Biological Opinion and Incidental Take Statement for Clubshell (*Pleurobema clava*), Northern Riffleshell (*Epioblasma torulosa rangiana*), Rabbitsfoot (*Quadrula cylindrica cylindrica*), Rayed bean (*Villosa fabalis*), and Snuffbox (*Epioblasma triquetra*) for the I-71 Bridge Replacement over Big Darby Creek, State and National Scenic River in Franklin County, Ohio.

Submitted to the Ohio Department of Transportation.

March 16, 2016

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INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service's) Biological Opinion (BO) based on our review of the FRA-71-0.00 (PID 93496) interstate improvement project and bridge replacement (FRA-71-0153L/R) over Big Darby Creek in Franklin County, Ohio. This document will discuss the effects that the proposed project will have on the federally listed clubshell (*Pleurobema clava*), northern riffleshell (*Epioblasma torulosa rangiana*), rabbitsfoot (*Quadrula cylindrica cylindrica*), rayed bean (*Villosa fabalis*), and snuffbox (*Epioblasma triquetra*) under section 7(a)(2) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The Service's Columbus Ohio Field Office (COFO) served as the lead Field Office for consultation on this project.

The FHWA determined that the FRA-71-0.00 bridge replacement project may affect and is likely to adversely affect the federally endangered clubshell, northern riffleshell, rayed bean, and snuffbox, and the federally threatened rabbitsfoot mussels. The request for formal consultation was received from the Federal Highway Administration (FHWA) on October 16, 2015, and formal consultation was initiated as of the date of that request, October 16, 2015. A Biological Assessment (BA) was enclosed with their letter. In a letter dated November 9, 2015 we indicated that the initiation package associated with the request for formal consultation was complete in accordance with 50 CFR §402.14.

Between the time of the submission of the BA by FHWA, and the completion of the BO, ODOT has assumed responsibility for NEPA compliance from FHWA. The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by ODOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 11, 2015, and executed by FHWA and ODOT. As such, the BO will be issued to ODOT, and ODOT will be responsible for carrying out all avoidance, minimization, conservation measures, reasonable and prudent measures, and the terms and conditions included within this document.

This BO is based on information provided in the BA, prepared on July 10, 2015; meetings (see consultation history below); available literature; communications with experts on the federally listed species considered in this BO; and other sources of information available to us and/or in our files. A complete administrative record of this consultation is on file at COFO.

CONSULTATION HISTORY

DATE	EVENT/ACTION
February 2014	ODOT sends email to the Service regarding the FRA-71-0.00 project regarding northern riffleshell presence and dead snuffbox mussels
February 2014	The Service sends response email to ODOT stating that the presence of northern riffleshell and snuffbox can be assumed and a survey was not necessary
August 2014	ODOT decided to look into replacement options for the Big Darby structure
January 2015	ODOT selected the preferred alternative for the Big Darby structure
May 2015	Level 2 Environmental Survey Report (ESR) submitted to ODOT-OES
July 2015	Agency coordination occurred
October 2015	FHWA submitted final BA and Level 2 ESR to the Service on October 16, 2015 and requested initiation of formal consultation
November 2015	The Service sent letter to FHWA notifying that formal consultation was initiated on October 16, 2015 and a complete initiation package was received.

Federally Listed Species Addressed in this Biological Opinion

The Service has also reviewed this project for adverse effects to the following listed species: **Indiana bat** (*Myotis sodalis*), **northern long-eared bat** (*Myotis septentrionalis*), and **Scioto madtom** (*Noturus trautmani)*. In a consultation letter dated July 6, 2015 ODOT determined that the proposed project may affect but is not likely to adversely affect the aforementioned species.

We understand from the information provided in the Level 2 Environmental Survey Report (ESR) that accompanied the BA that up to eight potential roost trees for the Indiana and northern long-eared bats may be impacted as a result of the project. Additionally, one capture record for the Indiana bat exists within five miles of the project site. The Service appreciates ODOT's willingness to implement seasonal clearing for all trees that may be impacted as a result of this project. Therefore, we concur with the determination that this project as proposed may affect but is not likely to adversely affect the Indiana and northern long-eared bats.

The project is within range of the Scioto madtom. All records for this species are restricted to Big Darby Creek in Pickaway County Ohio. ODOT has determined that potentially suitable habitat for this species occurs within the project area although no individuals have been found throughout its range in over fifty years. Considering the lack of records for this species within its range, the Service concurs that the project as proposed may affect but is not likely to adversely affect the Scioto madtom

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTION

The proposed project is sponsored by ODOT and the FHWA, and involves replacing the existing bridge with a two span bridge that will accommodate a third lane of the mainline I-71 in each direction (northbound and southbound). The new bridge will eliminate two larger hammer lead piers (located below the ordinary high-water mark (OHWM)) with one drilled shaft pier placed on the existing island above the OHWM resulting in a reduced footprint within the stream.

Because this project is a rehabilitation of an existing interstate, different alignment options are not being developed, as all alternatives utilize the existing horizontal alignment without need for realignment. The design profile will include full depth pavement which will closely follow the existing profile in most locations. At this time, it has been determined that no new right-of-way will be needed.

Activities associated with the proposed project include: 1) removal of the existing bridge superstructure using overhead cranes; 2) erecting work pads and cofferdams; 3) removal of existing piers and construction of new piers; 4) construction of new abutments; 5) inclusion of pipe culverts to maintain the required stream flow in conjunction with work pads; and 6) seasonal tree clearing in conjunction with clearing and grubbing.

Due to the direct and indirect effects that the proposed project will have on the federally endangered **clubshell**, **northern riffleshell**, **rayed bean**, and **snuffbox**, and the federally threatened **rabbitsfoot**, ODOT has submitted a BA for formal consultation under section 7 of the Act to address the matter. The remainder of this BO will address the potential impacts to the aforementioned species as a result of the proposed project.

Additional description of the project construction and demolition plans, erosion and sediment control plans, and construction sequence/schedule is as follows:

- The project is planned to begin July 2018.
- Proposed in-stream work dates will take place July 1 – November 30 for the duration of the project (pending approval from ODNR Scenic Rivers and National Park Service). The proposed dates will also follow ODOT's Construction Period timeframes of May 1 – November 30.
- A mussel salvage and relocation will be completed the field season prior to the initiation of construction (after July 1) by a federally permitted malacologist and in accordance with the most recent version of the Ohio Mussel Survey Protocol. *This will ensure that no more than one year will pass between the relocation and construction.*
- Potential increases in sediment/turbidity during and after construction will be minimized through the use of sediment and erosion controls in accordance with ODOT's Construction and Materials Specifications (2010), which conform to Ohio Environmental Protection Agency's (EPA's) National Pollutant Elimination Discharge System (NPDES) requirements for construction storm water management.
- Potential longer-duration water quality impacts associated with roadway runoff will be minimized through the implementation of post-construction Best Management Practices (BMPs) in accordance with the ODOT Location and Design Manual. Notes and estimated quantities have been included in the design plans to address erosion and sediment control.
- Appropriate seeding and re-vegetation will take place after completion of construction and removal of temporary work pads.

Clearing/Grubbing

Required tree clearing will occur during the Service's recommended seasonal clearing dates of October 1 – March 31. Mechanical removal of woody vegetation will not commence until all necessary sediment and erosion control structures have been installed. Other than the material used for the instream habitat, all other material will be disposed of above the OHWM of Big Darby Creek. No work, staging, storage, or access will occur outside the disturbance limits. Disturbed areas will be seeded and mulched as projects are completed.

Demobilization

At the end of the project all disturbed areas will be vegetated, all protective fencing will be removed, and all temporary sediment and erosion control structures will be removed when the vegetation has become established.

MUSSEL CONSERVATION MEASURES

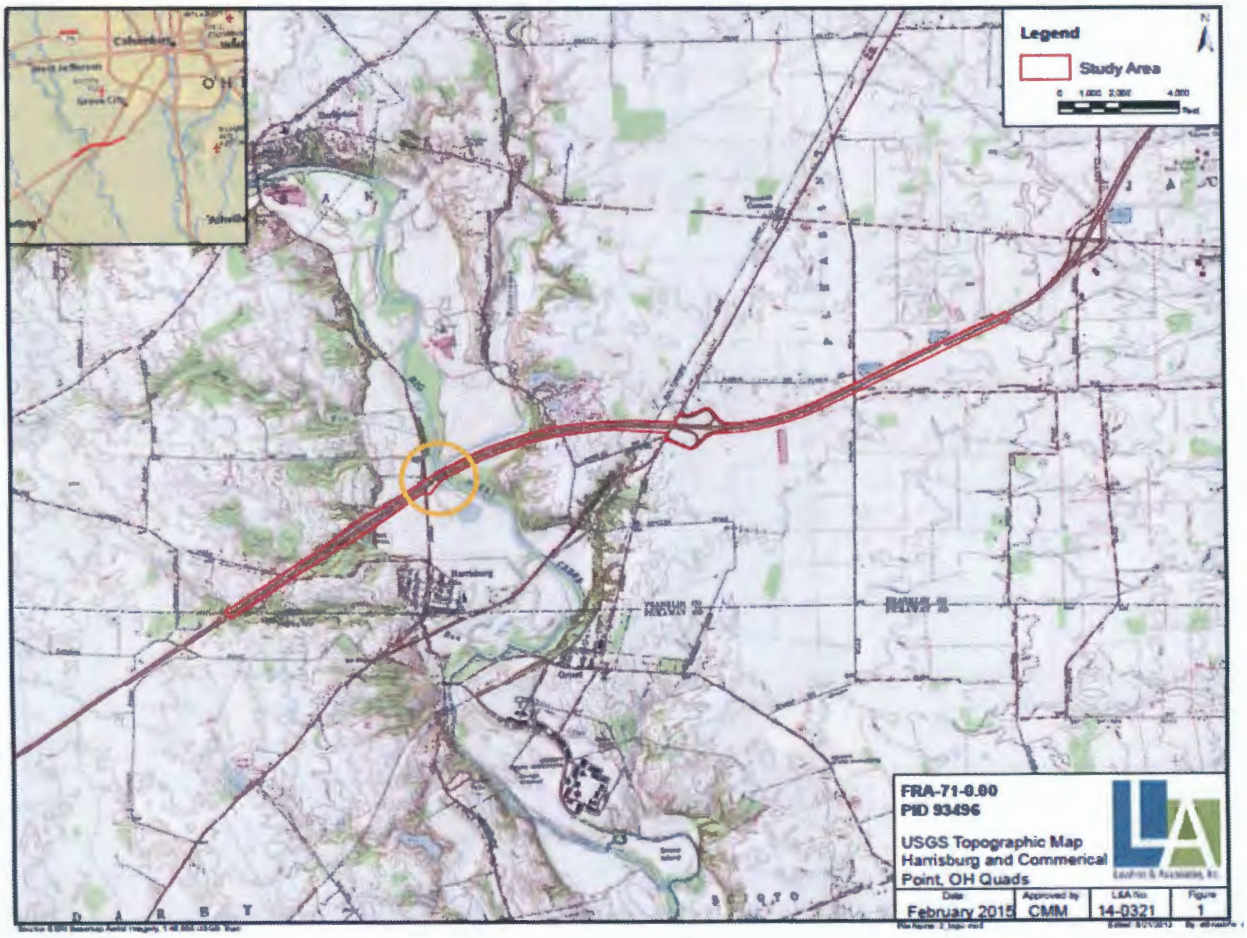
Proposed mussel conservation measures were included in the BA on pages 23 and 24. The Service recognizes that, individually and/or cumulatively, these mussel conservation measures contribute to the avoidance and minimization of adverse effects to impacted federally listed mussels but they do not necessarily eliminate all adverse effects that may result from the proposed action. These conservation measures are included below and by reference, with additional detail and minimization actions, in the "Reasonable and Prudent Measures" and "Terms and Conditions" sections of this BO. ODOT stated in the BA that the following conservation measures would be implemented as part of this project in order to avoid and/or minimize the effects of the proposed action on the five federally listed mussel species discussed in this BO.

Mussel Salvage and Relocation

Effects to the mussel community in the action area will be minimized to the extent practicable. A mussel salvage and relocation effort at this site will follow the Ohio Department of Natural Resources (ODNR) Division of Wildlife's and COFO's most recent version of the Ohio Mussel Survey Protocols.

All mussel species will be collected and placed into containers that allow for flowing river water and held temporarily while searches in a particular area are completed. The common mussels will be separated from any federally listed mussel and then relocated to an appropriate habitat upstream from the project. Federally listed mussel species will be recorded and tagged and then relocated to one or more appropriate areas upstream that has been investigated by a federally permitted malacologist and approved by the Service. A follow-up/survival survey will not be conducted.

Figure 1. Project Area



Sediment and Erosion Control Plan/Best Management Practices

Effects associated with erosion and sedimentation caused by project continuation and rock channel protection (RCP) placement will be minimized by implementation of erosion control BMPs and regular inspections and maintenance throughout the completion of the project and site restoration. Potential increases in sediment/turbidity during and after construction will be minimized through the use of sediment and erosion controls in accordance with ODOT's Construction and Materials Specifications (2016), which conform to Ohio EPA's NPDES requirements for construction storm-water management. Implementation of these BMPs will ensure minimization of effects to water quality by preventing adverse sedimentation effects to water quality and aquatic/terrestrial habitats in the action area.

PROPOSED ACTION ACTIVITIES

Replacement of the existing bridge over Big Darby Creek with a two span bridge that will accommodate a third lane of the mainline I-71 in each direction (northbound and southbound).

Action Area

In 50 CFR §402.02 "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 action area is not limited to the footprint of the action and should consider the effects to the environment resulting from the action. Within a set action area, all activities that can cause measurable or detectable changes in land, air, and water or to other measurable factors that may elicit a response in the species or critical habitat are considered. The action area is not defined by the range of the species that would be impacted; rather it is defined by the impacts to the environment that would elicit a response in the species (USFWS and NMFS, 1998). Therefore, the action area for this project includes all areas that may be directly or indirectly affected by project actions. Potential effects resulting from site preparation, construction, and ongoing use and maintenance were considered when defining the action area, which is comprised of the in-stream habitat potentially directly affected by project construction, as well as areas upstream and downstream of the project where indirect water quality impacts could potentially occur.

The proposed project area is located in Pleasant Township, Franklin County, Ohio. The majority of the proposed project is associated with the improvements to I-71 mainline and the proposed replacement of the FRA-71-0153 L/R structures. The action area is centered at the I-71 bridges (FRA-71-0153 L/R). The bridges will be widened to accommodate a third lane on I-71 and will be on virtually the same line and grade.

At the proposed bridge location, the river is approximately 255 ft. wide, has a normal water elevation of approximately 776 ft., and a typical water depth of approximately 2 to 5 ft. Flood stage for this point of the river is at 13 ft. At the project area, the river has a drainage area of 560 square miles (mi^2). Based on the National Land Cover Database (NLCD) (2011) mapping of a one mile radius (2,010 acres) surrounding the FRA-71-0.00 project study area, approximately 45% (903 acres) of the area is pasture/hay or row-crop. Additionally, approximately 33% (667 acres) of the area is forested and 18% (366 acres) of the area is developed land. A total of 36% (740 acres) of the area is undeveloped land.

This BO assesses effects to the aforementioned aquatic species. As such, all terrestrial habitats were excluded from the action area, with the exception of terrestrial areas immediately adjacent to waterways where actions may affect the aquatic environment (i.e., location of the bridge abutments). Abutments on either side of the bridge span will each permanently occupy a rectangular area of approximately 1040 ft^2 (each abutment is approximately 65 ft. long and 8ft. wide). Thus, terrestrial habitats included in the

project action area total 2400 ft² or 0.02 acres. The in-stream work pads will temporarily affect 0.15 acres of in-stream habitat.

II. STATUS OF THE SPECIES

This opinion covers the federally endangered **clubshell**, **northern riffleshell**, **rayed bean**, and **snuffbox**, and the federally threatened **rabbitsfoot**.

Species Description

Northern Riffleshell, Clubshell and Snuffbox

The northern riffleshell, clubshell and snuffbox are all small to medium sized mussels found in small to medium sized rivers with gravel, sand and mixed cobble substrates. These species can tolerate a variety of flow regimes but typically prefer the currents of riffles and shoals. All three species were historically known to occur in most of the Ohio River basin tributaries but have declined in numbers throughout these tributaries leaving only limited populations in areas with limited suitable habitat (USFWS, 2008).

Northern riffleshell have a sculpture-less shell except for weak radiating striae located on the posterior slope; the annular growth lines become particularly prominent on the marsupial swelling, giving it an undulating aspect. The periostracum is greenish-yellow to tan, with numerous radiating, darker green rays. Rare individuals have been found in the Big Darby Creek that appear to have had rose or orange colored shells (Watters, 2009). In Ohio, northern riffleshell are currently considered to be extant in five streams, including Big Darby Creek (Boyer, pers. comm. 2016).

Clubshell have a thick triangular shaped shell that is moderately inflated. The shell has no sculpture except for growth lines, but may have a sulcus in some individuals. The periostracum is tan, yellowish or greenish and becomes darker with age. Younger mussels may have green rays that will sometimes disappear as an adult (Watters et al., 2009). In Ohio, clubshell are currently considered to be extant in 10 streams, including Big Darby Creek (Boyer, pers. comm. 2016).

Snuffbox are somewhat oblong (ovate males and triangular females). Beak sculpture consists of three or four faint, double-looped bars. The anterior end of the shell is rounded and the posterior end is truncated (more so in females). The posterior ridge is prominent, being high and rounded, while the posterior slope is widely flattened. The ventral margin is slightly rounded in males and nearly straight for females. The periostracum is generally smooth and yellowish or yellowish green in young individuals, becoming darker with age (USFWS, 2012). In Ohio, snuffbox are currently considered to be extant in 13 streams, including Big Darby Creek (Boyer, pers. comm. 2016)

Rayed bean

The rayed bean is a small mussel, usually less than 1.5 inches (in) 3.8 centimeters (cm) in length (Cummings and Mayer, 1992; Parmalee and Bogan, 1998; West et al., 2000). Once occurring in 112 streams, lakes and canals in 10 different North American states and Ontario, Canada, today the mussel is only known to occur in 34 streams and 1 lake (Boyer, pers. comm. 2016). The shell outline is elongate or ovate in males and elliptical in females, and moderately inflated in both sexes, but more so in females (Parmalee and Bogan, 1998). The valves are thick and solid. The anterior end is rounded in females and bluntly pointed in males (Cummings and Mayer, 1992). Females are generally smaller than males (Parmalee and Bogan, 1998). Dorsally, the shell margin is straight, while the ventral margin is straight to slightly curved (Cummings and Mayer, 1992). The beaks are slightly elevated above the hingeline (West et al., 2000), with sculpture consisting of double loops with some nodules (Parmalee and Bogan, 1998).

No posterior ridge is evident. Surface texture is smooth and sub-shiny, and green, yellowish-green, or brown in color, with numerous, wavy, dark-green rays of various widths (sometimes obscure in older, blackened specimens) (Cummings and Mayer, 1992; West et al., 2000). In Ohio, it is currently only known to occur in 11 streams including Big Darby Creek (USFWS, 2012).

Rabbitsfoot

The rabbitsfoot is a medium to fairly large mussel, up to 130 mm in length. Historically it was known to occur in 51 rivers and creeks in 13 states; however, its current range is fragmented due to loss and degradation of stream and river habitat resulting in population decline. It has a thick elongated shell, squared off posteriorly and rounded anteriorly. It has a broad, low umbo with irregular chevron ridge sculpture that continues across a weak sulcus. These are usually nodulose and particular posteriorly. The periostracum is a base color of greenish or yellowish, overlain with abundant green, inverted tent-shaped markings, some being large and others less prominent (USFWS, 2013). In Ohio, it is currently only known to occur in five streams including Big Darby Creek (USFWS, 2013).

Life History

The general biology of bivalve mollusks belonging to the family Unionidae are similar. Adults are suspension-feeders, spending their entire lives partially or completely buried within the substrate (Murray and Leonard, 1962). Adults feed on algae, bacteria, detritus, microscopic animals, and dissolved organic material (Silverman et al., 1997; Nichols and Garling, 2000; Christian et al., 2004; Strayer et al., 2004). Their life cycle includes a brief, obligatory parasitic stage on fish. Eggs develop into microscopic larvae called glochidia within special gill chambers of the female mussel. The female expels the mature glochidia, which must attach to the gills or the fins of an appropriate fish host to complete development. Host fish specificity varies among unionids. Some species appear to use a single host, while others can transform on several host species. Following successful infestation, glochidia encyst (enclose in a cyst-like structure) and drop off as newly transformed juveniles. Most mussels have separate sexes. The age at sexual maturity is highly variable (0–9 years) among and within different species (Haag and Staton, 2003), and may be sex-dependent (Smith, 1979).

Population dynamics, variability and stability

The aforementioned mussels have declined significantly range-wide and in Ohio. These species have also been eliminated from long reaches of former habitat due to loss and degradation of stream and river habitat due to impoundments, channelization, chemical contaminants, mining, oil and natural gas development, and sedimentation. (USFWS, 1994, 2008, 2012, 2013). Impoundmentsand physical barriers alter the flow regimes typically resulting in the formation of a reservoir behind the impoundment and a restricted flow downstream of the impoundment structure. The impoundments' effect on flow velocity drastically alters the benthic substrate composition in the aquatic habitat. Additionally, impoundments restrict the movement and migration of potential host species which can isolate mussel populations. All of the mussels mentioned in this BO have declined in numbers throughout their range leaving only limited populations in fragmented areas and/or tributaries offering limited suitable habitat.

Results from surveys conducted by John Tetzloff in Big Darby Creek (RM 24.7-25.3, 2000-2001 and 2004-2006) revealed a diverse community of mussel species including one live snuffbox recorded in 2006. Additionally, weathered dead shells of clubshell, northern riffleshell, rabbitsfoot, and rayed bean were recorded during the surveys throughout the timeframes associated with these survey efforts.

In 2009 Dr. Hoggarth surveyed upstream of the Hellbranch Run, a branch of Big Darby Creek. A total of 118 living mussels were found representing 17 different species. At this time no federally listed species live or dead were found.

During a Phase 1 and Phase 2 mussel survey performed by EnviroScience in 2012 for the FRA-62 bridge project, fresh dead shells of the federally endangered snuffbox mussel were found downstream from the bridge suggesting that living individuals of this species may be present in the stream. Additionally it is noted that a diverse mussel community is distributed within the examined stream reach. Although the streambed presented poor mussel habitat, the occurrence of a diverse mussel community suggests that it is possible for federally listed mussel species to be present in other areas of the stream.

In 2015 Enviroscience conducted a survey 200 feet upstream from Hellbranch Run. No live or dead federally listed species were found as a result of the survey effort.

Although the clubshell, northern riffleshell, rabbitsfoot, rayed bean and snuffbox were quite common in Big Darby Creek historically, they are now all fairly rare within this drainage. The most common of these species is the northern riffleshell and clubshell since these species were recently augmented within Big Darby Creek in several Columbus and Franklin County Metro Parks. Approximately 11,680 northern riffleshell and 6,700 clubshell have been placed in Big Darby Creek, with the majority of the release sites occurring upstream of the I-71 bridge. Therefore, it is assumed that some northern riffleshell and clubshell have migrated downstream and now occur within the project area. In addition, natural reproduction of these augmented individuals has likely occurred, further increasing their numbers and distribution in the vicinity of the I-71 bridge.

Status and Distribution

Reasons for listing

The aforementioned species have been greatly reduced or eliminated from approximately half of the streams where they historically occurred. Furthermore, extant populations of these species, with few exceptions, are highly fragmented and restricted to short reaches and/or tributaries offering limited suitable habitat. The primary cause of range curtailment for these species has been modification and destruction of river and stream habitats, primarily by the construction of impoundments (USFWS, 2012).

Range-wide trend

The majority of the remaining populations of these species are generally small and can be geographically isolated (Butler, 2002). The patchy distributional pattern of these mussel populations throughout Ohio makes them much more susceptible to extirpation from single catastrophic events, such as toxic chemical spills (Watters and Dunn, 1993–94). Furthermore, this level of isolation makes natural repopulation of any vulnerable or extirpated population virtually impossible without human intervention.

New threats

The zebra mussel, an exotic species that colonizes the shells of native mussels, is a relatively new threat. It is present in many watersheds in Ohio and has been observed attached to native mussels. It can restrict the ability of a mussel to move, feed, respire, and reproduce, especially if large numbers are present on the shell of the native mussel. However, no zebra mussels were identified in Big Darby Creek during the 2014-2015 mussel surveys.

Analysis of the Species Likely to be Affected

This BO considers the federally endangered **clubshell**, **northern riffleshell**, **rayed bean**, and **snuffbox**, and the federally threatened **rabbitsfoot**.

III. ENVIRONMENTAL BASELINE

Status of the Species within the Action Area

Twenty-five (25) species of mussels have been reported in a mussel survey conducted approximately 0.8 miles downstream of the I-71 bridge. This survey was conducted by EnviroScience, Inc. (2012) for the FRA-62-(0.32) (0.49) project (EnviroScience, Inc. 2012 and 2014-2015). In addition, we considered the results from mussel surveys conducted by Tom Watters (1990 and 1998) at various locations within Big Darby Creek upstream and downstream of the I-71 bridge, results from John Tetzloff surveys in Big Darby Creek (2000-2001, 2004-2006 and 2015), and Michael Hoggarth's 2009 mussel survey of Big Darby Creek upstream of Hellbranch Run (Hoggarth, 2009).

One (1) federally endangered species (snuffbox) was recorded during the FRA-62-(0.32) (0.49) survey. Three (3) dead snuffbox shells were recorded in the FRA-62-(0.32) (0.49) mussel survey. In addition, sub-fossils of the endangered clubshell (*Pleurobema clava*) and threatened rabbitsfoot (*Quadrula cylindrica cylindrica*) were also recorded during this survey.

No critical habitat has been designated for the clubshell, northern riffleshell, rayed bean, or snuffbox. For the rabbitsfoot, the Service has designated critical habitat in 31 areas where the mussel is found, comprising approximately 1,437 river miles in Alabama, Arkansas, Indiana, Illinois, Kansas, Kentucky, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania and Tennessee. However, there is no designated critical habitat for the rabbitsfoot in the action area.

Efforts to increase the population of northern riffleshell and clubshell mussels in Big Darby Creek have been ongoing since 2006. This effort started with the placement of a cage in the creek that contained infected fish (fish infested with glochidia) that would eventually drop off of the host fish as juvenile mussels. In 2008 the first adult northern riffleshell translocation took place and in 2013 clubshell was added to the translocation effort. Translocation for both species has continued through 2015. This effort is made possible through the many partnerships occurring within central Ohio between the Ohio State University, the Service and multiple other partner volunteers.

Factors Affecting Species Environment within the Action Area

The watershed of Big Darby Creek is 560 square miles in area, the main stem of the creek runs from north to south for a total distance of 88 miles. Based on the NLCD (2011) mapping of a one mile radius (2010 acres) surrounding the FRA-71-0.00 project study area, approximately 45% (903 acres) of the area is pasture/hay or row-crop. Additionally approximately 33% (667 acres) of the area is forested and 18% (366 acres) of the area is developed land. A total of 36% (740 acres) of the area is undeveloped land. In general, agriculture is probably the greatest source of impairment of Big Darby Creek near the project study area. Development issues related to storm and construction runoff, septic and sewer, and infrastructure improvements are also issues near population areas near the project study area.

IV. EFFECTS OF THE ACTION

Analysis for Effects of the Action

Quantifying incidental take for freshwater mussels is problematic in nature. Mussels are typically buried beneath substrates making location and estimation of their population densities difficult. Even when found, mussels are likely present in larger numbers than discovered.

Beneficial effects:

Some beneficial effects have been identified or are expected to occur as a result of the proposed action. The newly constructed bridge will remain on the same alignment and have no additional piers installed below the OHWM. The new piers will be constructed on the existing gravel bar island located within Big Darby Creek. This island is well established and has been mapped historically in this area. The old in-stream piers will be removed and the areas of scour behind the existing piers will likely become more stable and offer better habitat for mussels and other aquatic fauna. The removal of the piers will also decrease the need for in-water maintenance during the life of the structure, such as removing logjams, pier patching, placement of RCP around the pier, etc. This will minimize potential future impacts to mussels in this location and is generally considered a positive change for overall river morphology.

Direct effects:

Construction of the bridge could directly affect federally listed mussels in a variety of ways. Mussels could be crushed by the placement of temporary access fills and cofferdams; they may become stranded on substrate through increased turbidity or become entrapped in substrate during construction, and mussels will be harassed during collection and relocation efforts. The portion of the action area in which potential direct effects to mussels will occur include the temporary workpad, and cofferdam as described in previous sections. Therefore, the total area of potential direct effects is 66,646 ft^2, or 1.53 acres.

All mussel species will be collected in accordance with the Ohio Mussel Survey Protocols and placed into containers that allow for flowing river water and held temporarily while searches in a particular area are completed. The non-listed mussels will be separated from any federally listed mussel and then relocated to an appropriate riffle upstream from the project. Federally listed mussels will be recorded and tagged and then relocated to one or more appropriate areas upstream of the project as determined by the Service.

The mussel salvage and relocation will reduce direct impacts to individual mussels. However, it is unlikely that every individual will be successfully located. Mussels may be overlooked, especially juvenile mussels and some mussels that have burrowed into the substrate.

We are unable to quantify the number of mussels that may be overlooked and become stranded or entrapped in the substrate. With successful implementation of the Mussel Salvage and Relocation Plan, we expect the number of individuals missed to be low.

Indirect effects:

Indirect effects to listed mussel species are those effects that are caused by or will result from the proposed action and are later in time but are still reasonably certain to occur.

Indirect impacts to mussels may occur when in-stream habitat is affected by increased turbidity, siltation, and sedimentation. The amount of affected area and severity of effects will be dependent upon rainfall, water flow, and other parameters such as amount of organic detritus along the shoreline and in the water,

underlying soil types or bed sediments, and the potential for decreased reproduction and recruitment due to increased sedimentation/turbidity resulting in low visibility for glochidia release during breeding season. In-stream effects will be minimized through use of BMPs and by avoiding construction during times of heavy water flow. Downstream effects are expected to be limited, and are likely to be restricted to the immediate vicinity of current construction activities. Because the indirect effects of construction/demolition on mussels are extremely complex and hard to quantify, they are not specifically delineated. The portion of the action area in which potential indirect effects to mussels will occur includes both the area of potential direct effects and in-stream habitat within 500 ft^2 of the construction area. The total area of potential indirect effects is therefore 91,911 ft^2, or 2.11 acres, making up an action area totaling 158,558 ft^2 or 3.64 acres.

Species Response to Proposed Action

Numbers of individuals/populations in the action area affected:
For the purposes of this BO and to cover any potential incidental take, we estimate that direct impacts will occur within 66,646 ft^2, or 1.53 acres of the action area. The most recent surveys to have been completed within Big Darby Creek were performed by EnviroScience (2014-2015) and John Tetzloff (2015). Forty sites were surveyed with each site being approximately 538 ft^2 in length within Big Darby Creek. These recent surveys will be used to estimate any potential incidental take that will occur as a result of the project. The combined results of the 2 surveys conclude that the total number of northern riffleshell found were **20** individuals including **3** fresh dead, **10** weathered dead and **7** live mussels. The total number of snuffbox found were **12** individuals including **1** fresh dead, **8** weathered dead and **3** live mussels. The total number of clubshell found were **19** individuals including **1** fresh dead, **8** weathered dead and **10** live mussels. Only one **1** weathered dead rayed bean was found and no rabbitsfoot were found within the surveyed reaches. Direct effects to mussels include the potential to be crushed resulting in injury or death; they may become stranded on substrate or become entrapped in substrate. Direct effects also include harassment from the salvage and relocation effort. Potential indirect effects include increased sedimentation/turbidity (increased bedload), chemical exposure due to an accidental fuel spill or other toxic material release, scour, increased roadway pollutants, decreased reproduction and recruitment due to increased sedimentation/turbidity resulting in low visibility for glochidia release during breeding season, and stress from relocation. The portion of the action area in which potential indirect effects to mussels will occur includes both the area of potential direct effects and in-stream habitat within 500 ft^2 of the construction area. The total area of potential indirect effects is therefore 91,911 ft^2, or 2.11 acres, making up an action area totaling 158,558 ft^2 or 3.64 acres. Based on the aforementioned 2014-2015 surveys, there is an estimated density of **2** northern riffleshell, **2** snuffbox and **2** clubshell expected to occur every 538 ft^2. There is an estimated density of **1** rayed bean and **1** rabbitsfoot expected to occur every 7,173 ft^2. Therefore, we have estimated that **60** northern riffleshell, **36** snuffbox, **57** clubshell, **3** rabbitsfoot and **3** rayed bean mussels may be taken. In addition, direct effects may result in the temporary loss of **66,646 ft^2** of habitat.

Sensitivity to change:
The degree to which different mussel species are prone to change when disturbed is unknown. Most mussels are thought to be relatively sedentary within the substrate. As a result, they are likely unable to respond to change by moving great distances; however, it is possible that mussels could move several meters. When disturbed, mussels, in general, tend to close their valves for a period of time; however, this response will vary depending on the disturbance. Mussels exposed to disturbance events will likely close their valves when disturbed and remain closed if continued to be disturbed. They are not likely to move out of the disturbed area on their own because of their inability to move great distances in a short period of time and because their valves will likely remain closed preventing extension of their foot for movement.

Resilience:
Resilience relates to the characteristics of populations or a species that allow them to recover from different magnitudes of disturbance. Assuming that the flow characteristics and habitat conditions in the action area will be improved over time and the magnitude of disturbance is expected to be low, resilience is not expected to decrease from its current level. Mussels can bury themselves or attempt to move toward water.

Recovery rate:
In this BO, the recovery rate relates to the time required for an individual mussel or population to return to equilibrium after exposure to a disturbance. Mussel individuals are expected to continue to spawn and recruit new individuals into the population; however, the level of successful recruitment to the adult stage is unknown.

CUMULATIVE EFFECTS

Potential cumulative effects are those effects likely to result from reasonably foreseeable future private, tribal, local, or State actions not involving federal participation. ODOT/FHWA is unaware of any tribal, local, or State actions (not involving federal participation) that are currently ongoing or planned in the Action Area. However, it is reasonable to assume that ongoing or future potential actions will affect mussels in Big Darby Creek. This includes private farming activities supplying nutrients and sediments into the watershed, chemical and de-icing applications used on the interstate, State, and local road networks and storm-water runoff from impervious surfaces surrounding the watershed.

We are not aware of any other State, tribal or local actions to include under Cumulative Effects.

VI. CONCLUSION

After reviewing the current status of the aforementioned mussel species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the northern riffleshell, clubshell, rayed bean, rabbitsfoot or snuffbox mussels. *No critical habitat will be affected by the project. Therefore, the project will not result in adverse modification of critical habitat.*

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulations 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 conduct. 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 or sheltering. Incidental take is defined as take that is 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), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act 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 ODOT, so that they become binding conditions of any grant, permit, or contract, as appropriate, for the exemption in section 7(o)(2) to apply. ODOT has a continuing duty to regulate the activity covered by this Incidental Take

Statement. If ODOT fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, ODOT 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 (1)(3)].

Amount or Extent of Take Anticipated

The Service expects that **66,646 ft²** of habitat for the clubshell, rayed bean, northern riffleshell, rabbitsfoot and snuffbox could be directly impacted as a result of this proposed action. The **66,646 ft²** of habitat is estimated to be impacted as a result of direct physical impacts and the placement of workpads below the OHWM. The Service believes that take of these species is estimated to be **60** northern riffleshells, **36** snuffbox, **57** clubshell, **3** rabbitsfoot and **3** rayed bean mussels and will cover any potential incidental take that may occur as a result of this proposed action.

In the "Analyses for Effects of the Action" section above, the Service determined that the proposed action would result in incidental take through (a) harm from construction that will likely result in (1) physical harm (i.e., cracked shell, bruising) to mussels that were not included in the relocation, (2) negative effects of sedimentation that could entomb, starve, and/or suffocate individuals, (3) loss and/or degradation of habitat, (4) harassment due to salvage and relocation efforts, and (5) disruption of host fish availability at key times during the reproductive cycle; and (b) harassment as a result of disruption in reproductive capabilities by, but not limited to, the spontaneous abortion of glochidia during relocation and/or monitoring efforts, individuals being dislodged downriver into unsuitable habitat, and potentially low dissolved oxygen levels.

Effect of the Take

In the accompanying BO, the Service determined that, based on the proposed project and the conservation measures described within, this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of clubshell, northern riffleshell, rabbitsfoot, rayed bean, and snuffbox. These measures are nondiscretionary:

1. ODOT will ensure that the proposed project components (e.g., mussel salvage and relocation, workpad placement, etc.) will occur as planned and as documented in the BA and the project plans.

2. ODOT will incorporate sediment and erosion controls in accordance with ODOT's Construction and Materials Specifications (2010), which conform to Ohio Environmental Protection Agency's (EPA's) National Pollutant Elimination Discharge System (NPDES) requirements for construction storm water management.

3. ODOT will ensure that one or more federally permitted mussel surveyors will undertake and carry out a mussel salvage and relocation effort the field season prior to construction and in accordance with ODNR and COFO's most recent version of the Ohio Mussel Survey Protocols.

4. In addition, a salvage and relocation work plan proposal must be submitted to the Service by the

permitted surveyor for approval prior to the salvage and relocation.

5. ODOT will use appropriate seeding and employ a re-vegetation plan that will take place after completion of construction and removal of temporary work pads.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the Act, ODOT 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. The project shall comply with all the lawful requirements of municipalities, counties, or other local agencies regarding the discharge of storm-water from construction activities. Reduction in storm-water runoff will limit the potential of sedimentation which could impact mussels.

2. Inspect all disturbed areas and areas used for storage of materials that are exposed to precipitation for evidence of or the potential for pollutants entering the drainage system in accordance with ODOT's Construction and Materials Specifications (2010), which conform to Ohio EPA's NPDES requirements for construction storm-water management. **Inspections should be conducted weekly and continue until vegetation has been established.** This will reduce possible impacts to mussels from pollutants and reduction in water quality.

3. During all mussel survey work, surveyors must return federally listed mussels to the substrate by hand, placing them on their side and allowing them to burrow on their own.

4. Any federally listed mussels found during the salvage and relocation must be recorded and tagged before relocation. (Any mussel found that was previously tagged as a result of the Allegheny translocation, should be recorded as: "Previously tagged from Allegheny translocation" also noting the coordinates of where it was found.)

5. All disturbed riparian areas should be mulched and vegetated with native plant species incorporating an appropriate prairie/riparian seed mix with the inclusion of riparian trees or shrubs to encourage establishment of beneficial vegetative cover and to decrease future erosion.

Please note: Upon locating a dead, injured, or sick individual of a federally listed species, notification must be made to COFO at (614) 416-8993. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury. Preservation of such specimens should be done in ethanol. The Service will advise ODOT if the specimens must be retained or if an alternative means of disposition is required.

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. ODOT 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.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use 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 carry out recovery plans, or to develop information.

1. Provide educational and outreach materials to local agencies and the public regarding the importance of stream health and implementation of BMPs to reduce pollutant runoff from neighboring yards, interstates, highways, roads and agricultural fields.

2. Create a bridge under crossing passageway for deer and other terrestrial wildlife.

3. Monitor under crossing for usage and to gain strategies for future application within the State.

4. Provide roadside signage highlighting prairie seed mix planting and the benefits for native pollinators and long term stream health.

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.

REINITIATION NOTICE

This concludes formal consultation with the ODOT on the proposed project discussed in this BO occurring in Franklin County, Ohio. As provided in 50 CFR §402.16, the 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.

For this BO, the incidental take would be exceeded when the take exceeds **60** northern riffleshells, **36** snuffbox, **57** clubshell, **3** rabbitsfoot or **3** rayed bean mussels, and/or habitat impacts exceed **66,646 ft^2** within the action area, which is what has been exempted from the prohibitions of section 9 by this BO.

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