

From Dick Johnson  
Biggins  
1994

**A Final Report on the Collection Activities of *Margaritifera hembeli*:**

**Endangered/Threatened Species Subcommittee report:**

**Permit Number:** [REDACTED]

**Period of Authorization:** June 24, 1993, to June 24, 1994

**Subcommittees:** Paul D. Johnson & Dr. Ken M. Brown.

**SUMMARY OF ACTIVITY**

The attempt to collect glochidal larvae from pregnant female *Margaritifera hembeli* by exposure to a 10<sup>-4</sup> serotonin solution was once again unsuccessful. While the monitoring technique presented in the application worked extremely well, and the observation of brooding demibranchs recorded, no glochidia were recovered in the samples. Only ten mussels at three sites were exposed to the serotonin solution. The fecund females would not relinquish their broods. As expected, no mortality was associated from the exposure to the serotonin solution. This technique has been successful in procuring glochidia from many different groups of freshwater mussels, but does not work with Margaritiferids or Antodontids.

**FREQUENCY OF MONITORING:**

Mussels from the Loving Creek, James Creek, Jordan Creek and Beaver Creek locations were monitored on the following dates.

Permit Received June 30, 1993 -

October 30, 1993      December 11, 1993      January 6, 1994

November 20, 1993      December 14, 1993      January 17, 1994

November 26, 1993      December 21, 1993

December 4, 1993      January 4, 1994

	USFWS	
	ASHEVILLE, NC	
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WEEKLY THERMAL VARIATION AT JAMES BRANCH CREEK:

<u>WEEK OF</u>	<u>Minimum C°</u>	<u>Maximum C°</u>
November 14, 1993	7°	11°
November 21, 1993	9°	12°
December 5, 1993	5°	17°
December 12, 1993	5°	18°
December 19, 1993	7°	12°

**ATTEMPTED EXTRACTION WITH SEROTONIN:**

During the December 11th monitoring session at James Branch Creek, 4 individuals with slightly swollen demibranchs were subjected to the serotonin treatment. During the procedure, the mussels relaxed their adductor muscles allowing the valves to open. Additionally, the foot was relaxed and protruded between the valves. Following the exposure the mussels were returned to the stream, and within 30 minutes the foot was retracted and the valves closed. The mussels were then returned to the sediment bed. On January 8th the two mussels exposed were re-examined, and appeared to be in good condition. The serotonin/stream water solutions collected on December 28th were returned to the lab and examined, and no glochidia were located.

On January 6th at Jordan Creek, two ripe females were exposed to the serotonin treatments. The serotonin/stream water solutions were returned to the lab and examined, and no glochidia were located. The two treated individuals were reexamined on January 17th and found to be in good condition.

On January 17, 1994 a final attempt to procure glochidia from four ripe females at Beaver Creek was made. The serotonin/stream water solutions were returned to the lab and examined, and no glochidia were found. The treated individuals were reexamined on January 29th and found to be in good condition.

#### DISCUSSION

Females of most brooding freshwater mussels display an obvious swelling of their gill tissues, including Margaritiferidae (Smith, 1979). *Margaritifera hembeli* females in brooding condition do not exhibit severe swelling, but do have an increased rigidity of their gills. This was especially true of the outer demibranchs, however all Margaritiferids use all four demibranchs for brooding (Smith, 1979). Additionally, Margaritiferids use their entire gill and not a small, modified section (Smith, 1988). This may explain the very large fecundities, in excess of one million glochidia, associated with *Margaritifera margaritifera* (Young and Williams, 1984).

It is apparent that Margaritiferid females cannot be induced to spawn with serotonin treatments. However, this technique is also known to have limitations with Anodontid mussels (T. Dietz, LSU, pers. comm.). The only solution is to capture brooding female mussels, bring them into the lab, and wait for the spawning event to occur. Glochidia may then be collected and fecundity estimates calculated.

## REQUEST

On October 25, 1993 the federal status of *Margaritifera hembeli* (Conrad) was officially down-listed from endangered to threatened. Because of the downlisting we propose to remove females from the streams and hold them temporarily in temperature controlled environmental chambers, in the laboratory at LSU, until spawning occurs. This procedure should not cause mortality, and the mussels would then be returned to the stream within 3 weeks (21 days). We believe that an appointed agent of the state can do this procedure, and recommend this strategy as the next course of action. We have been authorized agents of the state due to the field research we have conducted on *Margaritifera hembeli*, and this contingency (for temporary removal) is to be covered in a new letter by the state. If there is some need to file for federal permission to perform this procedure, please notify us immediately.

## REFERENCES

- Smith, Douglas G. 1979. Marsupial anatomy of the demibranch of *Margaritifera margaritifera* in northeastern North America. *Journal of Molluscan Studies*. 45:39-44.
- Smith, Douglas G. 1988. Notes on the biology and morphology of *Margaritifera hembeli*. *The Nautilus*. 102(4):159-163.
- Young, Mark and J. Williams. 1984. The reproductive biology of the freshwater pearl mussel *Margaritifera margaritifera* in Scotland. I. Field studies. *Archive fur Hydrobiologia*. 99(4):405-422.

# State of Louisiana



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## DESIGNATION OF PAUL D. JOHNSON AS AN "AGENT" OF THE LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

This is to certify that Paul D. Johnson, Department of Zoology and Physiology, Louisiana State University, has been designated as an "Agent" of the Louisiana Department of Wildlife and Fisheries (LDWF), pursuant to the Endangered and Threatened Fish and Wildlife Cooperative Agreement between the U.S. Department of the Interior, Fish and Wildlife Service (FWS) and LDWF and Section 6(c) of the Endangered Species Act of 1973, as amended. The designated "Agent" is hereby authorized to conduct research on the Louisiana pearlshell mussel (Margaritifera hembeli) in Louisiana, which is listed as endangered under state and federal laws.

This document will allow the "Agent" and research associates to conduct the following activities in Louisiana:

Remove individual Margaritifera hembeli from a stream, measure, tag and return each mussel to the stream.

The designated "Agent" shall furnish LDWF with a report of activities performed under this authorization no later than 15 June 1994. That report will contain a list of animals captured during the effective period of this authorization and the marking/tagging system employed. LDWF will then include those data in their report of all activities under the Cooperative Agreement that will be submitted to FWS by 30 June 1994.

This authorization becomes effective on 20 September 1993 and will remain in effect through 30 June 1994. This authorization is renewable on an annual basis if agreeable to the "agent", LDWF, and the FWS.

9-8-93

DATE

Hugh A. Bateman

Hugh A. Bateman, Administrator  
Wildlife Division

cc: Ken Dancak, wildlife biologist, USFS

Copy of old letter.  
New letter will state that temporary  
removal and replacement will be allowed.

(See text)

FJ