

United States Department of the Interior  
FISH AND WILDLIFE SERVICE

Suite 322  
315 South Allen Street  
State College, Pennsylvania 16801

January 19, 1989

Mr. Dean L. Shumway  
Division of Project Review (HL-20-RB)  
Federal Energy Regulatory Commission  
825 N. Capitol Street, N.E. Washington, D. C. 20426

Dear Mr. Shumway:

This responds to your September 8, 1988, request for consultation under the Endangered Species Act (Act) of 1973, as amended, on actions proposed in the Commission's Final Environmental Impact Statement (FEIS) assessing hydropower development in the Upper Ohio River Basin, Ohio, Pennsylvania, and West Virginia (EL 85-19-14). This represents the biological opinion of the U.S. Fish and wildlife Service (Service) in accordance with Section 7 of the Act.

Chronology

September 28, 1987	Service alerts the Federal Energy Regulatory Commission (Commission) of the presence of a listed endangered freshwater mussel, the pink mucket ( <u>Lampsilis abrupta</u> ) in the upper Ohio River.
June 27, 1988	The Commission releases the Draft Environmental Impact Statement (DEIS) for Hydroelectric Development in the Upper Ohio River Basin, Commission Docket No. EL 85-19-114(ER 88/419).
July 27, 1988	Service comments on the DEIS to the Commission pursuant to the Fish and Wildlife Coordination Act.
August 1, 1988 Interior	Intervention filed by the U.S. Department of the (Department) regarding 19 projects proposed for licensing by the Commission in the upper Ohio River Basin.
August 1, 1988	Department comments on DEIS.
August 16, 1988	Letter received from Mr. Charles C. Coutant (Oak Ridge National Laboratory), thanking the Service for providing information on the Ohio River islands and the endangered mussel, <u>L. abrupta</u> .

September 7, 1988 Additional information from the Commission provided to the Service regarding the effects of hydroelectric development in the upper Ohio River basin on the pink mucket, L. abrupta.

September 8, 1988 Commission's letter providing information and partial response to the Department's comments on the DEIS. The Commission states the letter is their request for formal consultation.

October 31, 1988 Letter to Cashell from the Department requesting an extension of time (25 days beyond receipt of written notice that the Section 10(j) issue resolution process has been completed under the Federal Power Act to determine whether the Department would make a referral to the Council on Environmental Quality.

November 17, 1988 Meeting between State and federal fish and wildlife agencies and Commission staff to discuss sufficiency of data in the EIS. Agencies provided 60 days to describe information needed to make recommendations under section 10(j) of the Federal Power Act.

December 13, 1988 Commission letter to the Service referring to the document submitted by the Service at the November 17, 1988, meeting and advises that its September 8, 1988, letter initiated consultation.

December 19, 1988 Service review of the additional Information package regarding L. abrupta.

December 21, 1988 Service responds to the Commission stating that a biological opinion will be provided based on existing data.

January 6, 1989 Commission responds to the Service advising that the 45 day period to submit the biological opinion would end on January 21, 1989.

#### Background

The Commission is presently proposing to license the construction and operation of up to 19 hydropower projects on the Tygart, Allegheny, Monongahela, and Ohio Rivers in Pennsylvania, West Virginia, and Ohio. According to the Commission, the recommended Alternative (Alternative 4) would prevent projects from causing dissolved oxygen (DO) levels that would ham aquatic life by requiring spill flows. However, the Commission has determined that the locks and dams at Willow Island (rivermile 161.7), Belleville (203.9), and Gallipolis (279.2) do not provide significantly more aeration than can be expected from a hydropower project. Therefore, spill flows at these dams will not be required when DO concentrations become low.

The Service alerted the Commission on September 28, 1987, of the discovery of the endangered pink mucket, L. abrupta, between river miles 292.0 and 292.4 below Gallipolis locks and Dam. L. abrupta is an oxygen sensitive species. Suitable habitat for this endangered species is also found in two reaches below Willow Island and Belleville Locks and Dams.



A difference of opinion exists regarding the validity of DO data used to make predictions about impacts of proposed projects on water quality and additional information was requested by the states of Ohio, Pennsylvania, West Virginia, the Environmental Protection Agency and the Service to address impacts.

The projects proposed for licensing could adversely impact fish movement in the river. The sauger, Stizostedion canadense, is the only known fish host of and entrainment and turbine-induced mortality could reduce the numbers and movement of sauger and adversely affect the reproductive capability of L. abrupta. Additionally, as many as 29 other mussel species endemic to the Ohio River, seven of which are listed by the State of Ohio as endangered, exist in the Belleville, Racine, and Greenup navigation pools. All of these mussels require a fish host in their reproduction cycles that could be adversely affected by entrainment-induced mortality.

#### Review of Endangered Species Information

The Service has reviewed the endangered species information contained in the DEIS, dated June 27, 1988, and FEIS, dated September 1988, including the additional information package (Appendix 1). The information concluded that development of hydroelectric projects, as proposed, could have some adverse effect on the pink mucket mussel, Lampsilis abrupta, but that the effect would not be significant. The Service concurs that some adverse effects could result but does not concur with the Commission regarding severity of the impacts. This disagreement is based on our concerns about the validity of the water quality data described in the documents.

The Service concurs that the projects will not affect any other endangered or threatened species and the remainder of this opinion only addresses L. abrupta. The non-affected species include the bald eagle (Haliaeetus leucocephalus) American peregrine falcon (Falco peregrinus anatum), Arctic peregrine falcon (Falco peregrinus tundris), Indiana bat (Myotis sodalis), eastern cougar (Felis concolor cougar), and the flat-spined three-toothed land snail (Triodopsis platysayoides). This precludes the need for further consultation on this project, as required under Section 7 of the Endangered Species Act of 1973, as amended, relative to the non-affected species. If this project is modified or new information becomes available to indicate that these species may be affected, consultation should be reinitiated.

The additional information also concluded that, while the project may adversely affect a listed species, it would not likely jeopardize the continued existence of that species. This determination is clearly not within the purview of the Commission, but rests with the Service [50 CFR 402.12 and 402.14(h)]. Following the issuance of a biological opinion, the federal agency shall determine whether, and in what manner, to proceed with the action in view of its Section 7 obligations and the Service's biological opinion [50 CFR 402.15(a)].

Pink Mucket Pearly Mussel, *Lampsilis abrupta*

Distribution

Historical records of *L. abrupta* indicate it is mostly an Ohio River Basin species, found mainly in the Tennessee, Cumberland, and Ohio River drainages with occasional records from the Mississippi. *Lampsilis abrupta* originally occurred in 25 river systems but was never collected in large numbers from any one site.

Presently, *L. abrupta* is known from 16 river systems, representing three major geographic locations. The largest populations are found in the Tennessee River (AL, TN and KY), Cumberland River (KY and TN), Osage River (MO), and the Meramac River (MO). *Lampsilis abrupta* is presently known from two sites in the area affected by this project; the Muskingum, River below Lock and Dam No. 3, and the Ohio River below Gallipolis Locks and Dam. There is strong evidence that extant populations could occur below both Willow Island and Belleville Locks and Dams on the Ohio River since suitable habitat is found at both locations.

Ecology and Life History

*Lampsilis abrupta* inhabits medium to large rivers in substrates ranging from silt to boulders. The preferred habitat is a mixture of sand, gravel, and cobble substrates swept by moderate to fast currents in depths up to eight meters. *Lampsilis* requires well-aerated water having high DO and low carbon dioxide concentrations. Habitat at the occupied Greenbottom site below Gallipolis Locks and Dam is typical for the species. *Lampsilis abrupta* was found in sand, gravel, cobble, and boulder substrates constantly being swept clean by steady currents in six to eight meter depths.

The life history of *L. abrupta*, although not exactly known, is thought to be similar to other native mussels. Males produce sperm which is discharged into the water column and dispersed by currents. Females downstream intake the sperm during feeding and respiration. Fertilization occurs within the posterior section of the outer gills which are modified as brood pouches. *Lampsilis abrupta* is a long-term breeder, i.e., eggs are fertilized in late summer to early fall and the embryos (glochidium) develop over winter and are discharged into the water column in late spring to early summer. The glochidium then attach (encyst) to the gill filaments or fins of a fish where they develop into a juvenile mussel. The sauger is thought to be the prime host species. It appears that the genus *Lampsilis* has evolved a mantle flap on the incurrent syphon which resembles a small fish or aquatic invertebrate,

complete with eyespot. When extended into the current, this flap facilitates the movement of glochidia in proximity to the host fish.

#### Reasons for Decline

Possibly the most important factor contributing to the decline of L. abrupta and freshwater mussels in general in the Ohio River is the alteration and destruction of habitat by impoundments for flood control, navigation,



hydropower, and recreation. Certain mussels are affected by their inability to adapt to habitat component changes, such as reduced flows, altered temperature regimes, and anoxic conditions.

Siltation has also severely affected freshwater mussels. The greatest diversity and abundance of mussels are usually associated with clean-swept sand and gravel substrates. Increased silt transport from surface mining, coal washing, dredging, farming, logging, and road construction are some of the major sources of sedimentation. Chronic increases in turbidity and suspended sediments decrease the depth and amount of light penetration affects primary productivity, increases water temperature, irritates or causes clogging of gills, and results in a blanket of silt on the substrate. Siltation affects mussels indirectly by affecting the fish host populations, by smothering fish eggs or larvae, reducing food availability or filling interstitial spaces in gravel and rubble substrate, thus eliminating spawning and habitat critical to the survival of young fish. Mussels may be directly affected by siltation through smothering.

Pollution from municipal, agricultural, and industrial waste discharges have decreased or eliminated mussel populations directly and indirectly through elimination of significant species of fish hosts resulting in reproductive failure.

All of the aforementioned impacts, especially those aggravated by river impoundments, have contributed to the decline of mussels preferring unpolluted waters with clean-swept sand, gravel, and cobble substrates. Lampsilis abrupta has these habitat requirements.

### Project Impacts

#### Dissolved Oxygen

Freshwater mussel experts agree that most species, including L. abrupta, require well-aerated water, having high DO and low carbon dioxide concentrations flowing over stable substrates of sand, gravel, and cobble. As is often the case in a similar group of organisms, different forms have varying habitat requirements to be able to exploit all possible habitats (niches). In the mussel group, this is clearly demonstrated. Thin shelled species, such as the giant floater, Anodonta grandis, and the paper floater, Anodonta imbecillis, inhabit silt and organic substrates often low in DO. The ridge mussel, Amblema plicata, has adapted to pool situations and is tolerant to silty conditions and resulting low DO. However, riffle/run species, such as L. abrupta are intolerant of extended periods of decreased DO levels. Reduced DO levels will also affect the presence of fish (in this case, probably sauger) over the mussel beds altering the reproductive cycle.

The preferred alternative may adversely affect the normal growth and reproduction of riffle/run species of freshwater mussels, including L. abrupta, resulting from decreased Do levels. Fish hosts of these mussel

species, including sauger, may also be adversely affected by entrainment and turbine-induced mortality.

A factor that has not been thoroughly considered is the obvious improvement in water quality in the Ohio River in the last 20 years. This improvement has resulted in increased reproduction and redistribution of freshwater mussels and their fish host. The dramatic shift of fish species composition favoring gamefish is well known by resource agencies and anglers. The Service believes that the improved water quality could be adversely affected by the proposed hydropower projects resulting in severe, long-term impacts on water quality and the river's aquatic life, and ultimately preclude the river from reaching its maximum potential as a productive warmwater system.

#### Biological Opinion

Although L. abrupta was at one time common throughout the Ohio River basin, it is now rare. The newly discovered Greenbottom site is the only place in the Ohio River mainstem, except near its confluence with the Mississippi River, where L. abrupta is known to survive. Although still considered rare, larger reproducing populations exist in other rivers, such as the Tennessee and Cumberland Rivers. Therefore, it is our biological opinion that the action will not likely jeopardize the continued existence of L. abrupta. An incidental take statement along with measures which must be taken to minimize the incidental take are specified in Appendix A.

#### Conservation Recommendations

Conservation measures are discretionary actions that the Commission/developers could take to promote the recovery of the species. They are consistent with the scope, magnitude, and duration of the federal action and are not intended to broaden the agency's authority.

The Service recommends the following work to assist in conservation of L. abrupta:

Conduct additional mussel surveys on the three reaches specified below Willow Island, Belleville, and Gallipolis Locks and Dams to attempt to locate additional L. abrupta populations. Reference the FEIS, Appendix It page 30, Item 5. Adequacy of the Data, (a).

This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should this project be modified or new information becomes available, consultation should be reinitiated.

Should any of the "Level of Take" criteria be reached in any of the study sites regarding the actual and potential existence of L. abrupta the Service will determine whether or not additional action is

necessary. Such action may include implementation of additional measures to minimize harm to the species and/or reinitiation of consultation.

