

Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, Pennsylvania 16801-4850

October 17, 2002

Mr. James A. Cheatham
Division Administrator
Federal Highway Administration
228 Walnut Street, Room 558
Harrisburg, PA 17101-1720

Dear Mr. Cheatham:

The Fish and Wildlife Service has reviewed the project plans, Biological Assessment, and associated Amendment for the proposed replacement of the Foxburg Bridge (S.R. 0058, Section 150), located in Armstrong and Clarion Counties, Pennsylvania. Your September 20, 2001, request for formal consultation was received on September 24, 2001. The enclosed document represents the Service's Biological Opinion on the effects that the proposed action will have on two federally listed, endangered, freshwater mussel species: the clubshell (*Pleurobema clava*) and northern riffleshell (*Epioblasma torulosa rangiana*). This Biological Opinion is provided in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This Biological Opinion is based on information provided in the Biological Assessment (dated June 2001), an August 2001 Amendment to the Biological Assessment, a January 1990 Hydrologic and Hydraulic Report, field investigations, meetings (see consultation history), and other information available in our files. A complete administrative record of this consultation is on file in this office.

The bridge design selected as the preferred alternative is intended to reduce the influence of the bridge structure on the floodplain and the existing channel, thus reducing the effect on riverine hydrology compared to existing conditions. If successful in the long term, removal of the existing structure will promote habitat stability in this reach and reduce extreme events of streambed movement (*e.g.*, scour) during peak flood events and ice jams. To evaluate if this bridge design produces the desired benefits, a U.S. Geological Survey (USGS) research study is proposed to document these benefits.

Although efforts were taken to reduce incidental take of the northern riffleshell during bridge demolition and construction, a number of these animals will be killed. Therefore, we are recommending that an effort be made to search for and salvage mussels within the top 10 cm of substrate within the direct effects area to minimize take of the northern riffleshell, and clubshell,

as necessary. These animals are to be retained in a captive holding facility that is demonstrably capable of long-term maintenance of freshwater mussels. If habitat conditions permit, the salvaged animals, or their progeny, can be placed back in the Allegheny River after construction is completed.

This project is scheduled to occur nearly ten years after the mussel survey upon which much of this Biological Opinion is based. Due to questions about whether or not this project can be initiated in the 2004 and 2005 construction seasons, we have included Term and Condition No. 6, which places certain restrictions upon construction timing and sequencing, and mussel sampling and salvage. When a project implementation, timing, and sequencing schedule is available, please provide us with a copy.

If you have any questions regarding this Biological Opinion, please contact Robert Anderson of my staff at 814-234-4090, extension 228.

Sincerely,

David Densmore
Supervisor

Enclosure

BIOLOGICAL OPINION

REPLACEMENT OF THE FOXBURG BRIDGE
OVER THE ALLEGHENY RIVER
(S.R. 0058, SECTION 150)

ARMSTRONG AND CLARION COUNTIES, PENNSYLVANIA

Prepared by:

Pennsylvania Field Office
U.S. Fish and Wildlife Service
315 South Allen Street, Suite 322
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October 17, 2002

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CONSULTATION HISTORY

The history of this consultation is as follows:

- 3/17/95 U. S. Fish and Wildlife Service (Service) receives a request from the Pennsylvania Department of Transportation (PennDOT) agent, Gannett Fleming, Inc., for information about proposed or endangered species within the area affected by the proposed replacement of the Foxburg Bridge.

- 4/18/95 Service responds to Gannett Fleming, Inc. that the project area is within the known range of the northern riffleshell and clubshell, and requests that a mussel survey be conducted.

- 9/1-10/2/98 U.S. Geological Survey (USGS), with the assistance of Service staff from the Ohio River Islands National Wildlife Refuge, conducts a mussel survey in project area.

- 01/02/97 USGS submits preliminary Foxburg mussel survey results to the Service.

- 1/27/98 Service provides PennDOT (via their agent) with an example biological assessment report and an explanation of relevant terms.

- 11/17/98 Service meets with PennDOT to discuss formal and informal section 7 consultation, development of avoidance and minimization alternatives, endangered mussels (e.g., habitat requirements, threats, distribution), and the proposed Foxburg Bridge replacement.

- 6/15/99 USGS submits Foxburg mussel survey data to the Service.

- 7/27/99 Service meets with the Federal Highway Administration (FHWA), Pennsylvania Fish and Boat Commission (PFBC), and Gannett Fleming, Inc., to review the results of the mussel survey report and to discuss the requirements for completion of the Construction Options Evaluation Report (COER) and Biological Assessment (BA).

- 10/29/99 PennDOT submits the hydrologic and hydraulic report for Foxburg to the Service.

- 5/8/00 Service meets with PennDOT to view the Foxburg Bridge site and to discuss the project’s status.

- 8/8/00 Service receives the final Foxburg mussel survey report.
- 9/5/00 Service recommends via telephone to PennDOT that the mussel survey be redone using updated and more intensive survey protocols.
- 06/14/01 PennDOT submits to the Service, the Draft Biological Assessment for the proposed project for review.
- 06/20/01 PennDOT, their agents, FHWA, PFBC, and Service meet to discuss the Draft Biological Assessment.
- 9/20/01 FHWA letter requesting the initiation of formal consultation, and transmitting PennDOT's Biological Assessment Amendment (dated 08/01). Service receives this request on 9/24/01.
- 11/9/01 Service requests detailed information about project timing and sequencing, and length of time causeway will be in the river (information lacking in the Biological Assessment).
- 11/20/01 Service acknowledges receipt of FHWA's request to initiate formal consultation, indicating that most required information has been supplied, and expecting to provide FHWA with a Biological Opinion before 02/06/02. The Service requests FHWA clarify which species are to be addressed in the Biological Opinion. Living and freshly dead specimens of the clubshell mussel were also found during the October 1998 mussel survey; therefore, although likely present at low densities, this species occurs within the project area. Service recommends that the clubshell be addressed in the Biological Opinion.
- 12/4/01 PennDOT, via their agent Gannett Fleming, submits an outline of construction sequence.
- 12/5/01 FHWA requests, in a letter dated 12/3/01, that consideration of the clubshell be added to the formal consultation for the Foxburg Bridge.
- 12/5/01 Service requests from PennDOT via telephone a more detail proposed project schedule with dates, and discusses salvage as a minimization measure to reduce take. This was also discussed with FHWA via telephone on this date.
- 12/20/01 PennDOT responds to the Service's 12/5/01 request, indicating that construction of the project is proposed to begin in the spring of 2004, and require three seasons to

complete, of which 18 months will be required to complete instream activities. The construction start date is tentative, although the construction sequence indicates that instream construction and demolition activities will be completed in two seasons (18 months) with additional activity taking place on the bridge approaches and deck.

2/22/2002

Service transmits its Biological Opinion to FHWA.

BIOLOGICAL OPINION

I. DESCRIPTION OF PROPOSED ACTION

The following project and project area descriptions are taken from FHWA and PennDOT District 10-0's June 2001, Biological Assessment of the Replacement of the Foxburg Bridge over the Allegheny River (S.R. 0058, Section 150) in Armstrong and Clarion Counties, Pennsylvania, and the August 2001 Amendment to that document.

As defined in 50 CFR 402.02, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States. The "action area" is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present federal, State, or private activities within the action area. This Biological Opinion (Opinion) addresses those actions for which the Service believes adverse affects may occur. In their Biological Assessment, FHWA and PennDOT outlined those activities that would adversely affect the clubshell and northern riffleshell. The following opinion addresses whether implementation of the project is likely or not likely to jeopardize the continued existence of these two species.

A. Action Area

The project action area is defined as 300 feet upstream to 1,200 feet downstream of the existing Foxburg Bridge, which encompasses the river reach in which mussels are anticipated to be directly and indirectly affected by the proposed construction and demolition activities. An investigation is also proposed that includes an action area defined as the bridge crossings at West Hickory, Foxburg, and East Brady, Pennsylvania including an upstream and downstream cross section at each bridge at which hydrologic conditions will be assessed.

Within the action area at Foxburg, the Allegheny River flows south towards Pittsburgh. The width of the river is approximately 525 feet, with average depths typically between 4 and 12 feet. Maximum depth in the vicinity of the bridge is 32 feet at summer low-flow conditions. The maximum depth occurs in a scour hole that is located between the two existing bridge piers and extending downstream of the bridge. Approximately one mile downstream the river is over 1,000 feet wide, is fairly shallow, and contains several islands. Four flood control projects have been constructed in the Allegheny River watershed upstream of the proposed project. These include Union City Dam, Woodcock Creek Dam, Tionesta Dam, and Kinzua Dam. Kinzua Dam is the largest structure and has the greatest effect on

river discharge at Foxburg. Normal water surface at the existing bridge is 858.2 feet above mean sea level (amsl) and the 100-year floodplain elevation is 874.8 feet (amsl).

Terrain on the west side of the river consists of very steep forested areas with permanent and seasonal residences located adjacent to S.R. 0268 and the river. Foxburg Borough on the east side on the river consists of permanent residences, commercial establishments, and former industrial areas associated with former railroad operations. The Pennsylvania State Historic Preservation Officer has determined that major portions of the Borough of Foxburg comprise a historic district. The Foxburg Bridge has been determined to be a contributing element to the Foxburg Historic District.

Currently the Allegheny River supports recreational canoeing and fishing within the project action area. The project is located downstream of a section of the river that has been designated by the U.S. Forest Service as a Wild and Scenic River Corridor. The designated recreational use section ends at the Interstate 80 bridge located upstream of the existing bridge, and a private canoe facility is located downstream of the bridge. Game fish within this section of the river include smallmouth bass, walleye, and muskellunge. The river has a designated use of “warm water fishery” according to the Pennsylvania Department of Environmental Protection, Chapter 93 Water Quality Standards.

B. Action Description

The proposed action involves demolition of the existing bridge and construction of a new bridge immediately upstream of the existing alignment. The existing bridge is a three-span, single-lane, “double decker” steel truss bridge constructed in 1921. The lower deck carries truck and automobile traffic while the upper deck previously carried rail traffic. The bridge has undergone several rehabilitations, including removal of the railroad approach spans to the upper deck in 1985. The two bridge piers were constructed on wooden cribbing. These experience severe scour that requires yearly underwater inspections and a remedial grouting program. Due to the deteriorated condition of the existing bridge and pier foundations, and the single-lane configuration, FWH and PennDOT have determined that the existing bridge needs to be replaced.

The new bridge design is proposed to minimize effects on local hydrology as compared to the existing bridge. For example, the existing abutments are located within the floodplain, which restricts free flow of the river during high flow events. The new bridge abutments will be located on top of the riverbank to allow flood flows to pass more freely. Upon completion of the new bridge the existing abutments and piers will be removed. The new abutments are planned to be set farther away from the river than the existing abutments; therefore, the cross-section of the river channel will be increased, and this is expected to reduce stream velocity and associated scour.

The proposed new bridge alignment is adjacent to the upstream side of the existing bridge. Construction of the new bridge and demolition of the existing bridge are planned over the course of two construction seasons. Traffic will be maintained on the existing bridge during the first year of construction, while the upstream portion of the new bridge is completed. Traffic will then be routed across the new span the following year to allow demolition of the old bridge, and bridge, there construction of the opposing lane of the new y avoiding a 10.2-mile detour.

Construction is proposed to begin in the spring of 2004 and take more than two years to complete.

The proposed replacement bridge consists of four spans, constructed of either steel or concrete and is supported by three in-stream piers. The final bridge material type selected will affect the exact placement of the east and west piers; the concrete four-span bridge will require the placement of piers about 10 feet farther away from the riverbanks than piers associated with a steel structure. The placement of the center and western piers is within areas identified as unsuitable habitat for mussels for both steel and concrete alternatives. The placement of the eastern pier is within streambed identified as suitable mussel habitat for both construction methods. The construction material selected will change the footprint location of the pier, but not the total area of river bottom or suitable mussel habitat disturbed.

The bridge will be constructed on drilled caissons (open bent piers) to minimize riverbed disturbance. At each of the three pier locations, three caissons (total of nine caissons) will be installed by placing a 12-foot box on the riverbed and driving an approximately 8-foot diameter casing through about 30 feet of alluvial material into bedrock. The bottom of each caisson will be attached via a socket into the bedrock.

Construction of the new piers and the bridge will take place from a combination of barges and, on the shallow western bank, a causeway. Because the Allegheny River at Foxburg is not navigable, and barges cannot be floated to the site, floating platforms will be built from prefabricated segmental barge units. These barges will be trucked to the site and positioned using "barge pushers," and anchored to the river bottom using spuds. The spuds consist of 16-inch diameter pipes that are driven into the riverbed. Access will be gained via a private boat launch upstream of the existing bridge on the eastern side of the river. The draft of the barges is approximately 3-feet when loaded. The launch area will affect 1,235 square feet of riverbed, which includes approximately 950 square feet of suitable mussel habitat.

A causeway will be constructed from the Armstrong County side of the river to allow for access to this section of the bridge during demolition of the existing structure and construction of the replacement bridge. The causeway will consist of three work platforms constructed of clean rock-fill material utilizing 1.5:1 side slopes. The entire causeway will be placed in regions of the river determined to have

habitat unsuitable for mussels due to the dominance of boulder substrate and the influence of acid mine drainage from an upstream tributary. The causeway needed for the steel bridge alternative is 8479 square feet, compared to 9189 square feet if the concrete alternative is selected. The entire causeway in both cases is within areas identified as habitat unsuitable for mussels. The causeway will be removed to the original riverbed level upon completion of the new bridge and removal of the existing bridge. The proposed causeway will be constructed at the beginning of the project and remain in place throughout the entire instream construction period. The exact footprint of the causeway has not been determined (it will depend upon the construction material selected).

Dismantling a truss bridge, such as the Foxburg Bridge, is a high-risk activity for demolition crew safety; therefore, the entire bridge will be dropped into the river using tightly sequenced controlled burns (not explosives) of precut structural members. These burns can be sequenced to cause the bridge to rotate onto its downstream side, away from the newly constructed bridge. Demolition of the existing truss by means of controlled burns will also include a special provision to limit the size of the truss members after demolition. Limiting the size of the truss members will allow the truss to be removed from the river without dragging large sections of the truss along the river bottom.

The Biological Assessment provided no information regarding pre-construction geotechnical investigations, bridge operation and maintenance, or an analysis of the effects anticipated due to these activities.

C. Conservation Measures

Conservation measures represent actions pledged in the project description that the action agency will implement to further the recovery of the species under review. Such measures should be closely related to the action and should be achievable within the authority of the action agency. The beneficial effects of conservation measures are taken into consideration in the Service's conclusion of jeopardy or non-jeopardy to the listed species, and in the analysis of incidental take. However, such measures must minimize impacts to listed species within the action area in order to be factored into the Service's analyses.

PennDOT has studied location alternatives, design, construction and demolition options, and suggested conservation measures which have resulted in an alternative selection that is proposed to minimize impacts to the freshwater mussel beds in the vicinity of Foxburg.

Construction of the proposed project is not expected to affect the long-term survival of the two species' populations at this site; the main concern will be the impacts associated with construction and demolition activities. Due to the large areas of unsuitable habitat at Foxburg, created in part by the

existing bridge, there is potential for habitat improvement in the vicinity of the existing bridge. In addition to design and construction options selected, the following conservation measures are included in the Biological Assessment (as “Minimization Efforts”, pp. 19 and 20).

1. Develop and implement a pier design that minimizes the hydrologic effects in the Action Area and reduces the potential of scour resulting from the proposed structure;
2. Develop and implement an approved erosion and sedimentation (E&S) plan in conjunction with the use of Best Management Practices;
3. Develop a monitoring program in order to minimize construction-related impacts that could occur with the placement of the causeway and drilling activities;
4. Return construction zones within the river to the pre-construction condition;
5. Develop rapid response remediation contingency plans in the event of rapid rise of river flows, fuel spill, or introduction of sediments;
6. Include information in the construction documents to make the contractor aware of the unique aspects of the project and the special provisions that must be followed on this project relating to the presence of endangered mussels;
7. Require contractors hired by PennDOT to document the zebra mussel-free condition of all equipment.
8. Implement a research project that would evaluate the effects of the proposed bridge on streambed scour and bridge-induced hydrologic changes to the benthic riverine community (referred to as “Riverine Enhancement Commitments” in the BA, pp. 20 and 21).

The proposed bridge design is predicted to allow natural restoration of the streambed, increasing mussel habitat as a result of the smaller bridge pier design and increased set-back of the abutments, compared to the existing structure. This study is designed to document existing benthic habitat conditions, predict future conditions, and monitor actual changes. Reference sites with known mussel distributions at West Hickory and East Brady, Pennsylvania will be modeled, and used to develop a more complete understanding of hydrologic conditions utilized by the northern riffleshell and clubshell in the Allegheny River. These reference sites will be used to compare changes in the extent of potential mussel habitat at Foxburg as a result of placement of the new structure.

II. STATUS OF THE SPECIES

A. General Biology of Freshwater Mussels in the Family Unionidae

Freshwater mussels (unionids) are sedentary filter feeders as adults, filtering oxygen and food from the water column across their gills. The breeding season is initiated by seasonal changes, such as water temperature. Females hold unfertilized eggs in water tubes within specialized regions of the gills called marsupia. Males liberate sperm into the water and females lying downstream uptake the sperm with incoming water. The eggs are then fertilized in the water tubes within the marsupium. The fertilized eggs develop into minute bivalve larvae, or glochidia, which, in turn, develop over a period of days to months. While in the marsupium, developing glochidia are exposed to the adult's circulatory fluid, but not directly to the water column (Gardiner *et al.* 1991, Richard *et al.* 1991).

The glochidia of most unionids are believed to be obligate parasites, with fish serving as the host organism for most species. Although many unionids are probably host-specific, the degree of host specificity and the host species for most unionid species, including the clubshell and northern riffleshell, are unknown (U.S. Fish and Wildlife Service 1994). The following species were capable of serving as hosts under laboratory conditions (Watters 1996, 1997) for the clubshell: striped shiner (*Notropis chrysocephalus*), central stoneroller (*Camptostoma anomalum*), blackside darter (*Percina maculata*), and logperch (*P. caprodes*). The same studies reported that the northern riffleshell was capable of utilizing banded darter (*Etheostoma zonale*), bluebreast darter (*E. camurum*), brown trout (*Salmo trutta*), and banded sculpin (*Cottus carolinae*). Some of these species (brown trout and banded sculpin) are not native to the Allegheny River system, while others may have habits that make them unavailable to the respective mussels species at the correct season. The host suitability studies described above did not test all of the fish species native to the Allegheny River; therefore, it is possible that additional species can be utilized by the glochidia of the clubshell and northern riffleshell.

Methods of host infestation depend on how glochidia are released. Some unionid species expel individual glochidia out the exhalant siphon. Host fishes either pass suspended glochidia over their gills during respiration where they attach, or contact settled glochidia on the substrate, where they attach to fins or skin. Other unionids have methods of luring potential host fish to the gravid female mussel through the use of lures. Lures for some species are extensions, or modifications of the female's body, which appear to resemble prey organisms, such as a fish or insect. The gravid northern riffleshell displays a brilliant white mantle margin to attract the fish host. In other freshwater mussel species, glochidia are bound together in a mucus matrix called a conglutinate, which can mimic insect larvae or other fish prey items. The gills and mouth of the host fish become infested when fish strike at the lure or attempt to eat the conglutinate (U.S. Fish and Wildlife Service 1994).

After encysting on the host fish, the glochidia transform into juveniles. They fall from their host and burrow into the substrate or attach to larger objects. Unlike the adults, which are filter feeders, juveniles appear to be pedial feeders, sifting food items from sediments with hair-like structures (cilia) arranged on their foot.

Clubshell mussel (*Pleurobema clava*). The clubshell was listed as endangered, without critical habitat, in 1993. This is a small to medium-size mussel, up to three inches long. The shell exterior is yellow to brown with bright green blotchy rays. The shell interior is typically white. The shell is wedge-shaped and solid, with a pointed, and fairly high umbo.

Historically, this species was once abundant throughout Ohio River tributaries in Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, and West Virginia. It was widespread in Ohio River basin rivers such as the Ohio, Allegheny, Scioto, Kanawha, Little Kanawha, Licking, Kentucky, Wabash, White, Vermillion, Mississinewa, Tippecanoe, Tennessee, Green, and Salt Rivers. The clubshell was also located in the Maumee River basin, and tributaries of western Lake Erie such as the Huron River and the River Raisin (Stansbery *et al.* 1982). This species has declined drastically with a greater than 95 percent range reduction. The largest remaining populations are in the Allegheny River and French Creek (and some tributaries), Pennsylvania. These streams support what appear to be reproducing populations, but with generally low numbers and a discontinuous distribution (*i.e.*, within suitable habitat areas scattered over several miles).

The clubshell inhabits clean, packed or loose, coarse sand and gravel in runs, often just downstream of a riffle, in medium to small rivers and streams (Stansbery *et al.* 1982). It cannot tolerate mud or slack water conditions (U.S. Fish and Wildlife Service 1994). The clubshell typically burrows completely beneath the substrate two to four inches, apparently relying on water to percolate between the sediment particles (Watters 1990).

The clubshell has a life span of 20 years or more. It is a short-term breeder (tachytictic); *i.e.*, fertilization takes place in mid-spring and the embryos (glochidia) are discharged into the water column in mid-summer (Ortmann 1919). Many aspects of the life history of this rare mussel are not known.

Clubshell populations are presently known to occur in the following streams; however, occupied stream reaches are generally restricted to a few miles or less:

State	Stream	County	Status ¹
Indiana	Tippecanoe River	Kosciusko, Fulton,	Present, reproducing
Kentucky	Green River	Taylor, Green, Hart	Rare
Michigan	East Fork of the West Branch	Hillsdale	Unknown
Ohio	Fish Creek	Williams	Rare
	Little Darby Creek	Madison	Present, reproducing
	Pymatuning Creek	Ashtabula	Rare, no reproduction
	St. Joseph River	Williams	Rare
	West Branch of the St. Joseph	Williams	Present, unknown
Pennsylvania	Walhonding River	Coshocton	Rare, unknown
	Allegheny River	Clarion, Forest,	Present, reproducing
	Conneaut Outlet	Crawford	Rare
	Conneauttee Creek	Crawford	Rare, unknown
	French Creek	Crawford, Erie,	Present, reproducing
	LeBoeuf Creek	Erie	Present, reproducing
	Muddy Creek	Crawford	Rare, unknown
West Virginia	Elk River	Kanawha	Present, reproducing
	Hackers Creek	Lewis	Rare, unknown
	Meathouse Fork	Doddridge	Unknown

¹ A status of “rare” indicates that less than ten individual living or recently dead specimens have been observed in recent years in that water body.

Northern Riffleshell (*Epioblasma torulosa rangiana*). The northern riffleshell was listed as endangered, without critical habitat, in 1993. It is a small to medium-size mussel, up to three inches long. The shell exterior is brownish-yellow to yellowish-green with fine green rays. The shell interior is

typically white. The species is sexually dimorphic; male shells are irregular ovate in outline, with a wide shallow sulcus just anterior to the posterior ridge. Female shells are obovate in outline, and greatly expanded post-ventrally.

According to Williams *et al.* (1993), the genus *Epioblasma* is among the most diverse of the Unionidae in North America, with 25 recognized taxa. This genus once ranged from the St. Lawrence River system to the Mobile River system, principally in larger rivers. All but one species in this genus is either thought to be extinct or is listed as an endangered species under the federal Endangered Species Act. The two sibling species associated with the northern riffleshell, the tubercled blossom (*E. torulosa torulosa*), and green blossom (*E. t. gubernaculum*) have not been seen alive or freshly dead in recent decades, and may be extinct.

The historical range of the northern riffleshell was somewhat similar to that of the clubshell, but with extensions further north into Michigan and Ontario tributaries of Lake Erie, Lake St. Clair, and the Detroit and St. Clair Rivers (U.S. Fish and Wildlife Service 1994). Like the clubshell, the northern riffleshell has suffered a range reduction of over 95 percent.

In 1992, a population of the northern riffleshell in the Detroit River in Michigan was found to be threatened by invasion of the exotic zebra mussel (*Dreissena polymorpha*). Divers collected 30 to 40 individuals, which were relocated to the St. Clair River in Michigan. About a dozen individuals were kept in captivity. Populations of northern riffleshell in the St. Clair and Detroit Rivers appear to have been extirpated by zebra mussels (M. DeCapita, USFWS, personal communication 2002)

The largest remaining populations occur in the Allegheny River and in French Creek, Pennsylvania. In the Allegheny River, the subpopulations are distributed over 80 miles of river (C. Bier, WPAC, *in litt.* 6 January 1994; in U.S. Fish and Wildlife Service 1994). The species has been documented to occur in good numbers at several locations in the Allegheny River, but its distribution is discontinuous (*i.e.*, localized to areas of suitable habitat) and the condition of these populations ranges from those exhibiting successful reproduction, to those with apparently depressed vigor and a predominance of older adults.

The northern riffleshell occurs in clean, packed, coarse sand and gravel in riffles and runs of small and large streams (Stansbery *et al.* 1982, Watters 1990). The species buries itself to the posterior margin of the shell, although females may be more exposed, especially during the breeding season (U.S. Fish and Wildlife Service 1994). From May to September, gravid females of this species expose a brilliant white mantel margin to attract host fishes. The northern riffleshell is a long-term breeder (bradyctictic), with fertilization in the late summer and glochidial release the following spring or summer (Ortmann 1919).

The present range of the northern riffleshell has been reduced to the following streams; however, occupied stream reaches are generally restricted to a few miles or less:

State	River System	County	Status ¹
Indiana/Ohio	Fish Creek	Dekalb, Williams	Rare, unknown reproductive status
Kentucky	Green River	Edmonson, Hart	Rare, unknown reproductive status
Michigan	Detroit River	Sanilac	Unknown, possibly extirpated drainages
Ohio	Big Darby Creek	Franklin, Pickaway	Rare, unknown reproductive status
Pennsylvania	Allegheny River	Clarion, Forest, Venango, Warren	Present, reproducing
	French Creek	Crawford, Erie, Mercer, Venango	Present, reproducing
West Virginia	Elk River	Kanawha	Rare, only 2 live young animals have been found in recent years

¹ A status of “rare” indicates that less than ten individual living or recently dead specimens have been observed in recent years in that water body.

B. Decline of, and Continued Threats to, the Clubshell and Northern Riffleshell

Because mussels are sedentary, long-lived, and annually have low juvenile survival rates, they are susceptible to both periodic and permanent environmental degradation. The range reductions of these mussels are attributed to physical loss of habitat and degraded water quality related primarily to water impoundments, channelization, streambank clearing, sewage, and agriculture. Impacts associated with run-off from human waste, chemical outfalls, and coal mining have also affected many tributaries.

The greatest diversity and abundance of mussels are associated with clean-swept sand and gravel substrates. Chronic increases in turbidity and suspended sediments that decrease the depth and amount of light penetration, affect primary productivity, decrease oxygen levels, increase water temperature, irritate or cause clogging of gills, and result in a blanket of silt on the substrate. Mussels may be directly affected by siltation through smothering. High turbidity may interfere with sight lures used by the northern riffleshell to attract host fish. Siltation also affects mussels by smothering eggs or larvae of the fish host populations and by reducing food availability. Siltation also fills interstitial spaces, eliminating spawning and habitat critical to the survival of young fish and juvenile mussels.

Pollution from municipal, agricultural, and industrial waste discharges has decreased or eliminated mussel populations directly, and indirectly through elimination of host fish species resulting in reproductive failures (U.S. Fish and Wildlife Service 1994).

The exotic and prolific zebra mussel, accidentally introduced to North America in the mid-1980's, poses a severe threat to all native mussel fauna through competition for space, food, and survival of glochidia. Presently, the zebra mussel, which was conveyed to the United States through ship ballast water from interior European ports, is abundant in the lower Great Lakes and the Ohio River, and is increasing in other portions of the range of these federally listed species. It is not known to occur in the free-flowing portion of the Allegheny River at this time. Zebra mussel populations in the Allegheny River basin in Edinboro Lake and the navigation channel of the lower Allegheny River have remained small, and do not pose a threat to unionid populations at Foxburg at this time.

III. ENVIRONMENTAL BASELINE

A. Status of the Species Within the Action Area

Within the vicinity of the Foxburg Bridge, the northern riffleshell occurs in low to moderate numbers. A single living clubshell, along with several freshly dead shells of this species, were found in the project area, indicating that this species occurs in the project action area at low densities. Both species are discontinuously distributed in the Allegheny River in Warren, Forest, Venango, Clarion, Armstrong, and Butler Counties, Pennsylvania. Prior to the freshwater mussel surveys conducted in relation to planning for the subject bridge replacement project, neither species was known to occur within the immediate project area; however, both species had been documented to occur upstream and downstream of the Foxburg Bridge site.

The USGS conducted a mussel survey for PennDOT at the Foxburg Bridge site in September and October 1998. The survey was conducted in accordance with the July 19, 1996, survey protocol (Mussel Survey Protocol: Allegheny River and French Creek) approved by the Service. The survey zone extended from 300 feet upstream to 1200 feet downstream of the existing bridge, and encompassed those areas most likely to be directly and indirectly affected by the project. Techniques employed during the survey included the use of clear-bottom buckets in shallow areas (< 2.5 feet deep) and diving gear in deeper areas (> 2.5 feet deep) to conduct searches along line transects (*i.e.*, qualitative surveys); inspection of middens and other shell concentration areas near shore; and excavation of 2.7 ft² quadrats (*i.e.*, quantitative surveys).

At the time of the survey, river depths within the survey zone ranged from one to thirty-three feet. While the majority of the study area was less than ten feet in depth, a deep scour area centered under the bridge was more than thirty feet deep. This scour hole extended from upstream to downstream of the bridge. Substrate in the main channel consisted primarily of gravel interspersed with cobble and

small boulders. Some areas had fine silt deposition, but this appeared to be related to near-drought conditions and was variable depending upon water velocity.

The survey revealed a total of more than 3000 live mussels representing 14 species in the study area. Combining results from all survey methods, 48 northern riffleshell (20 live and 28 dead) were found. The mucket (*Actinonaias ligamentina*) and spike (*Elliptio dilatata*) were the most abundant species found, representing 51.3 percent and 42.7 percent (respectively) of the mussels found using qualitative sampling methods. The northern riffleshell was the seventh most abundant species collected during the qualitative survey. Some of these northern riffleshell were young, indicating that recruitment is occurring at this site. During the qualitative searches, an individual living clubshell mussel was located, along with 5 shells that appeared to have died recently. No clubshells were found during the quantitative sampling portion of the study, indicating that this species, though present, is rare in the sampled area.

Forty-eight 0.25-square meter quadrats were excavated to determine the presence of juvenile mussels, to estimate mussel densities, and to search for the clubshell, which often occurs several inches below the water/substrate interface. Most of these quadrats were concentrated in the areas found to have abundant mussels in the qualitative survey. The substrate within each quadrat was excavated to a depth of four inches. During quadrat sampling, 101 live mussels representing 8 species were located. One live northern riffleshell was found in the quantitative sampling, indicating an estimated 2,233 individuals (range 315 to 15,848 individuals) are present in the area defined as suitable habitat within the action area near Foxburg. The exotic Asiatic clam (*Corbicula fluminea*) occurs at this site; however, no zebra mussels were located in the vicinity of the Foxburg Bridge.

The project area provides moderate quality habitat for mussels based on substrate quality, flow, and mussel density and diversity, including the presence of the northern riffleshell and clubshell. Based on survey results, however, it appears that the northern riffleshell, even though showing signs of recruitment, may exist at a relatively low density within the project area.

B. Factors Affecting Freshwater Mussel Environment Within the Action Area

This population is subjected to mammalian predation, acid mine drainage and non-point source pollution in the Allegheny River watershed. Additionally, riverbed scour appears to be a significant factor limiting these species within the action area.

IV. EFFECTS OF THE ACTION

It is expected that all clubshell and northern riffleshell in the 180,768 ft² footprint of the cofferdams (surrounding the caisson piers), the barge spud locations, and bridge demolition area, will be taken. Take (*i.e.*, death, injury, harm, harassment) is expected to occur due to suffocation, crushing, and/or displacement by these activities.

Juvenile and adult clubshell and northern riffleshell, and fishes that serve as hosts for their glochidia, could also be affected (*i.e.*, killed, injured, or stressed) by substrate disturbance (*e.g.*, scouring), increased turbidity, sediment deposition, and introduction of petroleum products into the river. These impacts would occur during bridge demolition and removal; causeway construction, use, and removal; on-bank construction activities associated with upland abutment and pier removal; construction of barge launch facilities; construction and use of staging areas and access roads near the river; construction activities on the bridge deck; and crane and heavy equipment operation on the causeway.

The extent of these impacts will depend on construction practices; river flows during construction; silt load in disturbed substrates; and the effectiveness of erosion and sedimentation control measures, and pollution prevention and remediation measures. The greatest potential for substrate scouring and deposition would occur in association with removal of the existing piers and abutments, as well as the presence of the cofferdams during construction, especially during high flows that induce riverbed movement (*i.e.*, scour). Those mussels not killed or injured during this process may still suffer death, injury, or increased predation risk if they are unable to right themselves and re-burrow into suitable habitat downstream. Mussels downstream of the causeway will be subject to the impacts (*e.g.*, gill clogging, suffocation) of sediment re-deposition.

A long-term alteration in habitat quality may occur within the action area. Water velocities during low flow periods may fall below required thresholds of these species in a less confined channel. Conversely, currently unstable areas now highly susceptible to scour (related to channel constriction from the existing structure) may become more suitable during low flow periods, as well as less susceptible to scour during higher flows.

No direct effects to mussels, or their habitat, are expected from construction of the abutments because these structures and associated rock fill are proposed to be placed above the mean river level, at approximately the 2-year flow level. Similarly, no direct effects to mussels, or their habitat, are expected from construction of the western and central piers, and their associated cofferdams and temporary causeway, because these structures are proposed for construction in areas that are unsuitable for mussels due to substrate composition, substrate instability, and water quality deficiencies. Indirect effects may result, however, due to placement and the long-term presence of these features. These effects would include scouring, sediment re-deposition, and changes in flow patterns, resulting in loss or injury of mussels; changes in fish host distribution; and a reduction in habitat availability and/or quality for both mussels and fishes.

As filter feeders on microscopic food items, the northern riffleshell and clubshell are very susceptible to smothering by silt and other sediments in the water (Ellis 1936, in U.S. Fish and Wildlife Service 1994). Siltation also may result in reduced dissolved oxygen and increased organic material at the substrate level (Ellis 1936, Harman 1974; both in U.S. Fish and Wildlife Service 1994). At sub-lethal levels, silt

interferes with feeding and metabolism in general (Aldrige *et al.* 1987, in U.S. Fish and Wildlife Service 1994). Because the clubshell typically burrows completely beneath the substrate, it is particularly susceptible to siltation, which clogs the substrate interstices and suffocates the animal.

Mussels will be smothered, buried and/or have their gills clogged from project-related silt and other sediments. Mortality, injury, and stress to mussels are expected from siltation and other types of sedimentation caused by both in-stream construction (*i.e.*, barge launch, causeway, and cofferdam construction) and onshore construction (*i.e.*, realignment of the bridge approaches, abutment construction, staging areas, and access road construction). Barge placement and use will require construction of a launch on the east side of the river, and an associated road to transport equipment to the barges. This will increase the likelihood of sediment and other pollutants reaching the river. Implementation of erosion and sedimentation control practices should help to minimize these sources of sediment.

Sediment and silt will also be resuspended due to project-related scouring. The causeway, even though it is proposed to be placed in unsuitable habitat, will restrict the river channel and will likely increase water velocity in suitable mussel habitat, potentially inducing scour. The change in velocity at low flow is anticipated to be small (increasing from 2.02 feet per second to 2.38 feet per second) although the proportional change in velocity at high discharge rates has not been modeled. If scour occurs as a result of placement of the causeway, it is most likely to occur from mid-channel east of the causeway. Silt and sediment resulting from project activities, as well as suspended material transported from upstream to the project area is likely to be deposited in areas of reduced water velocity and in eddies. The proposed project is likely to produce silt depositional areas, particularly 1) upstream of the causeway as flow decreases, creating a minor pooling effect; 2) immediately downstream of the causeway, where flow has not yet redistributed across the river channel and sediments scoured from the vicinity of the work areas are likely to redeposit; and 3) immediately downstream of the cofferdams. The area downstream of the causeway is unsuitable mussel habitat due to large substrates and acid mine drainage; therefore, downstream effects of the causeway on the northern riffleshell and clubshell are expected to be minimal.

The causeway is designed such that high water events will overwash it. Therefore, materials staged on the causeway, or sediments that are part of the causeway may be deposited into the river, possibly affecting mussels downstream. Barges are at risk of flooding, toppling, or sinking during high flow events unless precautions are taken to avoid this. Construction materials and equipment may also affect mussels downstream if washed into the river and either physically transported downstream by currents, or spill toxic materials such as fuel into the river. If a significant flow event occurs while the causeway is in place, scour of the action area could be extensive due to the constriction of the channel by the causeway, the new piers, and existing piers. Such an event is likely to directly affect northern riffleshells and clubshells transported with shifting substrate, or buried downstream where the river decreases and transported material is deposited. Long-term indirect effects are likely to occur as this material is then redistributed in subsequent flood events until a stable channel configuration is achieved.

The physical presence of construction activities may affect clubshell and northern riffleshell reproduction upstream and downstream by affecting transport of sperm and glochidia, or by modifying host fish behavior, travel patterns, or habitat use. These effects are expected to be short-term and localized in extent, but may result in take in the form of harm or harassment.

The BA did not evaluate the impact of geotechnical investigations necessary for final design of the caisson piers. Drilling associated with this activity will kill or harm any northern riffleshell or clubshell in the vicinity of this drilling.

Operation of this project presents several indirect threats to the populations of both the northern riffleshell and clubshell in the action area. These potential indirect effects include, but are not limited to, runoff from the bridge deck and approaches carrying silt, hydrocarbons, and de-icing materials as well as the possibility of accidents resulting in spills of toxic materials being transported across the bridge. These potential indirect effects of the proposed action are not evaluated in the BA or the addendum but can be expected to differ from the effects of the existing bridge due to differences in structure design.

Bridge maintenance, including, but not limited to, painting, channel “cleaning”, and scour-hole repair are either not anticipated, or were not evaluated in the BA or the addendum; therefore, maintenance is not evaluated in this Opinion, and any take due to maintenance activities is not covered by the incidental take statement in this Opinion.

After fully considering the direct and indirect effects of the proposed action, the Service believes that the northern riffleshell and clubshell will eventually recover to levels near their present levels within the action area. This conclusion is based upon the following factors: 1) the Allegheny River populations of the northern riffleshell and clubshell are intermittently distributed over several miles of the Allegheny River, including habitat immediately upstream and downstream of the project area; 2) recruitment has been documented for the northern riffleshell within the action area; 3) the most significant project-related river modifications are, for the most part, temporary; 4) PennDOT and FWHA will implement conservation measures to minimize impacts; and 5) there will probably be some long-term improvements in mussel habitat quality due to removal of the existing instream bridge piers, which appear to significantly constrain flow, and destabilize a large portion of the riverbed within of the action area.

V. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section, since they would require separate consultation pursuant to section 7 of the Act.

No cumulative effects are anticipated; therefore, none have been evaluated.

VI. CONCLUSION

After reviewing the current status of the clubshell and northern riffleshell, the environmental baseline for the action area, and the effects of the proposed Foxburg Bridge replacement project and the cumulative effects, it is the Service's biological opinion that replacement of the Foxburg Bridge, with implementation of the conservation measures (*i.e.*, commitments) proposed by PennDOT, is not likely to jeopardize the continued existence of the clubshell or the northern riffleshell. No critical habitat has been designated for these species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Federal Highway Administration so that they become binding conditions of any funding, permits, and/or approvals, as appropriate, issued to PennDOT for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA 1) fails to require PennDOT to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, authorization, or funding document; and/or 2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA or PennDOT must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(I)(3)].

AMOUNT OR EXTENT OF TAKE

The Service anticipates that clubshell and northern riffleshell will be taken during replacement of the Foxburg Bridge through direct mortality, injury, and stress. Take is predicted to occur within the footprint of the barge spuds, piers, the barge launch area, and cofferdams associated with the existing and new bridge; the demolition area of the existing bridge; in the vicinity of the bank abutments of the new and existing bridge; and in an area surrounding each of these features.

Direct mortality and injury will also occur outside the direct impact area due to sedimentation resulting from construction activities, scouring, and changes in hydrology related to the new bridge design.

Stress, short-term reproductive impairment, and limited mortality due to changes in hydrology, including ponding and scouring, are predicted to occur at least 150 feet upstream to 100 feet downstream of the centerline of the existing Foxburg Bridge. Stressors include low oxygen, decreased food and sperm availability in the water column, and increased silt and other sediment loading. The project will also result in loss or decreased suitability of mussel habitat due to ponding, sedimentation and scouring. These events could result in harm to adult clubshell and northern riffleshell, the glochidial life stage of these species, and populations of host fishes.

The Service anticipates that clubshell and northern riffleshell populations within the action area will recover to near their present levels. It is anticipated that post-project, much of the mussel habitat will be restored following removal of the construction materials and equipment, and that mussels will eventually recolonize the area.

The actual level of incidental take will be difficult to detect or quantify for the following reasons: 1) as indicated by the results of the mussel survey within the project action area, the northern riffleshell represents a small component of the mussel community; 2) the clubshell occurs in small, and possibly undetectable numbers; 3) individuals (juveniles and adults) of both species are small, and often buried in the substrate, making them difficult to locate; and 4) finding dead or injured specimens is unlikely.

Based on available information regarding project impacts, and species abundance and spatial distribution, however, the Service has estimated the level of expected take for the northern riffleshell. Implementation of the proposed project would be expected to result in the take of up to 65 northern riffleshell within the “direct effects area” (defined under Terms and Conditions, No. 2). Take within the direct effects area is expected to be in the form of mortality and harm.

The estimated take of the northern riffleshell within the action area of the proposed Foxburg Bridge replacement is based on the area anticipated to be directly affected by the proposed activities that also includes suitable mussel habitat. The anticipated area of suitable mussel habitat that the BA indicates will be directly affected by all proposed activities (*i.e.*, areas with a high probability of being subjected to actual substrate disturbance) is 8694 ft². The average population density of northern riffleshell, based upon the 48 excavated quadrat samples taken during the October 1998 mussel survey, is 0.9/ft² with a range 0.2/ft² to 7.1/ft². The estimated take of the northern riffleshell is expected to be about 65

individuals, but due to the wide range in confidence limits around this estimate, take may be as high as 534 individuals.

If a thorough survey and effective salvage attempt is conducted, this level of take should be reduced to 33 northern riffleshell, assuming 1) mussels visible at or residing within 10 cm of the substrate/water interface will be located and retrieved during the salvage attempt; 2) salvage of the northern riffleshell will be approximately 50 percent; and 3) captive holding mortality will not exceed 10 percent. However, some mortality, injury, and stress are also expected to occur from salvage activities. In addition, when handling northern riffleshell during salvage activities during the late summer, spontaneous abortion of glochidia may occur.

No density information is available for the clubshell at this site, and quantitative surveys failed to reveal its presence; therefore, the Service has not attempted to estimate a numerical level of take for this species. Accordingly, take for this species is defined as the loss of all clubshell within the direct effects area that are not retrieved during the salvage, plus any clubshell lost due to relocation-induced stress.

The numerical take levels listed above are intended to provide estimates of the level of take due to direct effects only, since the Service is unable to quantify the expected levels of take outside the direct effects area due to uncertainties regarding the extent of adverse effects expected (*e.g.*, hydrologic changes, scouring, and sedimentation). Any take that may occur outside the direct effects area is expected to be minimal and in the form of harm.

To further clarify and encompass all levels of take (direct and indirect), the Service is providing the following additional narrative criteria:

1. A maximum loss of 5 percent of mussel habitat within the direct effects area due to incomplete removal of project-related materials (*e.g.*, demolition debris) from the river following construction;
2. The spill or release of petroleum products or other hazardous substances into the Allegheny River during construction; and
3. The discharge of large amounts of sediment during construction, as defined by a noticeable sediment plume extending more than 200 feet downstream of the construction site and causeway.

If Nos. 2 or 3 of the above criteria occur, the FHWA shall immediately take remedial action(s), and contact the Service for recommendations and to determine if reinitiation of consultation will be required. If any of the above criteria are exceeded, the FHWA should initiate with the Service an evaluation to determine the cause. If evidence suggests that the cause was related to the construction activities, remediation and/or reinitiation of consultation may be required.

EFFECT OF THE TAKE

In the accompanying Biological Opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the clubshell or northern riffleshell.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of the clubshell (*Pleurobema clava*) and northern riffleshell (*Epioblasma torulosa rangiana*):

1. Implement the conservation measures described in the Biological Assessment, including those outlined under “Minimization Efforts” (Biological Assessment, pp. 19 and 20).
2. Prior to project construction, conduct mussel salvage in the direct effects area (defined under Terms and Conditions, No. 2), and relocate all native mussels encountered to a Service-approved captive holding facility designed to utilize up-to-date freshwater mussel husbandry techniques.
3. Implement the hydrologic study described under “Riverine Enhancement Commitment” (pp. 20 and 21, and Appendix D of the Biological Assessment).
4. Minimize the impact of bridge operation and maintenance on mussels and their habitat.

TERMS AND CONDITIONS

1. Implement the project modifications and commitments designed to minimize project-related hydrological and hydraulic impacts (*e.g.*, ponding and scouring) and other impacts (*e.g.*, presence of causeway rock material following construction) to *P. clava* and *E. t. rangiana* and their habitat, plus the following measures:
 - a. Evidence shall be provided to the Service that all equipment to be used in the Allegheny River (during construction or mussel relocation) has never been in zebra mussel-infested waters, or that equipment has been appropriately cleaned, disinfected, and inspected for zebra mussel adults and veligers, using accepted protocols.
 - b. Instream construction shall be completed in no more than two construction seasons.
 - c. Develop and implement a project erosion and sedimentation (E&S) control plan. This plan will address all sources of project-related erosion and sedimentation, including the causeway, any sedimentation basins on the causeway, construction access road, changes in roadway approaches, staging areas, pier and abutment removal and replacement, etc. This plan shall be submitted to the Service for review and approval at least three months prior to beginning construction activities.

- i. Best Management Practices for erosion and sedimentation control shall be in place before, during, and, as appropriate, after any work is conducted.
 - ii. PennDOT or FHWA will monitor the project site daily to ensure the E&S control practices are implemented, and to identify any project-related impacts from scouring or sedimentation.
 - iii. Contractors should be instructed on the importance of the natural resources in the project area and the need to ensure proper implementation of the required E&S control practices.
 - iv. Implement a penalty system for contractors that do not fully implement the E&S control plan.
 - v. Reports on implementation of these measures, and on evidence of scouring and sediment deposition, should be provided monthly to the Service. If it appears that scouring or sediment deposition is beyond that considered normal, the Service should be contacted promptly.
- d. Prevent hazardous materials (*e.g.*, petroleum products, solvents, paints, etc.) from entering the Allegheny River or contaminating soils or waters within the watershed. If a spill does occur, implement emergency remediation procedures to contain the spill and/or prevent the spill from entering the Allegheny River.
- i. Develop and implement a spill avoidance/remediation plan based on the most effective prevention and remediation practices. Such measures may include stationing of emergency response equipment at the project site, and designation of contained fueling and fuel storage areas away from the river. This plan should be submitted to the Service for review and approval at least three months prior to construction.
 - ii. PennDOT or FHWA will monitor the project site daily to ensure that spill avoidance practices are implemented.
 - iii. Contractors should be instructed on the importance of the natural resources in the project area and the need to ensure proper implementation of the required spill avoidance/remediation practices.
 - iv. Implement a penalty system for contractors that do not fully implement the spill avoidance/remediation plan.

- v. Monitor weather and river stages to allow removal of any hazardous materials from the causeway and the floodplain in the event that flooding is expected.
 - vi. The Service shall be notified immediately of any spills of hazardous materials.
2. To minimize take of endangered mussels in the direct effects area, a salvage effort will be conducted in the summer/fall season (*i.e.*, July thru September) prior to initiation of construction (excluding geotechnical drilling for the three eastern caisson locations). Salvaged *P. clava* and *E. t. rangiana* will be held in a suitable captive holding facility. We anticipate that the level of effort necessary to accomplish the salvage operation will be two teams of divers (two divers per team) conducting the salvage for three to five days.
- a. The direct effects area includes suitable mussel habitat most likely to be directly affected by construction and demolition activities. For the purposes of the salvage, the direct effects area includes suitable mussel habitat located within the area beneath the proposed bridge; the area under the existing bridge; a 75-foot buffer upstream and downstream of both the proposed and existing bridge; and the area anticipated to be affected by barge launching, plus a 20-foot buffer zone upstream, downstream, and lateral to the barge launch and staging area.
 - b. Prior to the salvage effort, the direct effects areas shall be clearly marked. Temporary and/or permanent marking shall be done in such a manner as to assist the salvage team. Bank and in-stream reference marking shall be done for the purposes of defining the direct effects area prior to the construction season.
 - c. Develop and implement a plan for mussel salvage from the direct effects area to an appropriate holding facility. The plan should include a protocol for maximizing the probability of finding the endangered mussels; a protocol for removing mussels from the substrate (*e.g.*, searching substrate to a depth of at least 7 cm); protocols for handling and holding mussels. All procedures and techniques will require Service approval through the Pennsylvania Ecological Services Field Office. The mussel salvage plan shall be submitted to the Service for approval at least six months prior to initiating any in-stream activities.
 - d. Salvage of mussels must be done only when the water temperature is above 55 degrees Fahrenheit and water clarity is good.
 - e. Approved, qualified personnel who are thoroughly briefed on the techniques to be used will perform the salvage of mussels. These personnel shall survey the direct effects area via diving, wading, and/or snorkeling, as appropriate. All endangered mussels located shall be collected by hand.

- f. Personnel conducting the salvage and holding of either *P. clava* or *E. t. rangiana* will need to obtain a federal threatened and endangered species permit, as well as a Scientific Collector's Permit from the Pennsylvania Fish and Boat Commission.
- g. While in holding, *P. clava* and *E. t. rangiana* shall be held using a Service-approved protocol that will maximize survival and minimize stress (*e.g.*, held in containers circulating river water to ensure appropriate and consistent water temperature and oxygen levels). Individual *P. clava* and *E. t. rangiana* shall be transferred to the holding facility within twelve hours of collection.
- h. Non-endangered mussels should be handled in such a manner as to increase their chances for survival.
- i. Any *P. clava* and *E. t. rangiana* accidentally killed, or that are moribund or freshly-dead and contain soft tissues, are to be preserved according to standard museum practices, properly identified or indexed (date of collection, complete scientific and common name, latitude and longitude of collection site, description of collection site), and submitted to a recognized museum or research facility (*e.g.*, USGS facility in Leetown, WV). The appropriate person at the selected repository institution should be contacted regarding proper specimen preservation and shipping procedures.
- j. The Service's Region 5 Division of Law Enforcement must be notified within 24 hours of any take that results in mortality of *P. clava* and *E. t. rangiana*. Notification must be made to the following Service offices at least two weeks prior to beginning in-stream salvage activities:
 - i. Service's Region 5 Division of Law Enforcement, 300 Westgate Center Drive, Hadley, MA 01035-9589 (telephone: 413-253-8343).
 - ii. Service's State College, Pennsylvania Field Office (Attn: Endangered Species Specialist), 315 South Allen Street, Suite 322, State College, PA 16801 (telephone: 814-234-4090).
- k. A report documenting the salvage effort shall be prepared and submitted to the Service's Pennsylvania Field Office and the Pennsylvania Fish and Boat Commission within three months of completion of the salvage. The report shall include an introduction, methods section, results section, conclusion and/or summary, and any relevant supplementary information (*e.g.*, names and qualifications of surveyors). The methods section should detail protocols used for surveying, holding, handling, and transporting mussels; and proposed husbandry conditions and methods of the proposed holding facility. The results section should include the total number of individuals of each mussel species collected; date collected; water and air temperatures; river stage; total number of live and dead *P. clava* and *E. t. rangiana* collected; condition,

size and approximate age of live *P. clava* and *E. t. rangiana*; data regarding non-endangered mussels; and maps or figures showing project features (causeway, old bridge, new bridge), and direct effects area. Annual reports of mussel survival will be made for the period of holding.

- l. FWHA and PennDOT are responsible for the cost of transferring and maintaining salvaged mussels at a Service-approved holding facility for 5 years to encompass construction and site recovery time in anticipation of reintroduction on-site or elsewhere. The ultimate fate of the captive held animals will not be the responsibility of FWHA or PennDot.
 - m. Salvaged mussels or their progeny will be returned to the Allegheny River at Foxburg if hydrologic studies indicate conditions are suitable, or to a Service approved alternate site, no more than 6 years after the initiation of bridge construction. Reintroduction will be accompanied by a mussel assessment of the reintroduction site immediately before, and 12 to 24 months after placement in the river to assess survival. The assessment will follow a Service approved methodology.
3. The proposed bridge design was, in part, selected to remediate damage to the benthic riverine habitat caused by the existing bridge, which restricts flow in this river reach. The proposed design significantly reduces the footprint in the river during construction and of the final structure compared to other pier designs used in Pennsylvania. PennDOT and FHWA propose to study the effectiveness of this design in achieving the suggested goals. To do this a study is proposed to model and document the changes to the hydrology and benthic habitat as a result of this bridge design. As outlined in the Biological Assessment and in Appendix D of the Biological Assessment, this study will include:
- a. Review existing data to determine what hydraulic data is available and what will need to be collected to provide baseline estimates of channel velocities, design discharge/stage, and channel cross-sections.
 - b. Flow conditions under various river discharges will be simulated utilizing acoustic Doppler current profiling (ADCP) data and hydraulic models.
 - c. Collect channel and hydraulic data at upstream and downstream reference sites at which mussel distributions are known (*e.g.*, West Hickory and East Brady, PA) and at the existing Foxburg Bridge crossing. Each site will include three cross-sections (1 each upstream, downstream, and at the existing bridge) to evaluate conditions in which mussel are either present or absent. Predictive hydrologic models and the analysis of water velocity measures (discharge, velocity, depth, width, and substrate size) will be combined to predict scour, and then related to the occurrence and distribution of mussels from existing data.

- d. A survey will be conducted to document channel orientation, and cross-sectional and longitudinal profiles using a Total Station and Global Positioning System (GPS).
 - e. Streambed fill and scour will be monitored to validate models and evaluate the potential changes to mussel habitat at Foxburg for three to six years after construction.
4. To monitor the effects of the action on *P. clava* and *E.t. rangiana*, and their habitat, a mussel and habitat survey will be conducted post-construction to determine the relative amount of suitable versus unsuitable habitat resulting from changed hydrologic and substrate conditions anticipated to result from placement of a different structure in the river.
- a. The survey will occur in the direct effects area, between three and five years post-construction, and will follow a Service-approved mussel sampling method to qualitatively assess mussel community composition and habitat conditions. We anticipate that the level of effort necessary to accomplish this assessment will be two teams of divers (two divers per team) conducting sampling for three to five days.
 - b. Surveys for mussels will be performed by approved, qualified personnel who are thoroughly briefed on the techniques to be used. These personnel shall survey the primary impact area via diving, wading, and/or snorkeling, as appropriate. All mussels located shall be identified to species, recorded, and replaced in the substrate.
 - c. Reports detailing survey methods and results shall be provided to the Service within six months after field work is completed.
5. Operation and maintenance of the Foxburg Bridge over the expected life of the project presents an ongoing potential effect on the northern riffleshell and clubshell. A plan should be developed to limit this effect.
- a. Use construction materials that require no paint, or implement painting techniques that prevent paint from entering the Allegheny River.
 - b. With local community leaders and Pennsylvania Department of Environmental Protection, develop a spill response plan for materials being transported across the Allegheny River.
 - c. Review alternatives for de-icing the roadway surface, and select materials that have minimal effects on aquatic biota.
 - d. Submit drainage control construction plans for Service review and concurrence, and implement structural designs (e.g., setting basins, permeable roadway surfaces) that remove silt and toxic material from the bridge before runoff enters the Allegheny River.

- e. Submit an operation and maintenance plan for the Foxburg Bridge to the Service for review and concurrence.
 - f. Consult with the Service prior to implementing any maintenance activities that may directly or indirectly affect mussels or their habitat (*e.g.*, bridge painting, scour-hole repair, pier and abutment work, etc.).
6. If the instream portion of the project is not completed by 2008, FWHA shall reinitiate section 7 consultation to evaluate project impacts on *P. clava* and *E. t. rangiana*, and to determine the appropriateness of the Reasonable and Prudent Measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service has identified the following actions, which, if undertaken by PennDOT and/or the FHWA, would further the conservation and assist in the recovery of *P. clava* and *E. t. rangiana*:

1. Produce a video or publication documenting the development of a bridge design and construction method that results in more ecologically favorable riverine conditions.
2. Facilitate development of a conservation plan for the northern riffleshell and clubshell in Pennsylvania among agencies carrying out activities that potentially affect the species.
3. Monitor the direct effects area at least twice during the 10 years following construction to determine species-specific rates of natural recolonization.
4. Support research to determine captive husbandry techniques suitable for propagation of *P. clava* and *E. t. rangiana*.
5. Within the Allegheny River watershed, implement and/or support projects that would improve water quality by reducing non-point source pollution. Such projects would include, but not be limited to, wetland preservation, wetland restoration, streambank fencing, and streambank restoration (via establishment of native plant species).

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the information presented with the Federal Highway Administration's September 20, 2001, request for initiation of formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law), and if 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. Note that failure to remove the existing bridge immediately following construction of the new bridge (*i.e.*, during the second construction season) would be an example of a significant project modification requiring reinitiation of consultation.

Date

Supervisor, Pennsylvania Field Office

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