C.H. Smith, J.L. Harris, C. Robertson, C.R. Randklev. 2018. Molecular and morphometric analyses reveal cryptic diversity within freshwater mussels (Bivalva: Unionidae) of the western Gulf coastal drainages of the USA. *Biological Journal of the Linnean Society* XX, pp. 1-17.
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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: **AMY LUEDERS** Digitally signed by AMY LUEDERS  
Date: 2020.10.16 11:08:58 -06'00'  
\_\_\_\_\_  
Regional Director, U.S. Fish and Wildlife Service \_\_\_\_\_  
Date

Concur: **MARTHA WILLIAMS** Digitally signed by MARTHA WILLIAMS  
Date: 2021.04.29 06:39:21 -06'00'  
\_\_\_\_\_  
Principal Deputy Director, Exercising the Delegated Authority of the Director,  
U.S. Fish and Wildlife Service \_\_\_\_\_  
Date

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

Director's Remarks:

Date of annual review:

Conducted by: