

White Cat's Paw Pearly Mussel
(*Epioblasma obliquata perobliqua*)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service, Midwest Region
Ohio Ecological Services Field Office
Columbus, Ohio

5-YEAR REVIEW

White Cat's Paw Pearly Mussel/*Epioblasma obliquata perobliqua*

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office: Carlita Payne, Midwest Regional Office, Fort Snelling, MN, (612) 713-5339

Lead Field Office: Angela Boyer, Ohio Ecological Services Field Office, Columbus, OH (614) 416-8993, extension 22

Cooperating Field Office(s): none

Cooperating Regional Office(s): none

1.2 Methodology used to complete the review:

Public notice was given in the *Federal Register* (72 FR 41348) requesting new scientific or commercial data and information that may have a bearing on the white cat's paw (*Epioblasma obliquata perobliqua*) classification of endangered status. Pertinent data was obtained from the Recovery Plan and from recent reports of freshwater mussel surveys of Fish Creek and St. Joseph River. This 5-year review was completed by Angela Boyer, Fish and Wildlife Biologist with the Ohio Ecological Services Field Office. The focus of this 5-year review is to summarize the current status of the white cat's paw pearly mussel. Peer review of this document was determined to be unnecessary because there is a lack of new information about this species and the review resulted in a recommendation to leave the status unchanged.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

72 FR 41348-41350 (July 27, 2007)

1.3.2 Listing history

Original Listing

FR notice: 41 FR 24064

Date listed: June 14, 1976

Entity listed: White Cat's Paw Pearly Mussel (*Epioblasma obliquata perobliqua*)

Classification: Endangered

1.3.3 Associated rulemakings: none

1.3.4 Review History: White cat's paw pearly mussel was included in cursory reviews initiated February 27, 1981 (46 FR 14652) for wildlife classified as endangered or threatened in 1975 and 1976; July 7, 1987 (52 FR 25522) for species listed in 1976, 1977, 1981 and 1982; and November 6, 1991 (56 FR 56882) for all endangered and threatened species listed before 1991. These reviews resulted in no change in the listing classification of endangered.

1.3.5 Species' Recovery Priority Number at start of 5-year review: 6c. The "6" indicates a high degree of threat and low recovery potential; "C" indicates a high degree of conflict with agricultural land uses, including dredging of Fish Creek tributaries for field drainage.

1.3.6 Recovery Plan

Name of plan: Recovery Plan for the White Cat's Paw Pearly Mussel

Date issued: January 25, 1990

Dates of previous revisions, if applicable: none

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate? *No.*

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria? *Yes.*

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat? *Yes.*

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

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

White cat's paw pearly mussel may be considered for reclassification to threatened status when the following criteria are met:

Criterion 1. The population of *E. o. perobliqua* in Fish Creek, Williams County, Ohio is protected. This population must be large enough to maintain sufficient genetic variation to enable it to evolve and respond to natural habitat changes.

Fish Creek was closed in 2004 to all mussel sampling and collecting except for that required in conjunction with life history research approved by the Ohio Department of Natural Resources (R. Ollis, Ohio Department of Natural Resources, in litt. 2009).

A \$2.5 million Natural Resource Damage Assessment settlement was reached in 1995 as a result of a 30,000 gallon #2 diesel fuel spill in 1993 that impacted the lower 7 miles of Fish Creek (USFWS 1997). The Ohio and Indiana settlement trustees worked jointly on projects that restored, protected and preserved land along the creek. More than 1,500 acres of the Fish Creek watershed have been protected through acquisitions, conservation easements, reforestation, stream bank stabilization and wetlands restoration (IDNR 2007).

Surveys of Fish Creek since the 1991 5-year review and completion of the recovery plan in 1990 have only found two live male white cat's paw pearl mussels, one in 1993, following the diesel spill, and the other in 1999 (J. Gallant, Ohio Department of Natural Resources, pers. comm. 1993; Watters 2000).

Criterion 1 has been partially met through the closure of the stream to mussel sampling and the implementation of conservation measures such as acquisitions, conservation easements, reforestation, stream bank stabilization and wetlands restoration. However, the stream and the white cat's paw pearly mussel, remain vulnerable to catastrophic events such as spills. The only remaining population of the white cat's paw pearly mussel currently hangs on the brink of extinction (USFWS 1990).

The USFWS Ohio Ecological Services Field Office received a 2008 Preventing Extinction grant to fund an intensive survey effort in Fish Creek, and possibly the St. Joseph River. Biologists are conducting surveys to locate any remaining white cat's paw pearly mussels to initiate a captive propagation program. This project began in the summer of 2009. This survey effort has not yet found any live individuals.

Criterion 2. Three additional populations are discovered or established. These populations must meet the conditions of Criterion 1.

Criterion 2 has not been met. No additional populations of white cat's paw pearly mussels have been discovered or established.

Criterion 3. The subspecies, its habitat and its host(s) are protected from any foreseeable threats that would impede the survival of any of the populations.

Criterion 3 has not been initiated.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

There is no new information on the species' biology and life history due to the complete lack of individuals available for research.

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Only 5 living individuals and 3 freshdead specimens have been observed since 1975. Based on the rarity of species collections, the only known population of white cat's paw pearly mussel appears to continue to decline.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

There is no information on the species' genetics due to the lack of individuals available for genetic research.

2.3.1.4 Taxonomic classification or changes in nomenclature:

The white cat's paw pearly mussel was listed as an endangered species on June 14, 1976 (41 FR 24064) under the name *Epioblasma* (=Dysnomia) *sulcata delicata* (including *perobliqua*) (Conrad 1836). This lengthy designation has since been shortened to *Epioblasma* (=Dysnomia) *sulcata delicata*. However, Morrison (1942) and Stansbery et al. (1982) examined the holotype of *Truncilla sulcata delicata* (Simpson 1900) and concluded that the specimen is an old, stunted, abnormal male of *Epioblasma rangiana* (Lea 1829). Therefore, since the name under which this subspecies was listed (*E. s. delicata*) is unavailable for the white cat's paw pearly mussel, and because Conrad's species description is more than sixty years prior to that of Simpson's, the name *Epioblasma obliquata perobliqua* is now recognized for this species. The species name *sulcata* (Lea 1829) is replaced by *obliquata* (Rafinesque 1820). Following Johnson (1978), Stansbery (1979) and Bogan and Parmalee (1983).

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

There have been no changes in the spatial distribution or historic range corrections since this species was listed on June 14, 1976.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

In 1993, a 30,000 gallon #2 diesel fuel spill impacted the lower 7 miles of Fish Creek in Ohio and Indiana (USFWS 1997). The long-term effects of this spill on Fish Creek are not known.

2.3.1.7 Other:

N/A

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

Channelization for flood control and other forms of substrate disturbance (e.g. gravel dredging operations, channel maintenance dredging, instream construction, and the removal of logs and other obstructions to flow) and siltation due to poor agricultural practices and deforestation are probably the leading factors in the decline of the white cat's paw pearly mussel (USFWS 1990).

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

The overutilization for commercial, recreational, scientific, or educational purposes were not considered to be a limiting factor in the Recovery Plan. We have no new information to indicate that this has changed.

2.3.2.3 Disease or predation:

The Recovery Plan does not discuss disease or predation as limiting factors for this species. We have no new information on disease or predation that would indicate either is a limiting factor.

2.3.2.4 Inadequacy of existing regulatory mechanisms:

We have no new information regarding inadequacy of existing regulatory mechanisms for protecting this species.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

Global climate change likely constitutes a significant new threat for the species. Current climate change predictions areas in the Northern Hemisphere indicate warmer air temperatures and more intense precipitation events (IPCC 2007). The predicted impacts on streams include changes in the distribution of algae, plankton, and fish, as well as changes in water temperatures and oxygen levels. Warming of waters in rivers and streams may make these habitats less able to support their current fish and mussel fauna (IPCC 2007). Highly specialize species, such as freshwater mussels, are likely to be most susceptible to the additional stresses of a changing climate.

The most recent literature on climate change includes predictions of hydrological changes, higher temperatures, and expansion of drought areas, resulting in a northward and/or upward elevation shift in range for many species (IPCC 2007). Although the specific effects of climate change on the white cat's paw pearly mussel are unknown, altered hydrology in rivers, increased frequency of extreme weather events, and a changing abundance and distribution of fish species have the potential to adversely affect this species. The magnitude of the climate change threat to the white cat's paw pearly mussel may be severe since this species is only known to occur in a 3-mile reach of only one stream.

2.4 Synthesis

The white cat's paw pearly mussel is a federally listed endangered subspecies that is currently known to exist in only a 3-mile portion of Fish Creek in Williams County in northwest Ohio. Museum records indicate that the white cat's paw pearly mussel historically occurred in Indiana in the Wabash, White, Tippecanoe, Maumee, and St. Joseph rivers, and Ohio in the Maumee and St. Joseph Rivers and Fish Creek. It may have also occurred in the Ohio River though the museum record is questionable since this subspecies is usually restricted to smaller streams (USFWS 1990).

The biology of the white cat's paw pearly mussel is similar to other bivalved mollusks belonging to the family Unionidae. However, due in large part to its rarity, relatively little is known about its specific life history requirements.

Fish Creek was surveyed, system-wide, in 1975, 1988, 1996, 1999, 2004, and 2005. Clark (1977) reported finding one live female and one freshdead female in 1975. Hoggarth (1993) reported finding a freshdead specimen in 1985. According to Watters (1988), a live individual was observed by a private collector in 1985. Watters (1988) found one live individual and one freshdead specimen in 1988, and one live individual in 1993. The last observation of a live white cat's paw pearly mussel occurred in 1999 (Watters 2000).

Table 1. White cat's paw pearly mussel records from Fish Creek since 1970.

Collector	Year	Live	Freshdead
Clark	1975	1 female	1 female
Private collector	1985	1 male	
Hoggarth and Rice	1985		1 female
Watters	1988	1 male	1 male
Watters	1993	1 male	
Watters	1999	1 male	

In 1993, a pipeline ruptured, discharging an estimated 30,000 gallons of #2 diesel fuel into a crop field in DeKalb County, Indiana. The diesel fuel made its way into a small drainage ditch that discharges to Fish Creek. This oil entered Fish Creek and spread downstream, crossing into Williams County, Ohio, exposing the lower 7 miles of the creek to the diesel fuel contamination. The spill occurred where the only remaining population of white cat's paw pearly mussel is known to occur. The magnitude of the impact on the white cat's paw pearly mussel is not known, though it has been determined that there were acute and likely sublethal impacts to freshwater mussels from the spill (USFWS 1997).

A \$2.5 million Natural Resource Damage Assessment settlement was reached in 1995. After the settlement, the Ohio and Indiana trustees worked jointly on projects to restore, protect and preserve the land along the creek. More than 1,500 acres of the Fish Creek watershed has been protected through acquisitions, conservation easements, reforestation, stream bank stabilization and wetlands restoration. Educational and research projects included mussel surveys, stream flow analysis and promotion of best management projects to local landowners.

In 2008, the Ohio Ecological Services Field Office received a Preventing Extinction grant to fund a search for any remaining live individuals to initiate a propagation program for augmentation and reintroduction. This survey work began in the summer of 2009.

Since 1991 when the last 5-year review was conducted on the white cat's paw pearly mussel, there has been no new information on the species' biology, life history, or genetics. Also, there has been no change in the species' spatial distribution or historic range. The white cat's paw pearly mussel should continue to remain listed as *endangered* because the species has continued to decline, threats have not been ameliorated, and the criterion for downlisting to threatened has not been met. Threats persist for the remaining white cat's paw pearly mussel population, including habitat alteration, land-use changes, and point and non-point source pollution. The life history and environmental sensitivity of the subspecies is poorly known, increasing the threat that previously unidentified activities could cause a precipitous decline of the only remaining population.

These unknowns also make it unlikely that the subspecies can be downlisted in the near future. In sum, our current understanding of the white cat's paw pearly mussel's status leads us to conclude that this species continues to face a probability of extinction throughout all or a significant portion its range, thereby meeting the definition of endangered under the Endangered Species Act.

3.0 RESULTS

3.1 Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist (*Indicate reasons for delisting per 50 CFR 424.11*):

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 New Recovery Priority Number: no change

Brief Rationale:

3.3 Listing and Reclassification Priority Number: NA

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

Prevent extinction by locating individuals to initiate a captive propagation program.

Update recovery criteria to address all of the listing factors that are relevant to the species.

Implement Criterion 3 - The subspecies, its habitat and its host(s) are protected from any foreseeable threats that would impede the survival of any of the populations.

5.0 REFERENCES

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U.S. FISH AND WILDLIFE SERVICE

5-YEAR REVIEW of White Cat's Paw Pearly Mussel

Current Classification: Endangered

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable:

Review Conducted By: Angela Boyer, Fish and Wildlife Biologist

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve Mary M. Knapp Date 11-4-09
Mary M. Knapp, Ph.D., Field Supervisor

REGIONAL OFFICE APPROVAL:

Lead Assistant Regional Director, Ecological Services, Fish and Wildlife Service

Approve Lynn M. Lewis Date 12/9/09