

**ILLINOIS ROUTE 173 OVER  
NIPPERSINK CREEK  
McHENRY COUNTY**

**Incidental Take Submittal  
For the State Threatened Species  
Slippershell Mussel (*Alasmidonta viridis*)**

**Conservation Plan**

**1) Description of the Impact likely to result in the proposed taking**

**A) Introduction and Legal Description of Project Area**

The project is for the reconstruction of the Nippersink Creek Bridge (Structure No. 056-0029) located in McHenry County, approximately 1.50 miles west of the Village of Hebron. The bridge is located on Illinois Route 173 (IL Rt 173) in the southwest quarter of Section 18 of T46N, R17E at latitude 42.4626° N, longitude 88.4673° W. Nippersink Creek is a tributary to the Fox River (Illinois River drainage). A U.S.G.S. topographic map indicating the project location is attached.

The project is for the removal and replacement of the existing structure over Nippersink Creek. The bridge was constructed in 1931 and widened to its current size in 1975. The existing bridge is a two-span precast, prestressed concrete (P.P.C.) deck beam bridge with an abutment length of 75'-9<sup>5</sup>/<sub>8</sub>" NS and a total width of 41'-0". The substructure consists of two vertical high walls, reinforced concrete abutments, four reinforced concrete wing walls and one reinforced concrete solid wall pier. The existing structure has been widened once with the widened sections of the substructure being supported on piles and the original sections supported on spread footings.

The new structure will be on the existing alignment and will be a single span design with a superstructure consisting of 42" P.P.C. I-Beams, an 8" reinforced concrete deck, and standard F-shaped concrete parapets on each side of the bridge. The proposed structure has a back of abutment to back of abutment length of 77'-7" with an out to out width of 47'-2" and a clear roadway bridge width of 44'-0". The substructure will consist of integral abutments supported on H-piles with a rip-rap slope protection system.

The proposed scope of work calls for the complete replacement of the structure spanning Nippersink Creek. There is currently no slope protection in place at this bridge and the creek bed extends up to meet the west abutment. The east

abutment is located adjacent to an existing wetland. The pier falls partially within the limits of Nippersink Creek and the adjacent wetland. The project will include removal of the substructure elements and complete removal of the abutments. Possibilities for removal of the pier include complete removal, abandoning the pier in place, removing the pier to the water level, or removing the pier to the streambed. No channel excavation work is anticipated. It is possible that clean fill may be required to provide a temporary platform for cofferdam construction and substructure removal.

The project will result in minimal wetland impacts. Wetland Site #1 is located along the east bank of Nippersink Creek, south and north of IL Rt 173, and currently falls underneath span 2 of the existing bridge. The area of this wetland that will be impacted is approximately 0.083 acres. The wetland has a Floristic Quality Index (FQI) of 10.9 and a mean C value of 2.6, indicating a low quality wetland. The layout of the proposed new structure places the east abutment and the rip-rap embankment cone within this wetland.

The Illinois Environmental Protection Agency/Illinois Department of Natural Resources Biological Stream Characterization (BSC) Work Group rates Nippersink Creek as a Class B (highly valued aquatic resource) stream based on the stream's fishery and macroinvertebrate data. Nippersink Creek on the south side of IL Rt 173 is identified as a high habitat value wetland by the McHenry County Illinois Advanced Identification Study (ADID).

Surveys were conducted in Nippersink Creek by the Illinois Natural History Survey (INHS) on August 7, 2008; the INHS team examined a 150 meter stretch of the creek. INHS describes the Nippersink Creek in this vicinity as having an average width of 6-8 meters, with depths ranging from 0.1 to 0.7 meters. The substrate is predominantly silted sand with small patches of gravel and cobble in the riffles and firm sand/mud in the pools. Shallow riffle habitat was found at, immediately upstream, and immediately downstream of the bridge. A portion of the stream banks is tree-lined, while the rest is lined with grass.

The property located within the road and bridge right-of-way is owned by the Illinois Department of Transportation (IDOT).

Construction is planned to begin in the fall of 2010.

## **B) Biological Data on the Species**

The slippershell mussel (*Alasmidonta viridis*) was listed as a State Threatened Species in 1989. The slippershell inhabits small to medium sized streams, creeks, and river headwaters. It is usually found buried in sandy or gravel substrates in shallow water. It is a filter feeder and feeds on algae, zooplankton, and debris filtered from the water column. Suitable habitat for fish host species must be

present for successful reproduction. Distribution in Illinois has been reduced as a result of increased siltation, pollution, and channelization.

Host species for the slippershell mussel are the johnny darter (*Etheostoma nigrum*) and the mottled sculpin (*Cotus bairdi*) (Clarke 1981). The slippershell is probably a long-term breeder, internally holding the larvae for approximately one year (Oesch 1984). Once released, the larvae attach to the fish host species and remain for an unknown duration. Little else is known about the biology of the slippershell mussel.

A mussel survey was conducted in Nippersink Creek by the INHS on August 7, 2008. Fresh dead slippershell mussel shells were found at the project area, indicating an extant population in the vicinity of the bridge (INHS, August 19, 2008).

Habitat for the slippershell is sand, mud, or fine gravel (Cummings & Mayer, 1992), which is the type of substrate present at the IL Rt 173 bridge.

### **C) Description of the Activities That May Result in Taking**

The potential for take would come from activities associated with the construction of a new bridge over Nippersink Creek. These activities consist of the removal of the existing abutments, the potential removal of the existing bridge pier, the temporary installation of cofferdams from which the work will occur, and embankment work. It is possible that clean fill may be required to provide a temporary platform for the cofferdam construction and substructure removal.

### **D) Explanation of the Anticipated Adverse Effects on the Listed Species**

The anticipated adverse effects include:

- 1) Slippershell mussels may be crushed or entombed by equipment or piers.
- 2) Short term water quality impacts due to erosion and sedimentation during construction work.
- 3) Continuation of the existing potential for degradation of habitat associated with runoff and salt spray from the bridge deck.

## **2) Measures to Minimize and Mitigate the Impact**

### **A) Plans to minimize the area, estimated number of individuals that will be taken, and the amount of habitat affected.**

The INHS will conduct a mussel survey in 2010 prior to the work commencing. The INHS will relocate all mussels found within Nippersink Creek in the vicinity

of the project prior to work commencing. All species of mussels located in the vicinity, regardless of species, will be re-located to appropriate habitat. By relocating all mussels, INHS and IDOT believe that no individual slippershell mussels will be taken. Construction activity will be limited to approximately 100 meters upstream and downstream of the project.

During construction, the piers will be installed using cofferdams. The use of cofferdams will minimize any sedimentation that enters the water, thereby reducing water quality impacts and potential impacts to mussels.

No new structures will be constructed within the limits of Nippersink Creek because the new bridge is a single span design and does not require a pier within the creek.

Super silt fencing will be used adjacent to the road work. Super silt fencing consists of chain link fencing with silt fencing attached; the chain link fencing adds stability to the silt fencing. This use of super silt fencing will also reduce the amount of siltation that enters Nippersink Creek.

The measures discussed above will minimize the amount of habitat that is affected. Permanent loss of habitat is restricted to the areas adjacent to the abutments that will have riprap placed for scour protection.

**B) Plans for Management of the Area Affected That Will Enable the Continued Use of the Species**

Measures taken to minimize substrate disturbance should allow mussels to move back into the area over time.

The property and habitats of the area in question are under public and private ownership. The right-of-way associated with IL Rt 173 is owned by IDOT. The surrounding property is privately owned and managed. The private ownership of this property prevents IDOT from controlling the management of the property.

**C) Description of All Measures to be Implemented to Minimize or Mitigate the Effects on the Species**

Avoidance and minimization efforts were described in Section 2A above. No additional mitigation is proposed.

**D) Plans for Monitoring the Effects of Measures Implemented**

There are no current plans for monitoring Nippersink Creek. The slippershell mussel is very small and the efforts needed to find specimens would likely cause more damage to the habitat.

**E) Adaptive Management Practices That Will Be Used to Deal With the Changed or Unforeseen Circumstances That Affect the Effectiveness of Measures Instituted to Minimize or Mitigate the Effects of the Proposed Action on the Species.**

In addition to items described in Section 2A and 2C above, IDOT's Bureau of Design and Environmental Manual (2002); Landscape Design and Erosion Control criteria and Specification 280: Temporary Erosion Control will be used. The methodologies described in these documents utilize the latest techniques in sediment and erosion control design and implementation.

**F) Verification That Adequate Funding Exists to Support and Implement All Mitigation Activities Described In the Conservation Plan.**

This project is authorized by IDOT, which receives funding from Illinois General Assembly and the Federal government in carrying out its programs.

**3) A description of alternative actions the applicant considered that would not result in take and the reasons that each of those alternatives was not selected. (A "no-action" alternative shall be included in this description of alternatives.)**

Several alternative bridge designs were addressed in the early design stage. The bridge is currently in poor condition, with over 50% of the beams in need of replacement. The minimum scope of work that was considered for this structure was a superstructure replacement. However, based on IDOT Bureau of Design and Environment Manual standards, the current clear roadway bridge width of 40'-6" does not meet the minimum requirement of 44'-0" for new or reconstructed bridges for two lane highways on principal arterials. Also, the current roadway superelevation of 7.2% is greater than the 6% maximum which is standard for the existing roadway's design speed and functional class.

The bridge has already been widened once and currently has two different methods of support at the abutments and pier. Widening a structure more than once should be avoided. Additionally, a hydraulic analysis of existing conditions was performed and the analysis indicated that the current hydraulic clearance is 0.24 feet and freeboard is 0.40 feet. These values are below the minimum standards of 2'-0" for clearance and 3'-0" for freeboard. Also, a 1995 scour evaluation determined that the potential scour depth at the pier is significant (below the bottom of the spread footing of the original pier section) and as such the structure has been given a scour rating of 3 (Scour Critical).

The combination of the above deficiencies led to the recommendation for a complete replacement of the bridge. Several alternative bridge designs were addressed in the early design stage. The bridge design that was chosen was chosen for the fact that it resulted in the least amount of environmental impacts.

Relocation of IL Rt 173 for a crossing of Nippersink Creek at another location would not be practical or economically reasonable. Introducing a new stream crossing would result in more extensive environmental impacts.

The bridge is currently in poor condition, with over 50% of the beams in need of replacement. This results in exposing the traveling public to safety hazards. The No-Action alternative would result in the continuation of this unsafe condition.

**4) Data and information to indicate that the proposed taking will not reduce the likelihood of the survival in the wild, the biotic community of which the species is part of, or the habitat essential to the species' existence in Illinois.**

The project will have minimal impacts on the surrounding ecosystem. There will be no piers placed within Nippersink Creek. The existing pier will be removed, resulting in the restoration of mussel habitat where the pier currently exists. Impacts to adjacent wetlands will be minimal and will result in the loss of 0.083 acre of wetland; this small amount is not expected to cause an effect because sufficient wetlands remain to filter out salt spray and runoff associated with stormwater prior to discharging into Nippersink Creek. Additionally, all mussels will be relocated prior to the commencement of work in 2010. It is therefore anticipated that no take will occur. Temporary, short term water quality impacts will be minimized through the use of cofferdams and super silt fencing. No new long term ecosystem impacts will result because it is the replacement of an existing bridge and existing conditions will be maintained.

The range of the slippershell mussel within Illinois includes the northern two-thirds of the state. Because of this and the items discussed above, it is unlikely that the temporary and permanent corridor impacts to the Nippersink Creek will jeopardize the continued existence of the species in Illinois.

**5) An implementing agreement, which shall include, but not be limited to:**

**A. Names of all participants in the execution of the conservation plan.**

Kevin S. Cummings  
Curator of Mollusks  
Illinois Natural History Survey

Tom Brooks  
Biological Resource Unit Manager  
Illinois Department of Transportation

Susan Dees  
Biological Resources Specialist  
Illinois Department of Transportation

**B. The obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of activities in the conservation plan and a schedule for preparation of the progress report to be provided to the Department.**

The INHS will relocate all mussels from the Nippersink Creek project area in 2010, prior to the start of construction.

The IDOT is responsible for all biological clearance coordination and recommendations related to the project.

**C. Certification that each participant in the execution of the conservation plan has the legal authority to carry out their respective obligations and responsibilities under the conservation plan.**

The project is authorized by IDOT, which receives funding from the Illinois General Assembly and the Federal government in carrying out its programs.

**D. Assurances of compliance with all other federal, state, and local regulations pertinent to the proposed action and to execution of the conservation plans.**

IDOT abides by the National Environmental Policy Act and all associated state and federal environmental laws in carrying out its mission of performing the most environmentally sensitive methods of transportation planning and engineering.

**E. Copies of any federal authorizations for taking already issued to the applicant.**

The slippershell mussel is a state threatened species and is not a federally protected species. No federal authorization is required.

## **Literature Cited**

Clarke, A.H. 1981. The freshwater mollusks of Canada. National Museum of Natural Sciences. Ottawa. 439 pp.

Cummings, K.S., and C.A. Mayer. 1992. Field guide to freshwater mussels of the Midwest. Illinois Natural History Survey Manual 5. xiii + 194 pp.

Illinois Natural History Survey, July 23, 2008. Wetland Survey Report for FAP 303 (IL 173) at Nippersink Creek, McHenry County, Illinois, Job No. P91-206-08, Sequence No: 14505.

Illinois Natural History Survey, August 19, 2008. Freshwater mussel survey, Job No. P-91-206-08, (Seq. No. 14505), Structure No.: 056-0029; Section 132 B-1-1-1

Oesch, R.D. 1984. Missouri naiads: a guide to the mussels of Missouri. Conservation Commission of the State of Missouri. 270 pp.