



## United States Department of the Interior

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FEB - 9 2009

Mr. Terry Birkenstock  
Chief, Environmental and Economic Analysis Branch  
Department of the Army  
St. Paul District, Corps of Engineers  
Sibley Square at Mears Park  
190 Fifth Street East, Suite 401  
St. Paul, Minnesota 55101-1638

Dear Mr. Birkenstock:

Enclosed please find our final biological opinion regarding the impacts of the Capoli Slough Environmental Management Program Project, which would be implemented in Pool 9 of the Upper Mississippi River in Crawford County, Wisconsin. In our biological opinion, we have concluded that this project is not likely to jeopardize the continued existence of Higgins eye (*Lampsilis higginsii*) in accordance with Section 7 of the Endangered Species Act (Act) of 1973, as amended. The project is likely to result in the incidental take of Higgins eye. Therefore, the biological opinion includes Reasonable and Prudent Measures to minimize the impact of this take.

For further information regarding this biological opinion, please contact Mr. Gary Wege, of my office, at (612) 725-3548 extension 207.

Sincerely,

Tony Sullins  
Field Supervisor



United States Department of the Interior  
FISH AND WILDLIFE SERVICE  
Twin Cities Field Office  
4101 East 80<sup>th</sup> Street  
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## **BIOLOGICAL OPINION**

**Capoli Slough Habitat Rehabilitation and Enhancement Project  
Environmental Management Program  
Upper Mississippi River Pool 9**

**February 6, 2009**

**U.S. FISH AND WILDLIFE SERVICE  
TWIN CITIES FIELD OFFICE  
BLOOMINGTON, MINNESOTA**

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## **Introduction**

This document transmits the Fish and Wildlife Service's (Service) Biological Opinion (Opinion) based on our review of the Capoli Slough Environmental Management Program Project (EMP Habitat Rehabilitation Enhancement Project (HREP) in Pool 9 of the Upper Mississippi River located in Crawford County, Wisconsin (Fig. 1), and its effects on Higgins eye (*Lampsilis higginsii*) in accordance with Section 7 of the Endangered Species Act (Act) of 1973, as amended. Your request for formal consultation was received on October 1, 2008.

The Opinion is based on information provided in the September 29, 2008 Biological Assessment (Kelner 2008a), field investigations, and other sources of information. A complete administrative record of this consultation is on file at this office.

## **Consultation History**

In a letter dated 25 February 2008, the U.S. Army Corps of Engineers (Corps) initiated informal consultation with the U.S. Fish and Wildlife Service, Twin Cities Field Office (Service) pursuant to Section 7 of the Endangered Species Act regarding the proposed action. At that time, the Corps acknowledged the presence of the federally endangered Higgins eye within the project area based on recent mussel surveys and notified the Service that it would be preparing a Biological Assessment of the impacts of the proposed actions on Higgins eye. The Corps requested from the Service a list of any additional species within the project area that might need to be included in the Biological Assessment. In a letter dated 11 March 2008, the Service responded with a species list of federally protected species in the general area, and identified Higgins eye as the only listed, proposed, or candidate species that may be present within the proposed Capoli Slough HREP area.

The Service submitted a draft biological opinion to the Corps for their review on 31 December 2008. On 7 January 2009, the Corps provided comments to the Service on the draft; the Service then made minor corrections and changes to finalize the biological opinion.

## **BIOLOGICAL OPINION**

### **I. Description of the Proposed Action**

The following description is adapted from the Biological Assessment (Kelner 2008a:34).

The goal of the proposed Capoli Slough HREP is to improve habitat quality and diversity for waterfowl, fish, and other organisms by preventing the loss of the Capoli Slough island/wetland complex, restoring eroded islands to reduce wind fetch and diversifying water velocities. Island stabilization, island construction, riffle construction, and dredging would be major components of the project. Construction would be done in open water conditions (non-winter) primarily by hydraulic and mechanical dredging and placement of material by heavy equipment. Barges would transport equipment and material (rock, river bed sediment) to work sites. The planning study area covers about 787 acres (318 hectares).

The features presently being evaluated include the protection of 10 islands, construction of four new sand-based islands, construction of four large narrow rock-mound-based narrow islands, backwater deepening, and creation of wetlands. The Corps assumed that for access dredging, a bottom width of 80 feet and a depth of 6 feet would be required. All of the island and rock mound widths used to calculate footprint areas were based on similar features constructed for other EMP-HREP projects in the Corps' St. Paul District.

#### **A. Action Area**

The action area is defined as all areas to be affected directly or indirectly by the proposed Federal action.

The following description of the action area is adapted from the Biological Assessment (Kelner 2008a).

The proposed Capoli Slough HREP is located along the Wisconsin side of the Mississippi River main navigation channel in lower Pool 9 (UMR river miles 658.0 to 656.8), approximately 5 miles downstream of Lansing, Iowa and 9 miles upstream of Lock and Dam 9. Capoli Slough branches off the main channel and parallels it for about a mile before flowing easterly across the floodplain. The site lies within the Upper Mississippi River National Wildlife and Fish Refuge. The island features of the project total approximately 89 acres (36 hectares) within an overall planning study area that covers 787 acres (318 hectares).

## **B. Conservation Measures**

In response to the results of a 2007 mussel survey conducted in the action area (Kelner 2008b), the Corps minimized and realigned certain project features (island construction and dredging areas) most likely to affect Higgins eye and other native mussels (Kelner 2008a:30).

The action also includes post-project mussel surveys (Kelner 2008a:39):

Quantitative mussel surveys will be completed pre-project and 5 and 10 years post-project in the access channels and Capoli Slough secondary channel. A stratified random start sampling strategy will be used to develop population estimates for the access channels and the Capoli Slough secondary channel. A more detailed study design will be developed in cooperation with FWS and other resource agencies.

## **II. Status of the Species**

### **A. Species Description**

For a complete description of the species, see pp. 1-2 of the species' recovery plan (U.S. Fish and Wildlife Service 2004).

### **B. Life History**

#### **Reproduction**

Major aspects of the unionid reproductive cycle have been well described. Males release sperm into the water, often in packets, that is taken in through the incurrent siphon by the female. Fertilization occurs and zygotes are brooded in the water tubes of the gills by the female. Embryos develop into larvae (glochidia) that are released in various ways. In the genus *Lampsilis*, the edge of the mantle of the female develops into a ribbon-like flap in front of the branchial opening. This flap has been described as "minnow-like" in appearance, often having a dark "eye-spot," and thus it has been suggested to be important in attracting fish hosts. The glochidia attach to a fish host, where they remain for approximately three weeks (at water temperatures of 20-22°C) as they transform into juveniles. They then drop off their fish host, develop a byssal thread, which may assist in dispersal, and upon settling on suitable habitat, use the byssal thread as a means of attachment, to prevent being swept away in water currents. See the recovery plan (U.S. Fish and Wildlife Service 2004:81-82) for a complete list of fish species tested as potential fish hosts for Higgins eye.

Higgins eye spawn in the summer and larvae are retained in the marsupia through the winter until they are released the following spring/summer.

### **Habitat**

Higgins eye is a large river mussel species. Davis and Hart (1995) indicated that it was found in the more “riverine” portion of Upper Mississippi River Pool 7 and in the tailwater reaches of other Mississippi River navigation pools. Wilcox et al. (1993) proposed the following decision criteria for estimating the likelihood of occurrence of *L. higginsii*:

- Substrate: Substrate not firmly packed clay, flocculent silt, organic material, bedrock, concrete or unstable moving sand;
- Current velocity: Current velocities less than 1 m/s during periods of low discharge;
- Mussel relative abundance: If 2,000 or more mussels are sampled and no *L. higginsii* are found, then it is unlikely to be present;
- Density: Density of all mussels should exceed 10/m<sup>2</sup>, and any rare species (including *L. higginsii*) should occur at densities greater than 0.01 individuals/m<sup>2</sup>;
- Species Richness: Species richness (number of species) should exceed 15 when as few as 250 individuals have been collected.

Substrate stability may be important in determining the presence of freshwater mussel communities. It is the permanence of the populations in substrate that appears to be most important in constituting a mussel “bed.” At smaller spatial scales however, such as within mussel beds, substrate difference provided little predictive power (Holland-Bartels et al. 1990). Heath (1995) found no correlation between overall mussel density and substrate size in the Wisconsin River where *L. higginsii* was found. Hornbach et al. (1995) have indicated that substrate size does influence mussel density, although accounting for only a small proportion of the variability in mussel density. Mussels also apparently help to stabilize the substrate of the river in some areas.

Higgins eye has been found in various substrates from sand to boulders, but not in areas of unstable shifting coarse sands. Miller and Payne (1995:10) considered substratum that was free of plants and consisted of stable, gravelly sand as suitable for Higgins eye.

The distribution of mussels is at least partially mediated by the distribution of their host-fish. Therefore, the distribution of mussels in relation to wing dams and other habitat features may be influenced by the relative distribution of their

host fishes in relation to these features. Higgins eye is found in substrate that consists of coarse sand and gravel, but not in either finer (silt) or coarser (cobble) substrates. Cawley (1996) indicated that Higgins eye were most common in sand/gravel substrate. Higgins eye occurrence is not limited solely to areas where the river bottom is free of rooted plants. Divers have recently found significant numbers of Higgins eye in substrates with rooted plants in the “littoral areas of river channels” at Cassville, WI and Cordova, IL.

## **B. Status and Distribution**

The historical range of Higgins eye is not known with certainty. Although nowhere abundant, it is believed to have been widely distributed, inhabiting the Mississippi River from just north of St. Louis, Missouri to Minneapolis-St. Paul, Minnesota. It was also found in several UMR tributaries, including the Ohio, Illinois, Sangamon, Iowa, Cedar, Wapsipinicon, Rock, Wisconsin, Black, Minnesota, and St. Croix River (U.S. Fish and Wildlife Service 2004). The extent of the range of Higgins eye has been reduced approximately 53 percent from its historic distribution to a 302-mile reach of the Mississippi River (Havlik 1980) and is now found only in the UMR upstream of Canton, Missouri, in the St. Croix River between Wisconsin and Minnesota, the Wisconsin River, and in the lower Rock River in Illinois (U.S. Fish and Wildlife Service 2004). In addition, fish infested with Higgins eye glochidia have been released recently into the Iowa, Cedar, and Wapsipinicon Rivers in Iowa. Of these three rivers, biologists have found transformed juveniles only in the Wapsipinicon River (Wege et al. 2007).

U.S. Fish and Wildlife Service’s recovery plan for Higgins eye (U.S. Fish and Wildlife Service 2004) focuses on the recovery of the species within Essential Habitat Areas (EHA). In the plan, the Service described ten EHAs, but also noted that it intended to “assess other areas that may contain the features that indicate that they are of utmost importance for the conservation of Higgins eye.” Since then the Service has added four additional EHAs (U.S. Fish and Wildlife Service 2008).

To make a tangible contribution towards achieving the species recovery objectives, an EHA must:

- 1) contain a reproducing and self-sustaining population of Higgins eye;
- 2) contain a dense and diverse mussel community;
- 3) and, not be threatened by zebra mussels or other relevant factors (U.S. Fish and Wildlife Service 2004:vi-vii).

Although the 14 EHAs may represent the best of the sites currently inhabited by Higgins eye, zebra mussels have profoundly affected almost all of these sites. Zebra mussels are a significant threat to Higgins eye at all ten of the EHAs in the Upper Mississippi River and in two of the three EHAs in the St. Croix River

(U.S. Fish and Wildlife Service 2008). Only one EHA, in the St. Croix River near Franconia, Minnesota, is not currently inhabited by zebra mussels and otherwise would meet the recovery plan's EHA standards (see above). The one other EHA not inhabited by zebra mussels, in the Wisconsin River at Orion, Wisconsin, does not currently meet the EHA standards for mussel density and diversity.

### **III. Environmental Baseline**

Regulations implementing the Act (50 CFR §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area which have already undergone Section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultations in progress. Such actions include, but are not limited to, previous timber harvests and other land management activities.

The impoundment of the Mississippi River and the ongoing water level management and channel maintenance activities may be the most significant human actions that have affected the physical and biological features of the action area. The introduction of zebra mussels has also profoundly affected native mussel habitats in the action area. For a thorough description of the past and present impacts of Federal, State, or private actions and other human activities in the action area, see sections 3.1 (Capoli Slough), 3.3.7.2 (Water Quality), 3.3.7.4 (Water Level Regulation), 3.3.7.5 (Channel Maintenance), 3.3.7.6 (Commercial Navigation), and 3.3.7.7 (Nonindigenous Species) of the Biological Assessment (Kelner 2008a).

#### **A. Status of the Species in the Action Area**

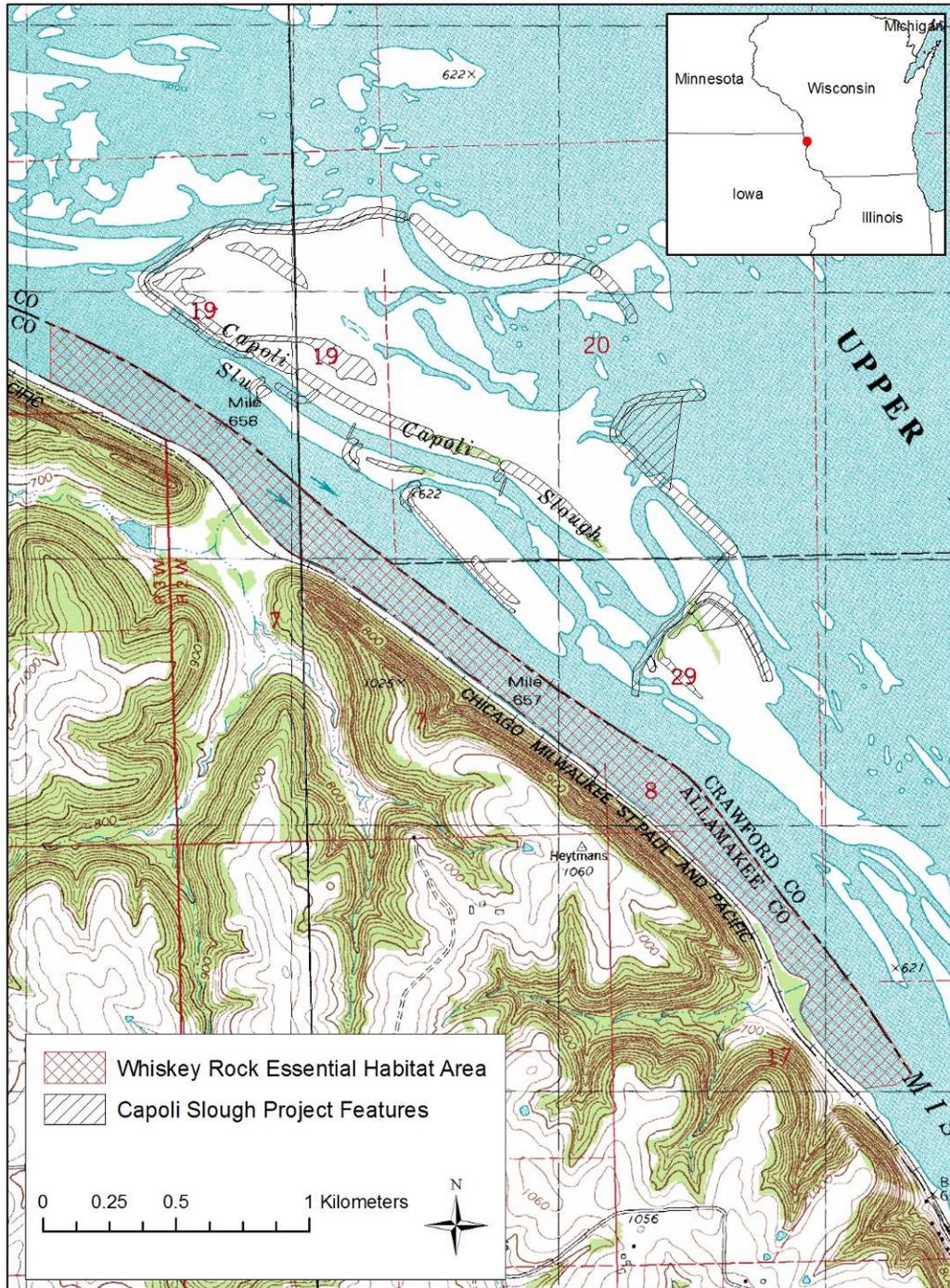
Kelner (2008a:26-29) summarizes the results of mussel surveys conducted in Capoli Slough and elsewhere in Pool 9. During the most recent survey – conducted in 2007 by the Wisconsin Department of Natural Resources – four Higgins eye were collected, but overall mussel density in the action area was low (about 1.2/m<sup>2</sup>). Mussels were most dense in areas where water depths ranged from 0.9 – 3.0 m and rooted vegetation was absent. Mussel surveys were also conducted in the action area in 1989, 1995, and 2002. During the 1995 survey two live Higgins eye were recorded – one within Capoli Slough and one along the main channel border (Kelner 2008a:27). No Higgins eye were recorded during the 1989 and 2002 surveys. The five Higgins eye collected within the project area during these four surveys were all collected from water greater than 1.5 m in depth.

The “Conclusions” section of the 2007 survey report (Kelner 2008b:5-6) succinctly describes the status of mussels, including Higgins eye, in the action area:

The majority of the Capoli Slough island complex area, the goal of which the proposed HREP is to protect, contains habitat not particularly conducive to mussels. Most areas of potential impact from island construction activities are shallow (<1m) often with aquatic vegetation present, and contain substrate consisting primarily of flocculent fine material (silt). As a result, mussels were either absent or rare throughout most of the island complex area sampled. Generally, within these areas where mussels were present, densities were very low (<1/m<sup>2</sup>), they tended to contain common species (i.e. *A. plicata*, *O. reflexa*, *L. cardium*) or species typically associated with such habitat conditions (i.e. *P. grandis*, *L. fragilis*). The likelihood of *L. higginsii* present within these areas is highly unlikely and there are expected to be no adverse impacts to mussels including *L. higginsii* throughout the majority of the project area.

However, there are a few areas that did support more abundant and species rich mussel assemblages including the federally endangered *L. higginsii* as well as other species listed for protection in Wisconsin. Within these areas (outlined on Figure 6), there is concern for potential impacts from island construction activities to mussels including *L. higginsii*. Typical of large rivers, these areas tended to be along channel borders in water depths >1.0m near or along slopes adjacent to the main channel, Capoli Slough proper, or along a remnant secondary channel adjacent to Island K (see Figure 6). Habitat within these areas was more riverine in nature with flow and substrate generally consisting of consolidated sand with vegetation either absent or sparse. Island construction activities within these areas and areas containing similar habitat conditions could potentially impact mussels including *L. higginsii* by burying, crushing or physical removal.

The Whiskey Rock Higgins Eye Essential Habitat Area (EHA) begins on the Iowa side of the main channel, directly across from the Capoli Slough project area (Fig. 1). The two areas are separated by 100-200 m of main channel habitat. The most recent survey conducted in this EHA (Farr 2004) indicates that mussel density may have been depressed by high densities of zebra mussels or other factors, although mussel diversity and Higgins eye relative abundance remains relatively robust. There may be some interchange of Higgins eye glochidia, attached to fish, between the Whiskey Rock EHA and the Capoli Slough project area.



**Figure 1. The Capoli Slough Environmental Management Program Project lies across the main channel of the Upper Mississippi River from the Whiskey Rock Higgins Eye Essential Habitat Area.**

## **B. Factors Affecting Species in the Action Area**

The factors affecting the species in the action area are primarily described above under “Environmental Baseline” in this Opinion and in the sections of the Biological Assessment (Kelner 2008a) referred to in that section.

## **IV. Effects of the Proposed Action**

### **A. Direct Effects**

Direct effects are defined as the direct or immediate effects of the action on the species or its habitat. Direct effects result from the agency action, including the effects of interrelated and interdependent actions.

We agree with the Corps in their assumption that Higgins eye are likely to be killed by dredging and island construction that take place “where other mussel species are abundant along the main channel border or secondary channel areas in water depths >3 feet (0.9 m) with sufficient flow and consolidated substrate” (Kelner 2008a:34). This type of habitat comprises about 4% of the project area – about 17,645 m<sup>2</sup> – and is broken up among 15 project features (Table 1, Kelner 2008a:36).

The Corps estimated Higgins eye abundance within each of these project features individually, summed these numbers, and concluded that installation of these project features would kill 86 Higgins eye (Kelner 2008a:36). This is based on the assumption that mussel density in these areas is about 1.2/m<sup>2</sup> – the mean mussel density found among samples collected in areas of varying habitat quality (i.e., vegetated and non-vegetated areas) within the project area. It may be more accurate to assume that mussel density in these areas reflects that found in portions of the project area with relatively good mussel habitat – i.e., areas with unvegetated substrates. In those areas, mean mussel density was 3.17 (Kelner 2008b:5). If Higgins eye comprises 0.4% of the mussel community (Kelner 2008b:8), then Higgins eye densities in these areas would be approximately 0.01/m<sup>2</sup> (i.e., 0.01 Higgins eye/m<sup>2</sup> \* 17,645 m<sup>2</sup>). Therefore, the project may kill about 176 Higgins eye during access dredging and during the construction of cobble liners, islands, a rock mound, and a closure (Table 1, Kelner 2008a:86). Dredging for access is likely to have the greatest proportional effect because it is more likely to occur in habitats occupied by Higgins eye (Kelner 2008a:29).

**Table 1. Sites/project features where incidental take of Higgins eye may occur (Kelner 2008a:36).**

Project Feature	Extent of Feature (m <sup>2</sup> )
Access Dredging A	1,776
Access Dredging B	2,577
Access Dredging C	1,189
Access Dredging D	3,487
Access Dredging E	603
Access Dredging F	1,742
Access Dredging G	707
Access Dredging H	4,167
Closure E	100
Cobble Liner A	375
Cobble Liner B	450
Island A	35
Island D	100
Island K	312
Rock Mound I	25
<b>Total Area</b>	<b>17,645</b>

## **B. Indirect Effects**

Indirect effects are caused by or result from the agency action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the immediate footprint of the project area, but would occur within the action area as defined.

In the Biological Assessment, the Corps predicts that the project might have a beneficial effect on Higgins eye within the action area by maintaining islands and secondary channels capable of flushing sediments (Kelner 2008a:35). This is a reasonable conclusion, but there is apparently little information on the long-term effects of this type of action on mussel habitats. Access dredging sites will not be maintained. Therefore, they may be recolonized by Higgins eye.

## **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 Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

We can think of no actions that will not be subject to future Section 7 consultation that would have a predictable impact on Higgins eye in the action area. The long-term effectiveness of the Capoli Slough project is likely to be

the primary human-caused factor influencing Higgins eye in the action area, in addition to those ongoing factors described in the Biological Assessment (Kelner 2008a) and in the Environmental Baseline section of this Opinion.

## **VI. Conclusion**

After reviewing the current status of Higgins eye, the environmental baseline for the action area, the effects of the proposed Capoli Slough Habitat Rehabilitation and Enhancement Project and the cumulative effects, it is the Service's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of Higgins eye. No critical habitat has been designated for this species; therefore, none will be affected.

The action is likely to kill some Higgins eye in the Capoli Slough project area – about 176; primarily in areas to be dredged for access. Effects to the local abundance of Higgins eye, however, may be temporary. The dredged areas are likely to retain the physical features (water flow and depth, substrate, etc.) that would allow for their post-project recolonization by Higgins eye and the project may generally improve and expand habitat for Higgins eye's fish hosts. In addition, overall mussel density and diversity in Capoli Slough indicate that it may be of only marginal importance in maintaining the rangewide abundance and distribution of Higgins eye. The reduction in Higgins eye density, although it may only be temporary, may decrease the transfer of glochidia by infested fish from the project area to the Whiskey Rock EHA, but we do not expect this to have a measurable impact on the viability of the Higgins eye population in the Whiskey Rock EHA. The action is unlikely to have any affect whatsoever on any of the thirteen other Higgins Eye Essential Habitat Areas.

## **VII. Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to Section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such activity. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent 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, and sheltering. Incidental take is defined as take incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), take incidental to and not an intended part of the agency action is not considered

prohibited taking under the Act, provided such take 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 Corps for the exemption in Section 7(o)(2) to apply. If the Corps fails to assume and implement the terms and conditions the protective coverage of Section 7(o)(2) may lapse. To monitor the impact of incidental take, the Corps 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)]

#### **A. Amount or Extent of Take Anticipated**

We relied on the following assumptions to estimate anticipated take. These are excerpted or adapted from Section 4 of the Biological Assessment (Kelner 2008a:34).

- 1) Higgins eye are not evenly distributed throughout the island complex but are restricted to where other mussel species are abundant along the main channel border or secondary channel areas in water depths greater than 3 feet with sufficient flow and consolidated substrate. These areas typically lack submersed and emergent vegetation.
- 2) Higgins eye are not present within some project areas that appear to meet the habitat requirements identified in Assumption 1, due to the scarcity of native mussels, absence of Higgins eye in mussel surveys, lack of adequate flow, and the predominance of silt and more flocculent substrate as determined from previous surveys. These areas include: eastern portion of Island K, Island K2, Island K3, Access Dredging K, Access Dredging J (see Figure 7 in Kelner 2008a).

Results from the most recent comprehensive mussel survey of the Capoli Slough island complex found a mean mussel density of 3.17/m<sup>2</sup> in non-vegetated areas, where Higgins eye are likely to be affected and Higgins eye comprised 0.4% of the entire mussel community. Therefore, Higgins eye density in these areas is about 0.01/m<sup>2</sup>. Subtracting the areas described under Assumption 2 from the areas described in Assumption 1, leaves a total of 17,645 m<sup>2</sup> distributed among 15 project features. This is the total area likely to be inhabited by Higgins eye and in which project activities are likely to kill mussels. We assume that all Higgins eye in these areas – about 176 – will be killed.

#### **B. Effect of the Take**

In the attached Opinion, we concluded that the anticipated incidental take would not jeopardize the continued existence of Higgins eye.

### **A. Reasonable and Prudent Measures**

The Service believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize take of species.

1. Develop and implement an Impact Minimization and Evaluation Plan for Higgins eye and other native mussels. The evaluation plan shall: 1) evaluate the assumption that Higgins eye and other native mussels will recolonize the dredged access channels, 2) evaluate both the feasibility of relocating Higgins eye and other native mussels from sites where take of Higgins eye is expected (Table 1) as well as the subsequent survival of any relocated mussels, and 3) evaluate the long-term impacts from the project on Higgins eye and other native mussels within the Capoli Slough secondary channel.
2. Monitor and report to the Service the actual extent (in square meters or acres) of access dredging and other activities that are expected to take Higgins eye (see Table 1) to ensure that anticipated take is not exceeded.

### **B. Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, the agency must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

- 1) Develop and implement an Impact Minimization and Evaluation Plan (Plan) for Higgins eye and other native mussels.
  - a) The Plan shall be developed in cooperation with the U.S. Fish and Wildlife Service, U.S. Geological Survey, Wisconsin Department of Natural Resources, Minnesota Department of Natural Resources, and Iowa Department of Natural Resources.
  - b) The Plan shall include an evaluation of the feasibility of relocating Higgins eye and other native mussels from selected project features (Table 1). Sites from which relocation of Higgins eye and other native mussels is feasible (i.e., may be implemented without altering the basic design, scope, or duration of the proposed action) should be identified along with their associated placement site(s) in Pool 9. Access channels where mussels are relocated should be evaluated as recolonization study sites.

- c) The sites/project features where Higgins eye may be present (Kelner 2008a:36) and that should be reviewed as part of this plan are described in Table 1 of the attached Opinion.
  - d) A draft Plan shall be provided to the Service for approval.
  - e) Implementation of the approved Plan shall commence prior to any construction within the 17,645 m<sup>2</sup> (4.3 acres) impact area where Higgins eye may occur in order to conduct pre-project mussel surveys in selected access channels and in the Capoli Slough secondary channel.
- 2) Monitor and report to the Service the areal extent (acres or square meters) of access dredging and other activities in the project areas where Higgins eye are expected to occur to ensure that anticipated take of Higgins eye is not exceeded.
- a) Upon initiation of activities that are expected to result in take of Higgins eye (access dredging, etc.) provide the Service with semiannual reports describing the actual (measured) areal extent of those activities.
  - b) This semi-annual reporting may conclude upon completion of the activities expected to result in take of Higgins eye, as described in Sections 2 and 4 of the Corps Biological Assessment (Kelner 2008a).
  - c) In each report, describe the activities that were completed in the previous six months that likely resulted in take of Higgins eye, the areal extent of those activities, and whether and by how much any activity exceeded the areal extent described in Table 1 of the attached Opinion and in Table 7 of the Biological Assessment (Kelner 2008a:36).

The Service believes that no more than 176 Higgins eye will be incidentally taken as a result of the proposed action. The estimate of take relies heavily on the actual extent of the project features likely to take Higgins eye. Therefore, the extent of those features and activities must be closely monitored by the Corps during construction. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

## **E. Reporting Requirements**

Federal agencies have a continuing duty to monitor the impacts of incidental take resulting from their activities [50 CFR 402.14(i)(3)]. In doing so, the Federal agency must report the progress of the action and its impact on the species to the Service as specified below.

Supply the Service with an annual report no later than January 31 each year that specifies:

1. The progress and results of implementing the Reasonable and Prudent Measures and their terms and conditions.
2. The location and number of any live and dead Higgins eye handled during mussel surveys or other activities identified by specific project, date and location including River Mile, and
3. The length, height, and if possible sex and age, of each Higgins eye handled during mussel surveys or other activities identified by specific project, date and location including River Mile.
4. The actual impact area of the Capoli Slough Project as project features are completed. Only those project features anticipated to take Higgins eye must be addressed in this part of the report (see Table 1).

This annual report shall be submitted to Field Supervisor, U.S. Fish and Wildlife Service, 4101 American Boulevard East, Bloomington, Minnesota, 55425-1665.

## **VIII. 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 adverse effects of a proposed action on listed species or critical habitat, to help implement recovery programs, or to develop information.

- Participate in the implementation of the Conservation Plan for Freshwater Mussels of the Upper Mississippi River System (Upper Mississippi River Conservation Committee 2004).
- Participate in public outreach efforts, in coordination with the Service and other resource agencies, as a means to disseminate information on life history and distribution of zebra mussels, the ecological importance of native mussels including Higgins eye, winged mapleleaf (*Quadrula*

*fragosa*), sheepnose (*Plethobasus cyphus*), spectaclecase (*Cumberlandia monodonta*), and snuffbox (*Epioblasma triquetra*), control measures to limit the spread of zebra mussels on the UMR and tributaries, and status of mussel propagation, relocation and other conservation efforts.

In order 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.

#### **IX. Reinitiation – Closing Statement**

This concludes formal consultation for the potential effects of the project on listed species. 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 maintained (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 that was 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.

## LITERATURE CITED

- Cawley, E. T. 1996. A compendium of reports of mussel studies containing *Lampsilis higginsii* from the period 1980-1996. Loras College, Dubuque, Iowa. 54 p.
- Davis, M., and R. Hart. 1995. Mussel habitat in the Richmond Island/Lock and Dam 6 tailwater area of Pool 7, Mississippi River, and its importance for recovery of the federally endangered mussel, *Lampsilis higginsii*. Unpublished report. Minnesota Department of Natural Resources, Lake City, MN. 34 p.
- Farr, M. D. 2004. Summary of results from 2004 UMR mussel survey. USACE-ERDC p.
- Havlik, M. E. 1980. The historic and present distribution of the endangered naiad mollusk *Lampsilis higginsii* (Lea, 1857). The Bulletin of the American Malacological Union 1980:19-22.
- Heath, D. J. 1995. A description of the Orion mussel aggregation of the Wisconsin River, Wisconsin with reference to *Lampsilis higginsii* (Lea, 1957) (Bivalvia: Unionidae). Wisconsin Department of Natural Resources, Prairie du Chien, WI. 21 p.
- Holland-Bartels, L., S. Littlejohn, and M. Huston 1990. Larval fishes of the upper Mississippi River. U.S. Department of the Interior.
- Hornbach, D. J., P. Baker, and T. Deneka. 1995. Abundance and distribution of the endangered mussel, *Lampsilis higginsii*, in the lower St. Croix River, Minnesota and Wisconsin. Macalester College, St. Paul, MN. 40 p.
- Kelner, D. 2008a. Final Biological Assessment of the Capoli Slough Habitat Rehabilitation and Enhancement Project Environmental Management Program Upper Mississippi River Pool 9. U.S. Army Corps of Engineers, St. Paul, MN. 21 p.
- Kelner, D. 2008b. Final report: Mussel survey - Upper Mississippi River Pool 9, Capoli Slough Habitat Rehabilitation and Enhancement Project. U.S. Army Corps of Engineers - St. Paul District, St. Paul, MN. 21 p.
- Miller, A. C., and B. S. Payne. 1995. The importance of a mussel bed near McMillan Island, Pool 10 of the Upper Mississippi River, for *Lampsilis higginsii*. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS. 23 p.
- U.S. Fish and Wildlife Service. 2004. Higgins eye pearlymussel (*Lampsilis higginsii*) recovery plan: First revision, Ft. Snelling, MN. 126 p.
- U.S. Fish and Wildlife Service. 2008. Higgins eye (*Lampsilis higginsii*) Essential Habitat Areas 2008 Review and Addition of New EHAs. U. S. Fish and Wildlife Service - Twin Cities Ecological Services Field Office, Bloomington, MN. 9 p.
- Wege, G., S. Oetker, R. Gordon, T. Brady, D. Anderson, D. Kelner, N. McVay, T. Newton, B. Karns, M. Davis, B. Sietman, D. Heath, S. Gritters, D. Sallee, and M. Hove. 2007. 2006 Status Report on the Accomplishments

of the Mussel Coordination Team (MCT). U.S. Fish and Wildlife Service, Bloomington, MN. 133 p.

Wilcox, D. B., D. D. Anderson, and A. C. Miller. 1993. Survey procedures and decision criteria for estimating the likelihood that *Lampsilis higginsii* is present in areas within the Upper Mississippi River system. Pages 163-167 in K. S. Cummings, A. C. Buchanan, and L. M. Koch, editors. Conservation and management of freshwater mussels.