Cumberlandia monodonta

Spectaclecase

Conservation Status

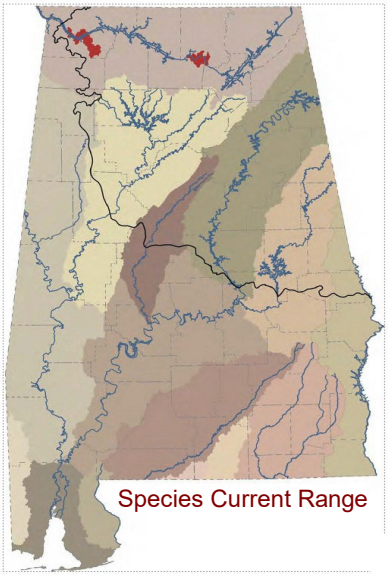
2025 SGCN Rank: P1
2015 SGCN Rank: P1
2005 SGCN Rank: P1
State Protection: Nongame Regulation 220-2-.92
Federal Status: T
NatureServe Rank: S1

Ecoregion

Southern Coastal Plain

Coarse Habitat

Mesic Hardwood Forest



Species Overview

A large-river specialist, *Cumberlandia monodonta*, Spetaclecase, is almost extirpated from Alabama due primarily to loss of its glochidial host(s), probably exacerbated by population fragmentation due to river damming and channelization. Few live individuals and recent shell material have been recovered in the last 20 years from the Guntersville Dam tailwater, but it is slightly more abundant in the Wilson Dam tailwater. Native to the Mississippi River basin this long-lived species has sporadic occurrences in large rivers and tributaries that have minimal physical channel modification. In Alabama the species was historically found only in the Tennessee River and the lower Elk River. The only known host fish is *Hiodon alosoides*, Goldeye, which is believed extirpated from the Tennessee River. Recovery of *C. monodonta* in Tennessee River cannot occur without recovery of its host fish.

Habitat Requirements

Cumberlandia mondonta inhabits large rivers with:

1. Stable river bottom substrates, generally with large boulders or bedrock ledges;
2. Reduced extrinsic sediment depositions;
3. Sufficient riparian buffers and riverbank stability;
4. Sufficient habitat heterozygosity to support a diverse fish community;
5. Sufficient physical (temperature, dissolved oxygen, pH, specific conductance, discharge, turbidity) a chemical (ammonia, nutrients, potassium, sodium, chlorides, copper, zinc, nickel) water quality supportive of mussels and host fish.

Threats

Major threats to the Spectaclecase include dams, small population size and fragmentation, loss of host fish, and pollution. Dam construction and channelization have contributed more of a decline to the Spectaclecase and its host fish than any other single factor. Dams affect both upstream and downstream populations by disrupting seasonal flow patterns, scouring river bottoms, altering water temperatures and quality, blocking fish passage, increasing sedimentation and siltation, and eliminating riverine habitat. Most large rivers throughout the mussel's range have been dammed leaving short, isolated patches of habitat immediately downstream of the dams, often restricting host fish availability. In addition to recruitment, the Spectaclecase depends on a host fish to move substantial distances upstream, so the lack of host availability isolates remaining upstream populations. Consequently, these small populations are more vulnerable to stochastic threats.

The mostly sedentary lifestyle of these animals renders them more vulnerable to toxins and degraded water quality from pollution. Contaminants from accidental spills, factory discharge, insufficient wastewater treatments, direct runoff from fields and feedlots, and poorly mitigated mining and construction sites can directly kill mussels. Indirectly, contaminants reduce the water quality, affecting the ability of surviving mussels to reproduce and lower number of host fish.

Conservation Actions

Direct Habitat & Species Management:

- Actions that reduce siltation and increase habitat and water quality.
    - Restore/enhance riparian buffers.
    - Reduce detrimental inputs such as contaminants and sedimentation.
- Evaluate water quality limits and food requirements for all life stages and host fish.
- Increase native host fish passage opportunities while limiting non-native species introductions and expansions.
    - Restore/Improve connectivity between occupied stream reaches and suitable habitat (fish passage, dam removal).
- Investigate potential to restore large boulder rock habitat with interstitial flows in large river habitats.
- Improve seasonal and diel temperatures, discharges, and dissolved oxygen content below large dams.
    - Implement suitable dam flow management.
- Monitor changes in hydrological regime, stream morphology, stream temperatures.
- Research effects of water quality parameters (e.g., contaminants, sedimentation, nutrients)
    - Determine/Implement measures to alleviate negative effects.

Facilities Used in Support of Aquatic & Wildlife Propagation:

- Improve propagation techniques for species.
- Possible augmentation of the Wilson Dam tailwater population.

Planning:

- Advocate and recommend that regulated river systems continue to be managed for high water quality standards with temperature/flows that best mimic natural seasonal regimes.
- Land use planning, particularly targeted at reducing sedimentation and nutrient enrichment.

Research, Survey, Data Collection & Analysis:

- Routine monitoring to confirm the species is extant in AL.
- Targeted surveys to assess population size.
- Target species surveys focusing on unique habitat areas available.
- Monitor population health.
- Research ways to improve the effectiveness of monitoring techniques (e.g., eDNA survey techniques).

Species Stocking:

- Following the 2008 flow restoration efforts at Tims Ford Dam, the lower Elk River represents the only suitable remaining habitat for potentential *C. monodonta* reintroductions.

Reviewer(s):

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References:

Bean, R. (2024). U. S. Fish and Wildlife Service Recovery Plan for Four Species of Freshwater Mussels. https://ecos.fws.gov/docs/recovery_plan/20240911_4Mussels%20Recovery%20Plan%20FINAL.pdf

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