

Green-blossom pearly mussel (*Epioblasma torulosa gubernaculum*)
Turgid-blossom pearly mussel (*Epioblasma turgidula*)
Yellow-blossom pearly mussel (*Epioblasma florentina florentina*)

**5-Year Review:
Summary and Evaluation**

**U.S. Fish and Wildlife Service
Southeast Region
Cookeville Ecological Services Field Office
Cookeville, Tennessee**

5-YEAR REVIEW

Green-blossom pearly mussel (*Epioblasma torulosa gubernaculum*)

Turgid-blossom pearly mussel (*Epioblasma turgidula*)

Yellow-blossom pearly mussel (*Epioblasma florentina florentina*)

I. GENERAL INFORMATION

A. Methodology used to complete the review –

This 5-year review was conducted by the Service's Cookeville Field Office. The primary sources of information used in this analysis were the species' recovery plans (Service 1985, 1984). A notice was published in the Federal Register on September 20, 2005 (70 FR 55157) announcing the 5-year status review for these species and a 60-day comment period was opened. It was sent to various Federal and State government agencies, universities, and others who might have information about one or more of the species. Reviewers were asked to provide comments and any relevant information about the current status of the species.

Responses to the request for comments were received from Dr. Richard Neves (Virginia Polytechnic Institute), Dr. James Layzer (Tennessee Technological University), Steve Ahlstedt (U.S. Geological Survey [retired]), John Brumley (Kentucky Division of Water), Mike Zeman (USDA, Natural Resources Conservation Service), Ellis Lauder milk (Kentucky State Nature Preserves Commission), Braven Beaty (The Nature Conservancy), and Jess Jones (U.S. Fish and Wildlife Service). Comments received were evaluated and incorporated as appropriate (see Review History).

B. Reviewers

Lead Region — Southeast Region: Kelly Bibb; 404/679-7132

Lead Field Office — Cookeville, Tennessee, Ecological Services: Jim Widlak; 931/528-6481 (ext. 202)

Cooperating Field Office — Southwest Virginia Field Office: Roberta Hylton, 276/623-1233

Cooperating Region — Northeast Region: Mary Parkin, 617/876-6173

C. Background

1. **Federal Register Notice citation announcing initiation of this review:** 70 FR 55157; September 20, 2005

2. **Species status:**

Green-blossom pearly mussel - Presumed extinct (2006 Recovery Data Call)

Yellow-blossom pearly mussel - Presumed extinct (2006 Recovery Data Call)

Turgid-blossom pearly mussel - Presumed extinct (2006 Recovery Data Call)

3. Recovery achieved

“1” for all 3 mussels; 1=0-25% recovery objectives achieved (2006 Recovery Data Call)

4. Listing history

Green-blossom pearly mussel

FR Notice: 41 (FR) 24062

Date Listed: June 14, 1976

Entity Listed: Subspecies

Classification: Endangered

Yellow-blossom pearly mussel

FR Notice: 41 (FR) 24062

Date Listed: June 14, 1976

Entity Listed: Subspecies

Classification: Endangered

Turgid-blossom pearly mussel

FR Notice: 41 (FR) 24062

Date Listed: June 14, 1976

Entity Listed: Species

Classification: Endangered

5. Associated actions

A final rule was published for the establishment of a non-essential experimental population of the yellow-blossom pearly mussel in the Tennessee River below Wilson Dam in Alabama on June 14, 2001 (66 FR 32250).

6. Review history

Green-blossom pearly mussel

Recovery Data Call: 2006, 2005, 2004, 2003 (presumed extinct)

1984: Final Recovery Plan Published

Yellow-blossom pearly mussel

Recovery Data Call: 2006, 2005, 2004, 2003 (presumed extinct)

1985: Final Recovery Plan Published

Turgid-blossom pearly mussel

Recovery Data Call: 2006, 2005, 2004, 2003 (presumed extinct)

1985: Final Recovery Plan Published

In an email dated September 28, 2005, Dr. Richard Neves, Virginia Polytechnic Institute, informed us of his opinion that the status of all three species has gone from “presumed extinct” to “likely extinct.”

In an email dated October 17, 2005, Steven Ahlstedt, U.S. Geological Survey [retired], informed us of his opinion that all three species are likely extinct.

In an email dated November 15, 2005, Ellis Laudermilk, Kentucky State Nature Preserves Commission, indicated that he believes the yellow-blossom pearly mussel is extirpated from Kentucky.

In an email dated December 6, 2005, Mike Zeman, Natural Resources Conservation Service, Nashville, Tennessee, informed us that his agency was not aware of any new records for any of the three species.

In an email dated November 21, 2005, Braven Beaty, The Nature Conservancy, Virginia, indicated that the green-blossom pearly mussel has not been collected alive since Dr. Richard Neves collected an individual at Pendleton Island (Clinch River) in the early 1980's.

In an email dated November 10, 2005, Jess Jones, U.S. Fish and Wildlife Service, indicated that his presumption was that all three species are extinct.

In an email dated October 6, 2005, Dr. James Layzer, Tennessee Technological University, indicated that he had no information about the green-blossom pearly mussel, yellow-blossom pearly mussel, or turgid-blossom pearly mussel.

In an email dated September 27, 2005, John Brumley, Kentucky Division of Water, indicated that he had no information about the green-blossom pearly mussel, yellow-blossom pearly mussel, or turgid-blossom pearly mussel.

7. Species' recovery priority number at start of review (48 FR 43098): The green-blossom pearly mussel and yellow-blossom pearly mussel have a number of 6 (degree of threat is high; potential for recovery is low; taxonomy is subspecies level). The turgid-blossom pearly mussel has a number of 5 (degree of threat is high; potential for recovery is low; taxonomy is species level).

8. Recovery plan or outline

Turgid-blossom pearly mussel and yellow-blossom pearly mussel

Name of Plan: Recovery Plan for the Tubercled-blossom Pearly Mussel Epioblasma (=Dysnomia) torulosa torulosa (Rafinesque, 1820), Turgid-blossom Pearly Mussel Epioblasma (=Dysnomia) turgidula (Lea, 1858), Yellow-blossom Pearly Mussel Epioblasma (=Dysnomia) florentina florentina (Lea, 1857)

Date Issued: January 25, 1985

Green-blossom pearly mussel

Name of Plan: Recovery Plan for the Green-Blossom Pearly Mussel Epioblasma (=Dysnomia) torulosa gubernaculum (Reeve, 1865)

Date Issued: July 9, 1984

II. REVIEW ANALYSIS

A. Application of the 1996 distinct population segment (DPS) policy

Not applicable. The turgid-blossom pearly mussel, yellow-blossom pearly mussel, and green-blossom pearly mussel are invertebrates and are not covered by the DPS policy, and therefore the other DPS questions will not be addressed further in this review.

B. Recovery Criteria

1. Do these species have final, approved recovery plans containing objective, measurable criteria? Yes

Since reproducing populations of the turgid-blossom pearly mussel and yellow-blossom pearly mussel were not known to exist at the time of approval of the recovery plan, the plan indicates that recovery efforts for the two species would be reevaluated if and when reproducing populations of one or both species was found and when each species and its habitat were protected from present and foreseeable events that might interfere with survival of the species. No populations – reproducing or non-reproducing – have been found since approval of the recovery plan.

2. Adequacy of recovery criteria

a. Do the recovery criteria reflect the best available (i.e., most up-to-date) information on the biology of the species and their habitats? Yes

b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and there is no new information to consider regarding existing or new threats)? Yes

3. Recovery criteria:

Yellow-blossom pearly mussel and turgid-blossom pearly mussel

1. A reproducing population of either E. turgidula or E. f. florentina is found in any stream or river system.

This criterion has not been met. Individuals or reproducing populations of both species have not been recorded for more than 40 years anywhere within the known ranges of the species.

2. Each species and its habitat are protected from present and foreseeable anthropogenic and natural events that may interfere with the survival of the population (Listing Factor A; the present or threatened destruction, modification, or curtailment of its habitat or range).

This criterion has not been met and is moot in light of the failure to locate individuals or populations.

Listing Factors B, C, D, and E are not relevant to these species because live individuals of both species have not been found for more than 40 years.

Green-blossom pearly mussel

1. A viable population of E. t. gubernaculum exists in the Clinch River from the backwaters of Norris Reservoir upstream to approximately CRM 280 and in the Powell River from the backwaters of Norris Reservoir upstream to approximately PRM 130. These two populations are dispersed throughout each river so that it is unlikely that any one event would cause the total loss of either population.

This criterion has not been met and is moot since live individuals have not been recorded from either river for 26 years, nor have viable populations of this species been recorded from either river for 50 years or more.

2. Through reestablishments and/or by discoveries of new populations, viable populations exist in two additional rivers. Each of these rivers will contain a viable population that is distributed such that a single event would be unlikely to eliminate E. t. gubernaculum from the river system.

This recovery criterion has not been met and is moot since live individuals have not been recorded in any other river throughout the species' range for 26 years, nor have viable populations of this species been recorded anywhere within the species' range for 50 years or more.

3. The species and its habitat are protected from present and foreseeable human-related and natural threats that may

interfere with the survival of any of the populations (Listing Factor A).

This recovery criterion has not been met and is moot since live individuals of this species have not been recorded within the species' range for 26 years, nor have viable populations of this species been recorded anywhere within the species' range for 50 years or more.

4. Noticeable improvements in coal-related problems and substrate quality have occurred in the Powell River, and no increase in coal-related siltation occurs in the Clinch River (Listing Factor A, the present or threatened destruction, modification, or curtailment of its habitat).

This recovery criterion has not been met. Both rivers have been and continue to be impacted by coal-related siltation and associated contaminants.

Listing Factors B, C, D, and E are not relevant to this species because live individuals of this species have not been found for 26 years and viable populations have not been recorded for 50 years or more.

C. Updated Information and Current Species Status

1. **Biology and habitat** – Neither the yellow-blossom pearly mussel, green-blossom pearly mussel, nor turgid-blossom pearly mussel have been recently found anywhere within their known ranges. The last known record for the green-blossom pearly mussel was a live individual collected in 1982 by Dr. Richard Neves of Virginia Tech in the Clinch River at Pendleton Island, Virginia. The last known collection of the turgid-blossom pearly mussel was a fresh-dead specimen found in the Duck River, Tennessee, in 1965 by biologists with the Tennessee Valley Authority. Herbert Athearn, a private malacologist, recorded the last known specimens of the yellow-blossom pearly mussel in the Little Tennessee River and Citico Creek, Tennessee, in 1967.

Since the last recorded collections of these species, numerous mussel surveys have been done by mussel biologists from the Tennessee Valley Authority, Virginia Tech, U.S. Geological Survey, and others in rivers historically containing these three species. Surveys have been conducted in the Clinch River (Stansbery 1973; Neves et al. 1980; TVA unpublished), Powell River (Dennis 1981; Ahlstedt and Brown 1980; Neves et al. 1980; TVA unpublished), French Broad River (TVA unpublished), Nolichucky River (Mullican et al. 1960; TVA unpublished),

Copper Creek (Ahlstedt 1981), North Fork Holston River (Ahlstedt 1980; Stansbery 1972; Stansbery and Clench 1974; Neves et al. 1980), Middle Fork Holston River (Stansbery and Clench 1975), South Fork Holston River (Stansbery and Clench 1978), Holston River (TVA unpublished), Big Moccasin Creek (Neves and Zale 1982), and Duck River (TVA unpublished). Biologists conducting those surveys have not reported live or fresh-dead individuals of the green-blossom pearly mussel, turgid-blossom pearly mussel, or yellow-blossom pearly mussel.

2. **Five factor analysis (threats, conservation measures, and regulatory mechanisms)**
 - a. **Present or threatened destruction, modification, or curtailment of habitat or range:**

No new information is available due to failure to find populations or live individuals.
 - b. **Over utilization for commercial, recreational, scientific, or educational purposes:**

No new information is available.
 - c. **Disease or predation:**

No new information is available.
 - d. **Inadequacy of existing regulatory mechanisms:**

No new information is available.
 - e. **Other natural or manmade factors affecting the species' continued existence:**

No new information is available.

D. Synthesis – Mussel experts believe that the green-blossom pearly mussel, yellow-blossom pearly mussel, and turgid-blossom pearly mussel are likely to be extinct. Numerous mussel surveys have been completed within the known ranges of these species over the past 50 years. Although other federally listed mussels have been found by these experts during these surveys, no live or fresh-dead specimens of the green-blossom pearly mussel have been found in more than two decades; live or fresh-dead specimens of the yellow-blossom pearly mussel or turgid-blossom pearly mussel have not been found for more than four decades. The Service concurs with these experts and believes that these species are likely to be extinct. However, we will continue to watch for them in conducting survey activities in their respective ranges.

III. RESULTS

- A. **Recommended Classification:**

Delist

- B. If applicable, indicate the Listing and Reclassification Priority Number: 6**

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

Since available information indicates that these three species are likely extinct, we would intend to proceed into the proposed rulemaking process. Our only recommendation is that Service field office biologists remain prepared to take appropriate actions should individuals or populations of one or more of these species be discovered in the future.

V. REFERENCES

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW OF
GREEN-BLOSSOM PEARLY MUSSEL
TURGID-BLOSSOM PEARLY MUSSEL
YELLOW-BLOSSOM PEARLY MUSSEL

Current Classification Endangered (all 3 species)

Recommendation resulting from the 5-Year Review

Downlist to Threatened
 Uplist to Endangered
 Delist
 No change is needed

Appropriate Listing/Reclassification Priority Number 6

Review Conducted By _____

FIELD OFFICE APPROVAL

Lead Field Supervisor, Fish and Wildlife Service

Approve *Lee A. Barclay* Date 5/29/07

Cooperating Field Supervisor, Fish and Wildlife Service

Concur Do Not Concur

Signature _____ Date _____

REGIONAL OFFICE APPROVAL

for Lead Regional Director, Fish and Wildlife Service

Approve *Norvin E. Walsh* Date 6/28/07

Cooperating Regional Director, Fish and Wildlife Service

Concur Do Not Concur

Signature _____ Date _____

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW OF
GREEN-BLOSSOM PEARLY MUSSEL
TURGID-BLOSSOM PEARLY MUSSEL
YELLOW-BLOSSOM PEARLY MUSSEL

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Review Conducted By _____

FIELD OFFICE APPROVAL

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date _____

Cooperating Field Supervisor, Fish and Wildlife Service

Concur Do Not Concur

Signature _____ Date _____

REGIONAL OFFICE APPROVAL

Lead Regional Director, Fish and Wildlife Service

Approve _____ Date _____

Cooperating Regional Director, Fish and Wildlife Service

Concur Do Not Concur

Signature *Thomas J. Healy* Date 9.21.07

Thomas J. Healy

Acting